MINISTRY OF ENERGY
REPUBLIC OF KENYA

ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT REPORT FOR THE PROPOSED KIPSING MINI-GRID

PROJECT:
KENYA OFF-GRID SOLAR ACCESS PROJECT

LOCATION :

KIPSING VILLAGE, OLDONYIRO WARD, ISIOLO NORTH SUB-COUNTY

2023

CERTIFICATION

This ESIA project report for the proposed Kipsing 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 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. Further, it reflects the views provided by various stakeholders and village elders at Kipsing, Isiolo county.

Name and Address of Firm of Experts:

Norken International Ltd ENGINEERING AND MANAGEMENT CONSULTANTS P. O. Box 9882 - 00100 Nairobi, Kenya Tel. +254 020 2248762 Registration No. of Firm of Experts: 0181	CENTRIC AFRICA LTD P.O. Box 102081-00101 Nairobi, Kenya Tel. +254 718 068 517 Registration No. of Firm of Experts: 7112

Name and Address of Firm of Experts:

Signed: _____ Date: _____
Isaiah B. Kegora
Lead EIA/EA Expert (NEMA Reg. No 1893)
For: Norken International Ltd & Centric Africa Ltd

Name and Address of the Proponent:
Mr. Rodney I. Sultani
Project Coordinator, KOSAP
Ministry of Energy,
P.O. Box 30582-00100,
Kawi House, Nairobi, Kenya

Signed: _____ Date: _____

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.

ACKNOWLEDGEMENT

The ESIA/Audit Experts are grateful to the project proponent for commissioning this Environmental and Social Impact Assessment. We would like to acknowledge with great appreciation Kipsing community members and leaders who were involved in the public participation and consultation process, for their co-operation throughout the exercise. I further acknowledge the support, either direct or indirect, from the various parties who assisted the ESIA/EA experts' team towards the successful completion of this ESIA report. They include environmental experts from the Centric and Norken consortium. Finally, the consultant wishes to acknowledge and appreciate the efforts and inputs by MoE, the Implementing Agencies (KP and REREC), and the World Bank Group teams in reviewing this report.

Table of Contents

LIST OF TABLES

LIST OF FIGURES

LIST OF PLATES

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
KP	Kenya Power
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 Isiolo County, one of the target counties, the Proponent is proposing to develop 9 No. mini grid facilities including Kipsing 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 Kipsing 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 Kipsing 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 Kipsing Sub-location, Isiolo County, exhibits a semi-arid climate with irregular rainfall patterns and scarce natural resources. Water scarcity poses a significant challenge, affecting both the local population and livestock. The vegetation predominantly comprises drought-tolerant shrubs, thorny bushes, and arid-adapted grasses. Overgrazing and deforestation have resulted in land degradation and soil erosion, further exacerbating the environmental issues. Agricultural practices face hurdles due to limited fertile soils and inadequate irrigation infrastructure. The region is also prone to natural hazards like flash floods and sandstorms.

The topography of the project area is diverse, featuring vast plains, scattered low-lying hills, and occasional rocky outcrops. It is part of a semi-arid landscape with undulating terrain. The flat plains offer space for livestock grazing, while the hills provide some relief and shelter. However, the irregular topography poses challenges to agriculture and water management, influencing water runoff and drainage patterns. Overall, the project site is relatively flat.

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 Kipsing Mini Grid project aims to provide electricity to approximately 327 residential and 7 nonresidential consumers in Kipsing Village at Kipsing Sub-location, Isiolo County. The project will utilize solar photovoltaic panels, a Battery Energy Storage System, and a Diesel Generator to generate electricity.

A Low Voltage Power Distribution Network will be established to distribute the power to customers. The project utilizes solar panels with a total capacity of 100 kWp to harness solar energy. Solar power is a clean and renewable energy source that will provide a significant portion of the electricity needed for the project. A 250 kWh Battery Energy Storage System is incorporated to store excess solar energy during the day, ensuring a consistent power supply even during cloudy or nighttime conditions. A 60 kVA diesel generator is included to serve as a backup power source for periods of low solar generation or in case of battery depletion. It provides reliability and backup in the event of extended periods of cloudy weather or high demand. A 2,000-liter fuel tank is provided to store diesel fuel for the generator, ensuring continuous operation during extended periods of low solar or high demand. Additionally, PV Inverter: A 100 kW solar PV inverter is used to convert the direct current (DC) electricity generated by the solar panels into alternating current (AC) electricity suitable for consumer use.

The estimated cost of the project is around USD 445,449.68 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 Kipsing Mini Grid approximately1.2702 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 Kipsing 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 (REREC). 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 February 2, 2022, a total of 55 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;

a) Will the power from the minigrid be extended/Distributed to the neighboring village?
b) Will the contractor source labour and construction materials from the community?

The project tream gave the following responses.

a) The minigrid is limited to a radius of 1.5km but other altenative solution of providing portable solar systems at an affordable price to those beyond the minigrid coverage.
b) Consultant assured the community that the contractor will source unskilled and semi skilled labour from the community where need be as its required by the law.
c) Where possible readily available materials will be sourced from the community organization or enterprises to promote local economic growth and development of the area

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 0-2 to 0-5 below present summaries of anticipated impacts and their corresponding levels of significance, both pre- and post-mitigation.

Table 0-1: 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 0-2: 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
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

Impact	Pre-construction	Construction phase	Decommissioning phase
Exclusion of VMGs, Vulnerable individuals and households	Not Applicable	Major	Major
Risk of communicable diseases	Not Applicable	Minor	Minor
Increased water demand		Negligible	Negligible
Forced labor		Minor	Negligible

Table 0-3: 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

Impact	Significance Of Impact (Pre-Mitigation)	Residual Impacts (Post-Mitigation)
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
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 PAPs	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 REREC 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, Samburu, Turkana, Marsabit, West Pokot, Isiolo, 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 Isiolo 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).

Isiolo 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 (KP) and the Rural Electrification and Renewable Energy Corporation (REREC).

1.2 PROJECT JUSTIFICATION

The Kenya Off Grid Solar Access Project (KOSAP) intends to support the Government initiative of ensuring increased electricity access to Kenyans, particularly among the low- income groups in off- grid areas. This proposed project is in line with the commitment of the Government of Kenya to reach 100% electricity access by 2023 through grid extension, stand-alone individual plant and autonomous solar mini- grids to electrify areas that are not economically feasible through national grid extension. The Kipsing site was proposed as part of this project due to its isolated nature and the high cost of grid extension to the area.

1.3 PROJECT OVERVIEW

The Project Site is located in Kipsing village at Oldonyiro ward- Isiolo County at latitude 0°36'06.0768"S and longitude 37°14'36.7296"E. The proposed solar mini grid will be located on a 1.2702ha piece of land beside Chief's office. The land land is set aside for public use. The mini grid will comprise Solar panels, batteries, inertors, perimeter fence. Distribution line will cover a radius of approximately 1.5 km. The project is expected to serve 334 consumers of which 327 are residential and 8 are non residential. The non residential consumers include shops, schools and places of worship.

1.4 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 and Monitoring Plan (ESMMP) 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 Environmetal and Social Operational Policies) along with applicable national, and local regulations.

1.5 ESIA METHODOLOGY

1.5.1 Justification for the ESIA

The approach chosen in undertaking this study was careful to consider EMCA, 1999, and its 2015 Amendment requirements, as well as the Environmental Impact Assessment and Audit Regulations, 2003. It involved largely an understanding of the project background, the preliminary designs and the implementation plan. The approach and methodology applied during the study enabled collection of both primary and secondary data. Qualitative and quantitative methods of data collection were employed. Secondary data was obtained through literature reviews while primary data was obtained through physical observations, photography, check lists, interviews and stakeholders' consultation.

1.5.2 Key activities undertaken during the study included the following:

- Physical inspections of the proposed project area
- Literature review of relevant documents
- Stakeholder consultations with different stakeholders and project affected persons and PAPs
- Gathering environmental and socio-economic data of the area by use of check list
- Continuous discussions with the stakeholders and accessing other sources of information on the proposed project details, the site planning and implementation plan,
- Photography, and interviews with people in the immediate neighbourhood.
- Evaluation of the activities around the site and the environmental setting of the wider area.

- Report writing and submission.

The initial stages of this assessment was project are discussed below screening. Screening of the project sought to ascertain whether or not this project falls within a category that requires ESIA prior to commencement. Other considerations made during this stage included a preliminary assessment of the environmental sensitivity of the proposed project area/site. This screening indicated that the proposed solar Mini-grid is among the listed projects under Schedule 2 of EMCA, 1999 thus requires an ESIA study.

Project scoping was the next stage which was done to delineate project issues that required detailed analysis. This step involved collection of primary and secondary data through field visits and literature review respectively.

1.5.3 Kick-off Meeting

The Consultant 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. 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.

1.5.4 Screening and Scoping

Evaluation of ESIA procedure has been undertaken as a fundamental procedure to implementation of the solar power mini-grid 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.

1.5.5 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 (PAD) and the four main safeguard framework documents prepared under KOSAP- these are Social Assessment (SA), Vulnerable and Marginalized Group Framework (VMGF), Resettlement Policy Framework (RPF) and the Environmental and Social Management Framework (ESMF).
Other documents that were reviewed included Isiolo County Integrated Development Plan 2018-2022, various Kenyan legal legislations, World Bank safeguard policies, topographical maps, google earth/maps, and Kenyan government publications among others.

1.5.6 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.

1.5.7 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 Isiolo County and at the mini-grid site level. This was be 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. Interviews, discussions, photography, observations and check lists are some of the methods employed in gathering the data.

1.5.8 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 single mothers, child-headed households. The VMG's include ethnic minority communities that are present in Kipsing.

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.

1.5.9 Public Consultations

Section 17 of the Environmental (Impact Assessment and Audit) Regulations of 2003, requires that all ESIA Studies undertake Public Consultation (PC) as part of the study. The aim of the PC is to ensure that all stakeholders interested in a proposed project such as project PAPs, government officers and the general public in the vicinity of the proposed project be identified and their opinion considered during project planning, design, construction, operation and decommissioning phases. Consequently, public consultations were carried out in the project area in a bid to inform the public and other interested parties on the proposed project and obtain their views on the same. The consultations also presented an opportunity for the community to raise issues and concerns pertaining to the project.

Owing to the different categories of the stakeholders, the ESIA team opted to employ various methods in engaging them. The methods included; face to face discussions for the government officers and key stakeholders, focused group discussions with the men, women and youth and a public baraza/meeting for the community members.

1.5.9.1 Stakeholder Identification and Mapping

Stakeholder engagement and participation was carried out at different levels and with different stakeholders. Stakeholder's identification and mapping was done based on the following criteria that is project affected persons and interested parties. The stakeholders include;

- PAPs of the proposed project who largely are the community members living within 3km radius of the proposed project

- Interested parties include
    - County government of Isiolo various department including the office of the governor, land and environment, survey and public administration such as ward and village administrators. In addition is the county commissioner and officers under his administration such as chiefs.
    - Members of parliament and members of county assembly

1.5.9.2 Mobilization for the Community Meeting

Prior to the community engagement meetings, a two weeks' notice was done/issued to inform the community members of the meeting. This was done by the county renewable energy officer (CREO). The officer called the Chief of the area where the meeting was to take place and requested him to inform the people of the meeting in regard to KOSAP community engagement forums. The chief then informed the people about the meeting through announcement by word of mouth assisted by the village elders in Kipsing village.

1.5.9.3 Public Forum/Meeting

The project team undertook community engagement forums with the target PAPs and the communities where the solar Mini-grids will be set. The main objective was to explain the project details including need for land identification and solicit broad community support and acceptability of the project. One open meeting with all the community members was held. The (KOSAP team) explained to the community members about the project and other related information as discussed in the minutes. The meeting was then opened up for a plenary session.

Community engagement proceedings and resolutions are presented in form of minutes taken/written during the meetings. The meeting was well attended by all people including men, women, youth and persons with special needs.

1.5.9.4 Focus Group Discussions

After the meetings the community members were told of the need to have focus group discussions to discuss the project further and allow the different groups more opportunities to ask questions or give suggestions regarding the project. Therefore, three separate meetings for men, women and youth. In these meetings the message on the project was echoed again especially on benefits and impacts (both positive and Negative) of the project to the community, rights of the community and the need to have a grievance redress mechanism and committee with representation from all groups in the community.

1.5.9.5 Key Informant Interviews

Key Informants were identified both at the county and locational levels and they were interviewed to obtain baseline information in regard to the proposed project. The key informants interviewed represented the health sector, education sector, Community Based Organization and traders.

1.5.9.6 Stakeholder Engagement Schedule

The ESIA team identified four categories of stakeholders namely; government officials, opinion leaders at local level, elders and the general community. Stakeholder engagement began early in the planning phases of the project. The stakeholder consultations were undertaken on the 31ST January 2022. During these meetings,

project information in terms of preliminary design, positive impacts, negative impacts, mitigation measures among others were discussed with various stakeholders. The stakeholders gave their views in to the project.

Interactive approach was adopted for the immediate neighbourhood in discussing relevant information key among them being;

- Land use aspects,
- Neighbourhood issues,
- Project acceptability,
- Social, cultural and economic aspects,
- Environmental Impacts
  - Physical impacts,
  - Biological impacts,
  - Legal Compliance.

1.5.10 Environmental and Social Management and Monitoring Plan (ESMMP)

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

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

Additionally, the ESMMP has a component on contracting management that will ensure the implementation of the ESMMP by all contractors and subcontractors. A contracting mechanism is included in the ESMMP to incentivize contractors and their subcontractors to comply with the ESMMP or alternatively penalize them for failure to

comply with the ESMMP. 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 ESMMP also have a budget to guide the contractor on resources required for the implementation and monitoring of the ESMMP.

Figure 1-1 is a summary of the methodology the consultant adopted in undertaking environmental and social impacts assessment for the proposed Kipsing ESIA project.

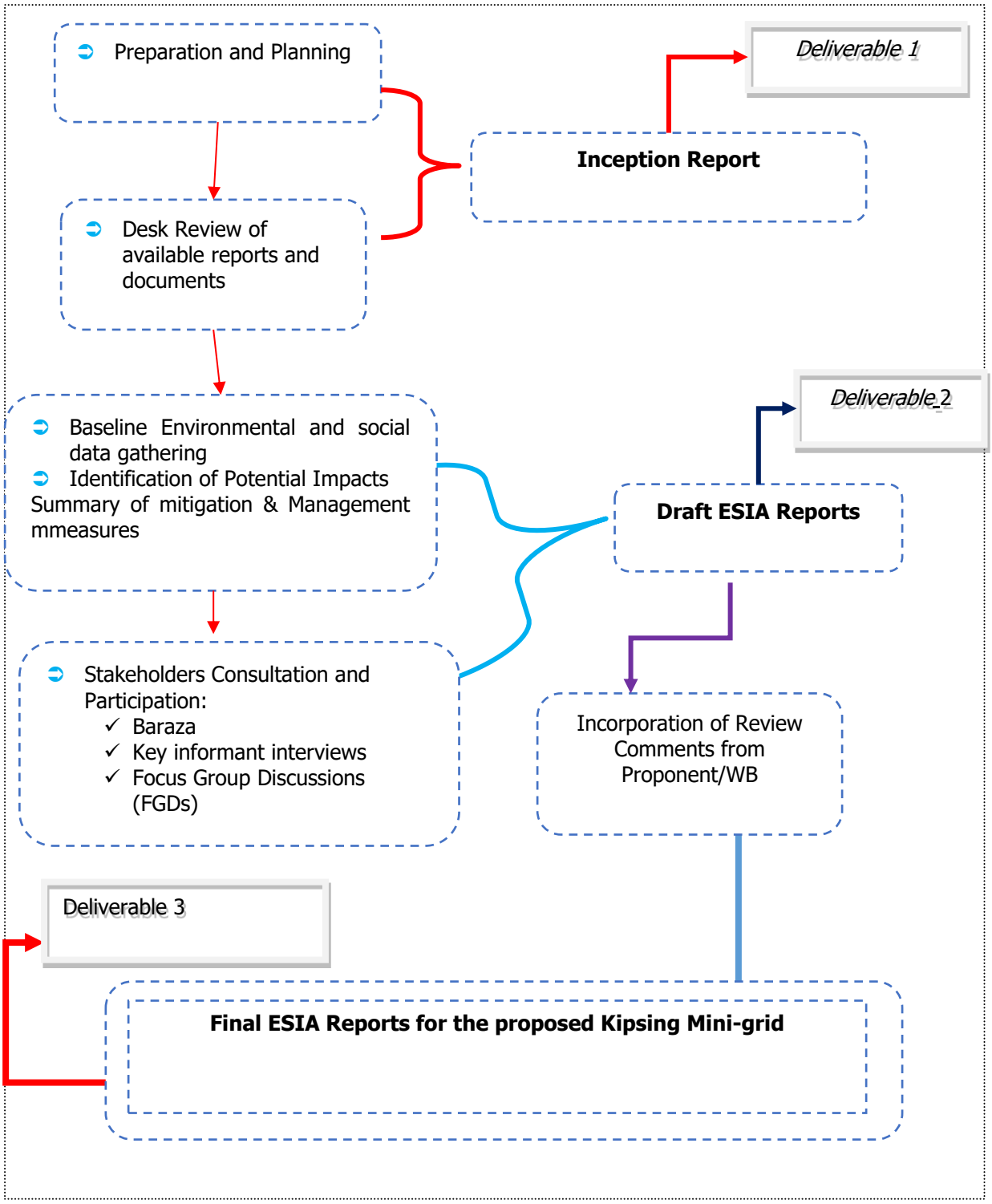


Figure 1-1: *Summary of Environmental and Social Impact Assessment Methodology*

1.7 LAYOUT OF THE REPORT

Table 1-1 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	Baseline Setting-Physical and Socio-Economic Environment	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 and Monitoring Plan	Outline of the ESMMP 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.
Section 9	References	List of references

1.8 STUDY TEAM

This ESIA process was conducted by a team of experts that comprised the following professionals:

Team - 04/02/2022 - progressed the ESIA study.

S/No	Names	Position
1	Irene Mate	Senior Environmentalist - REREC
2	Abdi Osman	County Renewable Energy Officer- Isiolo County
3	Loise Kioko	Norken International Limited /Centric Africa Limited-EIA/EA Expert
4	Lydia Komen	Norken International Limited /Centric Africa Limited-EIA/EA Expert

5	Martin Gitonga	Norken International Limited /Centric Africa Limited-EIA/EA Expert
6	Japheth Bor	Norken International Limited /Centric Africa Limited-EIA/EA Expert

1.9 STUDY LIMITATIONS

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.
- ✓ Limited information on some environmental aspects e.g. acquifers, rivers etc.
- ✓ Communication barrier with the community i.e. some people do not understand Swahili or English. This was mitigated by use of a translator.

2 PROJECT DESCRIPTION AND ALTERNATIVES

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 2-1 below provides a summary of the pertinent information of the proposed Kipsing solar mini grid;

Table 2-1: Summary Information of the proposed Kipsing Solar Mini-grid

S. NO.	PARTICULARS	DESCRIPTION
1.	Project location	The project is located in Kipsing village at Olonyiro Ward in Isiolo County. The proposed solar mini grid will be located on a 1.2702ha piece of land next to Kipsing chief's office. The solar mini grid will contain Solar panels, batteries, invertors, perimeter fence and length of distribution line to cover a radius of approximately 1.5 km.
2.	Proponent	Ministry of Energy
3.	Administrative location	Kipsing sub-location, Kipsing location, Oldonyiro Ward, Isiolo North Sub-county and Isiolo County
4.	Climatic condition	The county is hot and dry in most months in the year with two rainy seasons. The short rain season occurs between October and December with the peak in November while the long rain occurs between March and May with the peak in April. The higher ground areas near Mount Kenya and Nyambene Hills (Bulla Pesa, Burat and Kinna wards) receive between 500-670mm of rainfall per year. The drier eastern and northern part of the county receive less than 300mm. High temperatures are recorded in the county throughout the year, with variations in some places due to differences in altitude. The mean annual temperature in the county is 29°C. The county records more than nine hours of sunshine per day.
5.	Average Elevation	853 ft
6.	Site Conditions	The site is generally in open area with minimal fauna and flora.
7.	Road Accessibility	Earth road.
8.	River/canal/nallah/ pond present in project	None.

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

2.2 PROJECT LOCATION

The project site is located in Kipsing village Kipsing location, Oldonyiro Ward , Isiolo North sub-county in Isiolo County at 0°36'06.0768"N and longitude 37°14'36.7296"E. The proposed power MG will be constructed on approximately 1.2702 hectares of land on a community land set aside for public use. The proposed project is situated about 800 m from Kipsing primary school and 40 km from Isiolo town.

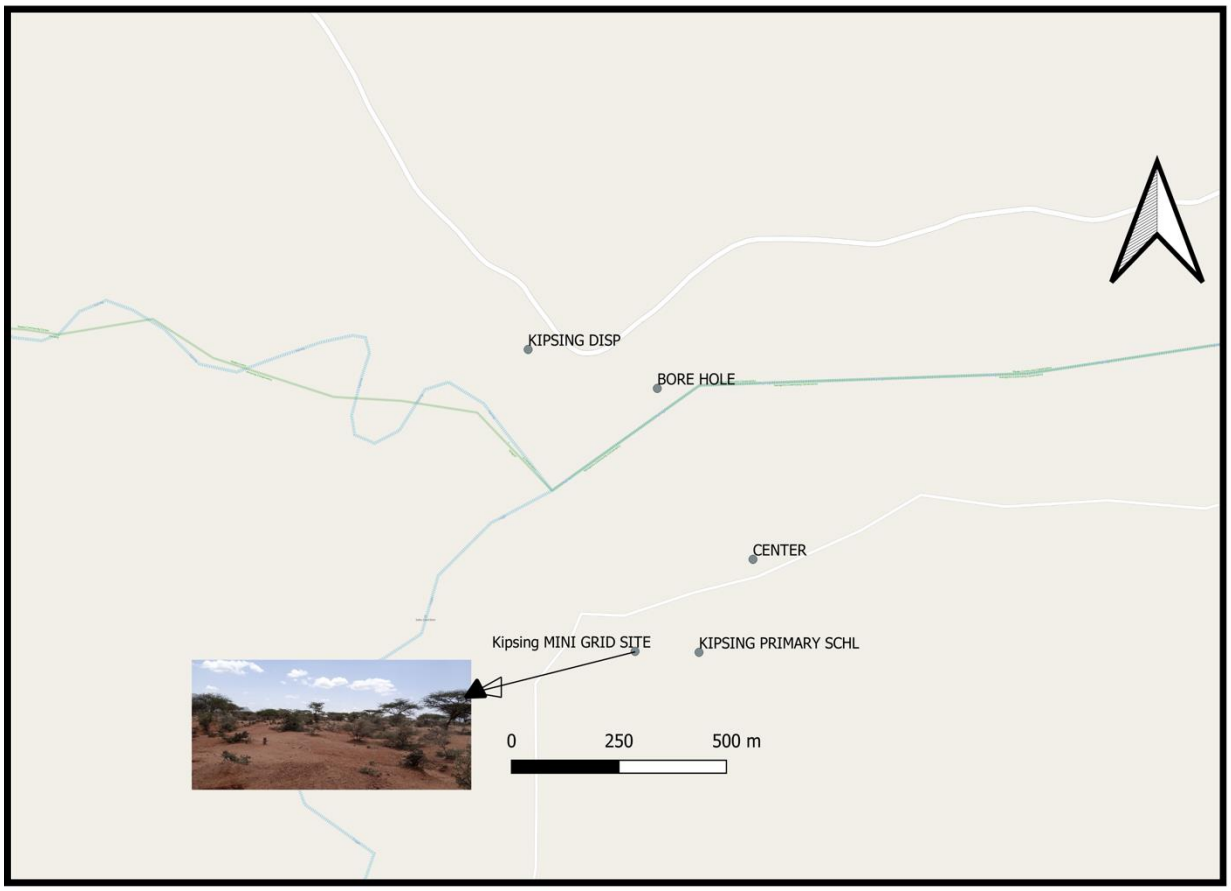


Figure 2-1: Project Location

2.3 DESCRIPTION OF PROJECT FACILITIES, COMPONENTS AND ACTIVITIES

2.3.1 Description of the Proposed Solar Mini-grid

This hybrid power generation site is projected to generate 100 (kWp) and is meant to serve between 300-500 households (customers). The proposed mini-grid installations

will be built to comply the International Electro technical Commission (IEC) standards. It will have an installation of solar panels of with a capacity of 100 (kWp) and battery house with 250kWh. The solar panels will have a connection to the batteries through underground cables.

This generator will be a capacity of 60 kVA capacity with a fuel tank of 2000ltrs capacity To optimize this hybrid system the HOMER software will be used. The goal of the hybridization of diesel systems is to reduce fuel consumption by switching off diesel generator set(s) for several hours a day, in order to reach a PV energy, share in the final mix of at least 60% or more. The power will be distributed to the customers by overhead lines. The project site is expected to serve clients within a radius of 1.5km from the site (generation source).

The PV plant and the battery capacity have been sized accordingly to the daily demand and the solar resources. In addition to this Design architecture, the project site shall have a site office that shall also have a Control Room adjacent as well as a guard house. The guard house shall be constructed using concrete and masonry works whereas the control room and office can also be a containerized facility.
The Solar PV hybrid system is based on a centralized photovoltaic plant connected to a 3-phase 415V AC busbar line, where the multi-mode battery inverter and the diesel generator are also connected.

The plant is configured such that a significant portion of daytime loads is fed directly from the solar generator (grid-tie inverter) without intermediate battery storage usage. The solar PV power plant is also equipped with a Diesel Generator, which is normally used as reserve power. The diesel generator switches on automatically whenever the battery state of charge reaches a certain defined DOD (Depth of Discharge). The diesel generator is equipped with automatic startup function controlled by the battery inverter charger. The table 2 below illustrates the preliminary data for the mini-grid in Kipsing.

Table 2: The preliminary Data for Kipsing Solar Mini-grid

Name	Residential	Nonresidential	Circuit (km)	Peak demand (kw)	Daily demand (KW)	Monthly demand (kWh)	PV(DC-KWp)	Gen set fuel Tank	Batteries	Generator (kva)	Cost (USD
Kipsing	327	7	11.95	58	311	9340	100	2000	250	60	445,449.68

Key Components of the Project:

Power Generation Sources:

a) Low Voltage Power Distribution Network:

A kilometer Low Voltage (LV) power distribution network is established to distribute the generated electricity to the residential and nonresidential consumers. The LV network is designed to efficiently transmit power while minimizing losses, ensuring a stable supply to the customers.

b) **Monthly Energy Demand:** The project is expected to meet a total monthly energy demand of 9340 kWh.

c) **Daily Energy Demand:** The average daily energy demand is approximately 311 kWh, ensuring a consistent supply for the consumers.

d) **Peak Demand:** The peak demand of the system is 58 kW, which is the maximum power requirement during any given moment.

e) **PV Capacity**: The solar photovoltaic panels have a total capacity of 100 kWp.

f) **Battery Capacity**: The Battery Energy Storage System has a capacity of 250 kWh, providing energy storage and ensuring a continuous power supply.

g) **Generator Capacity**: The diesel generator has a capacity of 60 kVA, serving as a backup power source.

h) **LV Network Length**: The low voltage distribution network spans a length of 11.95 kilometers, connecting consumers to the power source.

i) **Estimated Project Cost**:

The estimated cost of the Kipsing Mini Grid project is approximately USD 445,449.68 It's important to note that this cost may be subject to change as more detailed plans and implementation phases are developed. The investment is expected to provide long-term benefits to the local community, improving their quality of life, economic opportunities, and access to modern amenities.

2.3.2 Nature of the Project

The proposed project will be having two components in one that is a Hybrid Mini-Grids (PV- and Diesel) and construction of Power line reticulation lines. The following sections are explanations for each of the components that will be implemented.

2.3.2.1 PV Hybrid Mini-Grid Sizing

The power system has been sized based on the energy parameters. These are:

- The proposed Residential & Non-Residential Users available
- The PV Capacity in kilo Watt peak.
- The storage battery Capacity
- The Inverter capacity in (kW)

The system will be modular, so that it can be upgraded easily to meet future demand needs. The proposed power plant will be configured as AC coupled due to the

significant portion of daytime loads that can be fed directly from the solar PV generator without intermediate battery storage. This will include:

- PV modules with PV inverters,
- Diesel Genset,
- Deep-cycle lead-acid electrochemical batteries with liquid electrolyte (largely used in off-grid applications thanks to its well proven technology at baseline costs compared with other types of batteries).

The proponent will be required to apply for a NEMA ESIA variation of the license, during the design changes over the project lifespan.

2.3.2.2 Solar PV modules

The project will use PV Array (DC-kW)- 100 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.

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.

2.3.2.3 Powerhouse

The Battery, Multi-mode inverter and all monitoring equipment will be installed indoors with adequate air ventilation accordingly to the manufacturer's recommendations. Thus, a powerhouse or a containerized solution, considering the equipment manufacturer's recommendations shall be installed. All electrical boards and LV protections will also be installed indoors. The batteries will be installed in the powerhouse in a separate room, specifically for their use and meeting the electrical safety requirements according to its voltage class.

2.3.2.4 Battery

The battery considered is lead-acid, deep discharge type with a permissible repeated deep discharge without damage. Automotive or starting type batteries are not acceptable. It shall be of the open "vented" OPzS type with recombination caps and transparent enclosure for easy inspection of electrolyte level.

OPzS stands for:

O = Ortsfest (stationary)

Pz = PanZerplatte (tubular plate)

S = Flüssig (flooded).

Other batteries can be considered:

1. OPzV type, "gel" lead-acid batteries are "maintenance less" but the unit weight is higher and the lifetime is sensitive to high temperatures.
2. Li-ion batteries, have longer lifetime, are lighter and smaller. But they have a higher investment cost and are not adapted to high air temperature so that an additional active cooling system is needed.

The batteries must be manufactured according DIN 40736-1: "Stationary batteries with tubular positive plates. Capacities, measurements and weights". The battery array will have 12 batteries.

2.3.2.4.1 Battery Rating

The battery nominal voltage does not need to be established at this stage and different technology providers may offer different solutions on this issue. Nevertheless, it must be noted that the voltage class, either ELV or LV, will determine the electrical isolation and accessibility requirements of the battery room. The battery shall have at least the rated capacity of 2.16V at the C10 discharge rate according to DIN 43539-9.

2.3.2.4.2 Battery Performance

The battery shall have a self-discharge when new of less than 5% per month (at 25°C and fully charged) of its rated capacity and shall have a Coulombic efficiency of at least 85% and energy conversion efficiency of at least 85% when new and charged to more than 50% of capacity. The battery cycle life for discharge/charge regular cycles down to 80% DOD shall be more than 1500 cycles (According to IEC 896-1).

2.3.2.4.3 Lifetime

The design lifetime of the batteries shall be of at least 8 years without losing more than 10% of the rated C10 capacity. When the batteries get damaged, they will be stored separately at the site and then transported to Nairobi for proper disposal.

2.3.2.4.4 Battery Cabling and Protections

The battery connection point shall be as close as possible to the Multi-mode Inverter. Cables used to connect the battery shall have a temperature rating higher than 20°C above ambient temperature. It is recommended that they be flexible (multithreaded) to allow for easy installation and maintenance. Fuses in cables that connect components to the battery shall be rated for D.C. use, be installed separately as close as possible to the battery terminals and rated to interrupt high fault currents from the battery. A neutralization kit will be provided at the site to manage any battery acid spills that may occur.

2.3.2.5 Multi-Mode Inverters

Inverters and Chargers:

PV Inverter: A 100 kW solar PV inverter is used to convert the direct current (DC) electricity generated by the solar panels into alternating current (AC) electricity suitable for consumer use.

Battery Inverter Charger: A 60 kW battery inverter charger is employed to manage the energy flow to and from the battery storage system. It ensures efficient charging and discharging of the battery, maximizing the system's overall performance.

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.

2.3.2.6 Cable Requirements

The cables used in the site shall fulfil these requirements:

- ✓ The cables shall be suitable for laying on racks, in ducts, trenches, trestles, conduits and under-ground buried installation with chances of flooding by water.
- ✓ All cables of module area if laid on cable trays shall be covered. If cables are to be laid underground, laying shall be as per latest relevant code.
- ✓ Cables with Copper conductor on DC side & that with aluminum conductor in AC side to be used as power cables shall have tensile strength as per relevant standards. Conductors shall be stranded.
- ✓ Cables with XLPE insulation, PVC sheathed & armored suitable for a continuous conductor temperature of 90^0C and short circuit conductor temperature of 250^0C shall be used.
- ✓ PVC insulation shall be suitable for continuous conductor temperature of 70^0C and short circuit conductor temperature of 160^0C.
- ✓ Only terminal cable joints shall be accepted. No cable joints to join two cable ends shall be accepted.
- ✓ Cables inside the control room shall be laid in suitable Cable Trays of approved type.
- ✓ Cable terminations for LT cables shall be made with suitable cable lugs & sockets etc. crimped properly and passed through brass compression type cable glands at the entry and exit point of the cubicles.
- ✓ The panels' bottoms shall be properly sealed to prevent entry of snakes / lizard etc. inside the panel.
- ✓ The terminal end of cables and wires are to be fitted with good quality letter and number ferrules of proper sizes so that the cables can be identified easily.

2.3.2.7 Diesel Genset

The Diesel Generator Set shall have a capacity as per KP requirements/specifications. It should include a highly corrosion resistant enclosure, control panel and monitoring, fuel tank and circuit breaker protections. The Diesel Genset shall be suitable for indoor or outdoor installation and shall perform accordingly with Multi-mode Inverter and the mentioned architecture model. The Diesel Genset shall be working in a fully automatic manner with the above stated components. The diesel gensets will have base mounted fuel tanks that will be factory tested for leaks. There will also be an external reserve fuel tank with a capacity of not less than 500 litres. The proponent, through the operating entity will have regular inspection by the manufacturer. The noise rating for the generator set will be 75dBA @ 1 meter at 75% load under free field conditions. The generator sets will have a high-quality noise absorbent and fire-retardant grade acoustic insulation material complying to IS 8183.

2.3.2.8 Distribution lines

The mini-grid will have a distribution line circuit of 11.95 km in total. Electricity distribution from the generation plant to the end consumers will be done by means of a distribution line formed by low voltage (LV) line. The site is infested by termites that would eat wooden distribution lines and concrete pole are recommended. Supply of concrete poles 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 the necessary line accessories and earthing will be as per requirements and specifications.

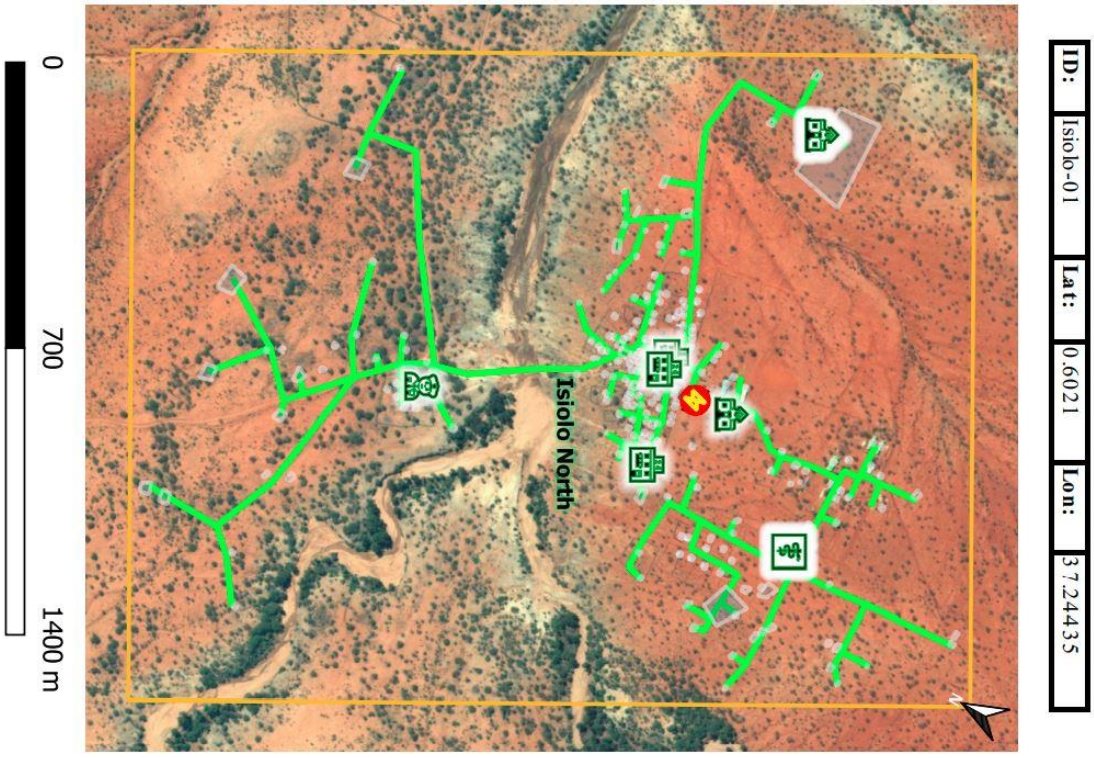


Figure 2: Kipsing Distribution Lines

2.3.2.9 Project Activities

The main activities during the pre-construction phase will be land acquisition for generation assets, wayleaves, contractor facilities and workers` camps. During the construction phase, there will be site clearance and leveling, civil works and construction of utilities and structures for the facilities, installation and connection of the power plant.

2.3.2.9.1 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.

2.3.2.10 Land Tenure

Kipsing site is a community land set aside for public use. Compulsory land acquisition will be done for the 1.2702 hectares that will be used for the generation assets, with compensation in kind for the land taken to the community. An abbreviated Resettlement Action Plan (A-RAP) outlining the principles and procedures for land acquisition and compensation is annexed to this ESIA. Is captured under baseline 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 registered and unregistered community land/group ranches.

2.3.2.11 Compensation Details

Compensation for the land taken will be in kind by doing a community project in health, education or water sector; the value of the project will be equivalent to the value of the land taken and informed by the National Lands Commission (NLC) Valuation criteria. In Kipsing, the community requestedthe proponent to construct chief's office and in addition equip the community borehole and connect water to community water kiosk.

2.4 RESOURCE REQUIREMENT

2.4.1 Workforce Requirement

The Solar Mini-grid will be installed, operated and maintained by the O&M contractor for the first seven years and then handed over to REREC engineers and operators. So, for the seven years REREC will be monitoring the operations of the contractor.

2.4.2 Water Requirement and Source

2.4.2.1 Construction Phase

Water will be required on a daily basis for civil works and for workers at the project site. However, the quantity of water required will vary depending on the duration of construction and the mobilisation of construction workers at site.

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.

As noted previously, approximately, employees (direct and contractual) will be working during operation phase. For this workforce, approximately 10,000 Litres storage water tank 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 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

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.

2.4.6 Electrical safety

The Contractor shall ensure that all safety equipment such as safety helmet, shoes, gumboots, dust respirator, hand gloves etc are available at the site and shall take adequate steps to ensure the proper use of the equipment at all times.

2.4.7 Access to the Site

It is proposed that the Kipsing Solar Mini-grid will have one access road, which will be designed according to KPLC's standards, taking into account the Ministry of Road's requirements. The Solar Mini-grid will be accessed via the existing Earth road. However, a proper access to the site and drainage will be constructed to safely access the site and to avoid flooding.

2.4.8 Fencing and Security

The site is in an area that is basically open and in close proximity to residential homes and a public facility. This calls for proper security measures to be put in place to protect both human and domestic animals from accessing the Solar Mini-grid site. Therefore, the Mini-grid will have a chain link fence to keep off the electrical installation away from access by unauthorized persons or animals. A gate will be constructed at the entrance to the site which will be locked at all times. The Mini-grid will be lit at night, and a photocell will be used to automatically switch on the lights at a set time each evening. The Mini-grid will also be guarded at all times by two security guards during the day and two guards at night.

2.4.9 Vegetation Undergrowth

Concrete will be used on surfaces where it is required leaving the rest of the areas covered with vegetation. Vegetation undergrowth will be managed by regular slashing and cleaning up of the site compound.

2.5 ANALYSIS OF ALTERNATIVES AND PROJECT JUSTIFICATION

Various alternatives available to the project are discussed. The identification and examination of alternatives is fundamental to environmental assessment. It provides decision-makers with information that enables them to properly consider optimal solutions to development proposals. Alternatives illustrate and contrast the environmental implications and consequences of different options available to achieve the same end.

2.5.1 Present Power Supply Position

According to the Isiolo County Integrated Development Plan (2018-2022), electricity connectivity at the county stands at 10.1% of households which is slightly common in male headed households at 12% as compared to the female headed households at 8%. More than half (71.7%) of households rely on firewood for cooking while 12.2% use charcoal, 7.7% use kerosene and 6.6% use liquefied petroleum gas (LPG). The county has potential for solar and wind energy which has not been exploited.
In Kipsing, majority of the households use firewood for cooking and portable solar solutions (including Sun-king and D-light) for lighting and mobile phone charging purposes. During the Focus Group Discussions with the men, women and youths, it was reported that they face challenges accessing power. The main challenge being lack of money to pay for accessible sources of power in the area.

2.5.2 Land identification criteria

Minigrid Sites under KOSAP were selected based on a number of factors.
1.Geophysical Factors-Proximity to Hills-Shade effect, Soil erosion, Drainage of the area, Flooding etc.
2. Land identified is free from any dispute on ownership or any other encumbrances
3.Proximity to public utilities-Schools, Dispensaries, Places of worship and community settlements
4. No squatters, encroachers or other claims to the land
5.The Size of the Minigrid to be constructed and the optimal coverage of a Minigrid in terms of the number of people to be reached.
6. The Land identified should be on spaces set aside for public use within the community centres.
The land was identified by the beneficiary communities and confirmed by technical staff to be suitable for the sub-project and free from any environmental or health risks. The impacts on the Community will be marginal and will not result in displacement of households or cause loss of household's incomes and livelihood.

The site identified was considered against the criteria highlighted above and was found suitable for Minigrid construction.

2.5.3 Alternative power distribution lines

The project requires the distribution of generated power into the settlement points within Kipsing through optimal access points, therefore all possible options for power distribution have been assessed.

The identified viable option for power distribution within Kipsing village for the solar mini-grid project is overhead distribution lines. Although other alternatives, such as underground lines and passing the power lines off established community public access routes, may have been considered, they are not feasible for this specific project due to technical and practical reasons. A mini-grid connection with enough capacity and material was recommended due to the anticipated increasing demand for connections.

This eliminates the need to overhaul the proposed mini-grid connection when the population increases in Kipsing.

Underground distribution lines involve the installation of power cables beneath the ground, typically in trenches or conduits. While this option may be visually appealing and minimize the impact on the environment, it presents challenges in terms of cost, maintenance, and accessibility. Excavation for underground lines can be difficult and costly in Kipsing village due to challenging terrain, and maintenance and repair of underground lines may require specialized equipment and labour. Additionally, accessing underground lines for routine maintenance, fault detection, and repairs can be challenging, especially in remote or inaccessible areas of the area. Furthermore, scalability and flexibility may be limited with underground lines, making future expansions or changes in power demand more complicated and costly.

Passing the power lines off established community public access routes may not be practical in Kipsing village due to community settlement patterns, existing infrastructure, and environmental considerations. Establishing new routes or modifying existing ones to accommodate power lines may require significant resources, land acquisition, and community consultations, which can be time-consuming and costly.

Additionally, the appropriateness of potential mini-grid site identified by the Proponent was also assessed in terms of various suitability criteria and technical restrictions as outlined below:

Parameter	Comment
Seismicity	According to the Seismic Distribution Map by WHO (2010), generally Isiolo county's seismic hazard is categorized as "Very Low". It is however recommended that the civil and structural infrastructure for the project should be designed in compliance with the national seismic regulation embedded within the Building Code
Land Use	The parcel of land earmarked for the project is community land with vegetative cover being natural trees and bushes. At present, the land is unutilized.
Terrain	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 leveling (cut and fill) for the construction of the solar mini-grid and increases the potential for environmental impacts during construction as well as operations i.e. steeper slopes have higher surface water flow rates and therefore higher erosive potential. The proposed site is slightly slopy and cost-effective during construction. The proposed site and distribution alignment does not exhibit significant slopes that may impact on the construction/installation activities.
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 there will be no impact to water sources through siltation.
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 installment of additional, costly foundation infrastructure. The site has sandy soil which drain more readily than other types of soils.

Flora and Fauna	The potential sites need to be assessed in terms of their ecological value at both a macro and micro sale i.e. within the site and the environment surrounding the site to ensure the protection of endemic and red data species and their habitat, should they be present. The proposed site is not of a high ecological value.
Visibility	Highly visible sites i.e. on a ridge / elevated terrain are considered less favorable 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 proposed site is on flat and may not create sharp visual impact because it is not on an elevated point.
Accessibility	The proposed site is accessible by existing public roads which will avoid the need for construction of new access roads. 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. As such 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.

Considering these technical and practical challenges, the identified option of overhead distribution lines along Kipsing access routes is the most feasible for the solar mini-grid project in Kipsing village. Overhead lines, which involve the installation of power cables on poles, are more cost-effective, easier to maintain, and provide greater flexibility for future expansion. Proper design, installation, and adherence to safety and environmental standards can ensure reliable and efficient power distribution to the consumers on the area, making overhead distribution.

2.5.4 Alternative Solar Mini Grid Site

The identification of site for the proposed Mini-grid involved site visits to the study area, preliminary site assessments and consultations among the concerned departments of County government of Isiolo, community, MOE and REREC.

The community as a primary stakeholder with help from the secondary stakeholders identified a piece of land on which the mini-grid would be set considering various suitability criteria and technical restrictions stipulated by REREC, 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, proposed site is 1.2702 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 watercourses 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 200m away from a close water resources and so no likely 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 minigrid site is on flat part near Kipsing primary school and may not create sharp visual impact because it is on a flat land.
- 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, its accessed via earth road connecting Kinna to Kipsing.
- Distance to site – it is important that the site be located strategically within the receiving area's electrical load Centre; this is true of the proposed site. The site is approximately 150 meters from the Kipsing primary school.

- Adjacent land use – adjacent land use has minimal 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.

2.5.5 Relocation option

Based on the above-mentioned suitability criteria and technical requirements, the proponent decides to put up the Solar Mini-grid within land identified by stakeholders. 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.

In determining the most appropriate site for the establishment of the mini-grid, several options were explored. This site selection process considered the following criteria:

- The availability of primary resources required for the operation of the mini-grid, such as Sun;
- Availability of land to locate the site and associated infrastructure;
- The availability and accessibility of infrastructure for the provision of services, manpower and social structure for the construction and operation of the power plant;
- General environmental acceptability in terms of social impacts, water utilization, general ecology, etc.

Looking for an alternative Land to accommodate the scale and size of the proposed project would take a long time although there is no guarantee that the land would be available. After considering many options for the construction for the min-grid, there was enough land for the community, therefore use of the site to construct the mini grid will not significantly affect land use. The community is further marginalised with no electricity grid connectivity compared to other regions in the country.

Grid Connection with enough capacity and material was recommended due to the anticipated increasing demand in solar energy. This eliminates the need to overhaul the grid connection when the population increases in Kipsing.

In assesment and consideration of the above concerns, the site chosen by stakeholders in Kipsing was identified as the most suitable area for the establishment of the proposed mini-grid, relocation of the projects is not a viable option.

2.5.6 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 to the community as a whole. The target PAPs will stay without electricity and the government objectives of bringing electricity in order to open up the area and provide better public services will not be realized. The No Project Option is the least preferred from the socio-economic and partly environmental perspective due to the following factors:

- The socio-economic status of target communities the local economy would remain unchanged.
- Generation of employment opportunities through expansion of business activities that would have been spurred by availability of electric power will not occur
- Opening up the area for investors will not occur.
- Health benefits that come with electricity will not be realized
- The targeted consumers will forgo the desired electricity supply in the area
- The country won't meet its energy requirement
- The objectives of the government's efforts towards achieving Vision 2030 will not be realized.

From the analysis above, it becomes apparent that the no project alternative means no project to the local people and the Government of Kenya and the benefits outlined above and other indirect benefits that would accrue from construction of the proposed project.

2.5.7 Alternative Sources of Energy

2.5.7.1 Thermal Power Generation

Thermal power through installation of Diesel Gen Sets is an option which can be considered to provide power to Kipsing. This would need more than 250-300litres of Industrial Diesel Oil (IDO) is burnt daily to generate targeted 50kWp of electricity at Kipsing, Thermal generation can also be fueled using alternative fuels such as natural Gas, bio diesel, industrial kerosene, heavy vehicle fuel, coal and unleaded petrol. Thermal power generation has serious negative environmental impacts including generation hence the need for REREC to install the proposed solar power plant. This energy alternative will not be viable.

2.5.7.2 Hydro Electric Power – HEP

Hydroelectric energy is a form of energy that harnesses the power of water in motion such as water flowing over a waterfall to generate electricity. Kipsing has no permamnent river that could facilitate HEP generationsince, River Bisanadi is seasonal. The proposed Area is quite far from the national grid hence which means it would be costly venture and may take time before the residents get power for their livelihood.

2.5.7.3 Other sources of Energy:

Wood fuel is the greatest source of Energy contributing to 80% of energy requirements in Africa. Over reliance on wood has led to deforestation, desertification, global warming and climatic change among other socio – economic demerits. This alternative has several deleterious effects to the environment and human health.

Based on this discussion the proposed Mini-grid presents the most appropriate option of electrifying/ bringing power to Kipsing in terms of technology, cost and environmental considerations.

2.5.8 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).

2.5.9 Conclusion

The proposed project is the best alternative among those proposed based on community needs assessment and alternatives disusscussed above.

3 APPLICABLE POLICY, LEGAL AND REGULATORY FRAMEWORK

3.1 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.

3.2 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).
- **The Energy and Petroleum Regulatory Authority (EPRA):** 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 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 the community 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 Kipsing site.

- **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 solutions 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.

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

3.3 NATIONAL POLICY AND LEGISLATIVE FRAMEWORK REVIEW

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 3-1: 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 water scarcity during the drought season. The proponent will have to purchase water for use during construction.*

The applicable policy and legislative framework is illustrated in ***Table 3-2*** below.

Table 3-2: Policy and Legislative Framework

S.No.	Legislation/ Guidelines	Description of the Legislation/Guidelines	Relevance of the legislation/Guidelines
	POLICY		
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 industrialized, 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.
2	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.
3	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	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

		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.	is in line with the requirements of the NEAP. The project will be reviewed by NEMA for approval before implementation.
4	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 to ensure sustainability. The paper provides comprehensive guidelines and strategies for government action regarding environment and development.	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
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.	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.	The proposed project is to be implemented in the rural setting at Kipsing. The area is not economically empowered hence few HIV/AIDS prevention resources are available. This policy shall provide a framework to

		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;	both the project proponent and contractor to address issues related to HIV/AIDS during the entire project phase.
National Laws			
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.
2	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 operationalized by subsidiary legislation promulgated under the Act and specifically Legal Notice (L.N.) 101: Environment (Impact Assessment and Audit) Regulations, 2003.
3	L.N. 101: EIA/EA Regulations, 2003	These regulations provide the framework for undertaking EIAs and EAs in Kenya by NEMA licensed Lead Experts and Firms of Experts. An	The proposed project is subject to relevant provisions of these regulations and subsequently, the ESIA has been undertaken in accordance with the requirements.

	And 2016 Amendments	EIA or EA Study in Kenya is to be undertaken by a firm duly licensed by the 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.	
4	L.N. 120: Water Quality Regulations, 2006	This regulation provides for the sustainable management of water used for various purposes in Kenya. The regulation contains discharge limits for various environmental parameters into public sewers and the environment.	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.
5	L.N. 121: Waste Management Regulations, 2006	Generally, it is a requirement under the regulations that a waste generator segregates waste (hazardous and non-hazardous) by type and then disposes them in an environmentally acceptable manner.	Waste to be disposed in accordance with these regulations.
6	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.	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.
7	Environmental Management and Coordination, (Conservation of Biological Diversity)	These regulations are described in Legal Notice No. 160 of the Kenya Gazette Supplement No. 84, December 2006. These regulations apply to conservation of biodiversity which includes conservation of threatened species, inventory	The proposed project will impact biodiversity through clearance of vegetation on the proposed site. This will be done in strict adherence to ESMMP and revegetation of degraded site will be done as spelt out in the ESMMP

	(BD) Regulations 2006	and monitoring of BD and protection of environmentally significant areas, access to genetic resources, benefit sharing and offences and penalties. Additionally, this regulation provides for the local enforcement of the International Convention on Biological Diversity (CBD).	
8	Environmental Management and Coordination, (Fossil Fuel Emission Control) Regulations 2006	These regulations are described in Legal Notice No. 131 of the Kenya Gazette Supplement No. 74, October 2006. These regulations include internal combustion engine emission standards, emission inspections, the power of emission inspectors, fuel catalysts, licensing to treat fuel, cost of clearing pollution and partnership to control fossil fuel emissions. The proposed project will generate fuel emissions linked to the back-up generator. This will only happen when the sun rays are poor.	This legislation gives caution to proponent on proper handling and management of fuels. REREC will adhere to the ESMMP while handling and managing the fuels
9	Licenses and Permits Required Under The EMCA	The subsidiary legislations under the EMCA are partially monitored using 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 following permits to be available for inspection during the construction and operational phases of the project: ✓ EIA License under Environmental Management and Coordination Act, 1999; ✓ Workplace Registration under Occupational Safety and Health Act, 2007; ✓ Construction Permit by the County Government; and

			✓ Noise Permit under Legal Notice 61: The Environment Management and Coordination (Noise and Excessive Vibration Control) Regulations, 2009.
10	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.	The contractors will be required to fully comply with 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.
11	L.N. 31: The Safety and Health Committee Rules, 2004	These rules came into effect on April 28, 2004, and require that an Occupier formalize 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	The contractor will be required to constitute Health and Safety Committee to oversee safety and health at the construction site
12	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.	The contractor should make sure that the workers exposed to hazards and or accidents undergo requisite medical examinations as required by these rules
13	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)	The contractor to ensure that equipment is serviced properly and/or use equipment that complies with the threshold noise values provided in the act. Alternatively,

		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 compensated as an occupational disease.	each contractor will be required to develop and implement a written hearing conservation programme during the construction phase.
14	L.N. 59: Fire Risk Reduction Rules, 2007	Several sections of the rules apply to the proposed project as enumerated below. - 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.	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. Developing an emergency plan should a fire occur which includes evacuation procedures etc.

		- Regulation 34 requires Proponents to develop and implement a comprehensive written Fire Safety Policy - 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.	
15	The Energy Act, 2019	The Energy Act of 2019 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 for establishing the systems associated with these purposes. The Act also established the Energy and Petroleum Regulatory Authority (EPRA).	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. • The Mini-Grid proponent has the technical and financial capability to conduct the project • The proponent has conducted the necessary engagement with the community.
16	Water Act, 2016	Part 2 section one of the Act notes that every water resource is vested in and held by the national government in trust for the people of Kenya. Section 143 (1) notes that; A person shall not, without authority conferred under this Act- (a) Willfully obstruct, interfere with, divert or obstruct water from any watercourse or any water resource, or negligently allow any such	All construction, operation and decommissioning phases will take caution to refrain from polluting any water resource and will endeavour to prevent pollution in line with the ESMMP.

		obstruction, interference, diversion or abstraction; or (b) Throw, convey, cause or permit to be thrown or conveyed, any rubbish, dirt, refuse, effluent, trade waste or other offensive matter or thing into or near to any water resource in such manner as to cause, or be likely to cause, pollution of the water resource.	
17	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 persons engaged in the designing and installation of the Mini-Grid shall be licensed by EPRA
18	The Public Health Act (Cap. 242)	The Act prohibits the 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.
19	The Standards Act Cap 496	The Act is meant to promote the standardization of the specification of commodities, and code of practice; to establish a Kenya Bureau of Standards, to define its	REREC will ensure that commodities and codes of practice utilized in the proposed project adhere to the provisions of this Act. All materials and spares used to construct the project will comply with the standardized specifications and certification.

		functions and provide for its management and control.	
20	Penal Code Act (Cap.63)	Section 191 of the penal code states that if any person or institution that voluntarily corrupts or foils water for public springs or reservoirs, rendering it less fit for its ordinary use is guilty of an offence. Section 192 of the same Act says a person who makes or vitiates the atmosphere in any place to make it noxious to health of persons /institution, dwelling or business premises in the neighbourhood or those passing along public way, commits an offence.	REREC shall observe the guidelines as set out in the environmental management and monitoring plan laid out in this report as well as the recommendation provided for mitigation/minimization/avoidance of adverse impacts arising from the project activities.
21	The Land Act, 2012	An Act of Parliament to give effect to Article 68 of the Constitution, to revise, consolidate and rationalize land laws; to provide for the sustainable administration and management of land and land- based resources, and for connected purposes Forms of Tenure. 5. (1) There shall be the following forms of land tenure- (a) freehold; (b) leasehold; (c) such forms of partial interest as may be defined under this Act and other law, including but not limited to easements; and (d) customary land rights, where consistent with the Constitution.	Land in Kipsing is community land whose tenure falls under customary land rights. REREC will observe all the relevant provisions of the Act including conversion from community land to public land as will be deemed appropriate

		Methods of acquisition of title to land. 7. Title to land may be acquired through— (a) allocation; (b) land adjudication process; (c) compulsory acquisition; (d) prescription; (e) settlement programs; (f) transmissions; (g) transfers; (h) long term leases exceeding twenty-one years created out of private land; or (i) any other manner prescribed in an Act of Parliament. Conversion of land. 9. (1) Any land may be converted from one category to another in accordance with the provisions of this Act or any other written law. (d) Community land may be converted to either private or public land in accordance with the law relating to community land enacted pursuant to Article 63(5) of the Constitution.	
22	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'.	The proposed project site falls on unregistered community land. The community has since allocated the land in kind for project use. The establishment of the mini-grid will convert communal land to generation and distribution of electric energy for long term. Further, based on community need assessment the proponent will undertake in kind development project to support the community.

		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'. These 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 PAPs and thus their rights secured in this Act	
23	Land Registration Act, 2012	Section 27 (2) provides that a transfer without valuable consideration shall have the same effect as a transfer for valuable consideration when registered.	Once the KOSAP PIU finalizes stakeholder engagements in all the identified counties, the transfer process shall be commenced to ensure that the land rights are secured. This gives the project the required land security to allow project implementation, which is in compliance with this legal requirement.
24	Land value amendment Act 2019	It aims at standardizing the value of land in Kenya for the primary purpose of enhancing efficiency and expediting the compulsory land acquisition process for public projects. It introduces Section 107A into the Land Act, which provides the criteria for the valuation of freehold and community land that is the subject of compulsory acquisition. Community Land, like freehold land, shall be valued based on the criteria outlined in Section 107A and the Land Value Index which will be jointly developed by the national government and county government. Section 5 introduces a list of the forms in which compensation can be made.	Land in Kipsing is community land. The 1.2702 hectares allocated by the community for the proposed mini-grid will be acquired for the project. The MOE will pay compensation in kind through implementation of projects in water, education or health sectors. During the public participation, the The community chose construction ofchie's office, and quipping of community borehole and piping of water to community Kiosk.
25	The Environment and Land Court Act 2011	This is an Act of Parliament intended to give effect of article 162(2) b of the constitution; to establish a superior Court to hear and determine disputes relating to the environment	The project will have a grievance redress mechanism with a committee. The work of the committee will be to receive and respond to all the grievances raised. As explained in chapter five of this report, an aggrieved

		and the use and occupation of, and title to, land and to make provision for its Jurisdiction functions and powers, and for connected purposes. The principal objective of this Act is to enable the Court to facilitate the just and expeditious, proportionate and accessible resolution of disputes governed by this Act.	party will turn to the legal system after exhausting the GRM levels of resolution set. In the event any disputes on land and environment are not resolved through the project GRM, this court will provide a forum for timely resolution of such grievances.
26	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 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 e.g., 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 – Isiolo County.
27	The Employment Act No 11 of 2007	This Act is important since it provides for employer – employee relationship that is important for the activities that would promote management of the environment within the energy sector.	With the Contractor and the Project Proponent being primary employers during the construction and operational phases of the Project, respectively, they are bound by this law to abide to its stipulations on employee management and relations
28	The Work Injury Benefit Act, 2007	This is an Act of Parliament to provide for compensation to employees for work related injuries and diseases contracted in the course of their employment	The Proponent and Contractor will maintain an insurance policy cover for its employees, record of accident, carryout proper accident investigations; organize for pre-employment and regular medical examinations for staff.
29	Air Quality Regulations (2014)	Regulation 3 stipulates that the objective of these Regulations is to provide for the prevention, control, and abatement of air	The Proponent and contractor will implement mitigation during construction to ensure neighbouring properties are not impacted by nuisance dust

		pollution to ensure clean and healthy ambient air.	
30	The Traffic Act Chapter 295 Laws of Kenya	This Act consolidates the law relating to traffic on all public roads. Key sections include registration and licensing of vehicles; driving licenses; driving and other offences relating to the use of vehicles on roads; regulation of traffic; accidents; offences by drivers other than motor vehicles and other road users. Many types of equipment and materials shall be transported through the roads to the proposed site. Their registration and licensing will be required to follow the stipulated road regulations. The Act also prohibits encroachment on and damage to roads including land reserved for roads.	The project will observe the provisions of the Act including management of traffic of construction vehicles as guided by the ESMMP
31	National Museums and Heritage Act, 2006	The Act seeks to consolidate the law relating to national museums and heritage; to provide for the establishment, control, management and development of national museums and the identification, protection, conservation and transmission of the cultural and natural heritage of Kenya; to repeal the Antiquities and Monuments Act and the National Museums Act.	During implementation of the project, the Act will be followed in the event of case of chance find of cultural heritage on the proposed site

32	The Prevention, Protection and Assistance to Internally Displaced Persons and Affected Communities Act, 2012	This an Act of Parliament that provides for the prevention, protection and provision of assistance to internally displaced persons and affected communities and give effect to the Great Lakes Protocol on the Protection and Assistance to Internally Displaced Persons, and the United Nations Guiding Principles on Internal Displacement and for connected purposes.	According to this Act, displacement in projects should be avoided to the extent possible and implementation of KOSAP sub-projects will adhere to this requirement.
33	County Government Act, 2012	This Act makes provisions for county governments' powers, functions and responsibilities to deliver services and for connected purposes. Part VIII of the act on Citizen Participation (87) (b) emphasizes on the right of citizens to participate to any development projects prior to their implementation. This Act gives guideline on planning in the County and especially the partnership in development between the National Government and other investors.	In complying with this requirement, the ESIA team held consultations on the project with the County Government of Isiolo namely the Governor, County Executive Committee members for Environment, Energy and Public service and Administration. Additionally, the County government through the CEC Public service administration and the Chiefs office mobilized the communities for the consultation forums
34	The Sexual Offenses Act 2006	This is a comprehensive law that criminalizes a wide range of behaviours including rape, sexual assault, defilement, compelled or induced indecent acts with child imbeciles or adults, gang rape, child pornography, child trafficking, child sex tourism, child prostitution,	Implementation of a project creates changes in a community in which it is implemented and is has potential to cause shifts in power dynamics between community members and within households. For instance, male jealousy is a key driver of Gender Based Violence (GBV) which can be triggered by labor influx

		exploitation of prostitution, incest by male and female persons, sexual harassment, deliberate transmission of HIV or other life threatening sexually transmitted disease, stupefying with sexual intent, forced sexual acts for cultural or religious reasons among others. The Act also has orders for medical treatment for victims including free HIV prophylaxis, emergency pregnancy pill and counselling. The Act provides stiff penalties in which most of the crimes attract minimum of ten years imprisonment which can be enhanced to life imprisonment.	on a project when workers are believed to be interacting with community women. Hence, abusive behaviour can occur not only between project-related staff and those living in and around the project site, but also within the homes of those affected by the project.
35	The Children Act, 2012	Part 2 of the Act denotes the rights of the children and their welfare shall be protected from child labor and armed conflict i.e. Every child shall be protected from economic exploitation and any work that is likely to be hazardous or to interfere with the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral or social development. The Act also notes that a shall be protected from sexual exploitation and use in prostitution, inducement or coercion to engage in any sexual activity, and exposure to obscene materials.	Sensitization to the community on the need to ensure the protection of children has been done and will continue throughout the project cycle. In addition, the contractor will sensitize workers against abuse and exploitation of children.

36	Persons with Disability Act, Chapter 133	This Act provides for the protection of the rights of people with disabilities ensuring they are not marginalized and that they enjoy all the necessities of life without discrimination. The Act guarantees that (1) No person shall deny a person with a disability access to opportunities for suitable employment. (2) A qualified employee with a disability shall be subject to the same terms and conditions of employment and the same compensation, privileges, benefits, fringe benefits, incentives or allowances as qualified able-bodied employees. (3) An employee with a disability shall be entitled to exemption from tax on all income accruing from his employment.	The Act will be adhered to in order to ensure that persons with disability are included in all decision making that affects their lives. This will be monitored to make sure they are not excluded from project benefits and exposed to negative impact from the project that could adversely affect them.

3.4 WORLD BANK OP APPLICABILITY

Error! Reference source not found. below shows the applicability of World Bank Operational OPs to the proposed project in Kipsing site;

Table 3-3: World Bank Operational Ops

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, the MoE has commissioned an 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	The proposed project will not affect natural habitats due to its area of coverage. Additionally, caution will be taken to ensure minimum disruptions to habitats as guided by the ESMMP.

		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, 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 majority inhabitants of Kipsing are Samburu who are classified as a marginalized groups in Kenya. They are the soul PAPs of the proposed project. Further the proponent will continue to engage the PAPs 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	The policy is applicable to the entire project because there is land acquisition for the Mini-grid, Wayleaves, contractor facilities and worker's camps.

		implementing resettlement; and (iv) provide assistance to affected people regardless of the legality of land tenure.	

3.5 ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK (ESMF) FOR KOSAP

An Environmental & Social Management Framework (ESMF) for KOSAP was prepared by the Environment & Social Unit, Safety, Health & Environment (SHE) Department of Kenya Power in liaison with REREC and MOE. The purpose of the Environmental and Social Management Framework (ESMF) was to provide a procedure for environmental and social assessment of the proposed REREC, KPLC and MoE subprojects.

The ESMF provides guidelines for MoE, KPLC & REREC in determining the appropriate level of environmental and social assessment required for the sub-projects and in preparing the necessary environmental and social mitigation measures for these sub-projects.

This ESIA report for Kipsing Project Site is guided by this KOSAP ESMF.

3.6 RESETTLEMENT POLICY FRAMEWORK (RPF) FOR KOSAP

A resettlement policy framework report was prepared following the Kenyan laws and World Bank policy (O.P 4.12) on involuntary resettlement. The RPF states that K-OSAP component 1 (Mini-grids for Community Facilities, Enterprises, and Households) which involves installation of mini-grids will require land acquisition.

The Framework seeks to avoid, manage, and/or mitigate potential risks arising out of damage to assets, disruption to work, temporary negative impacts on livelihoods and/or in the unlikely case of displacement. The RPF proposes guidelines to develop a Resettlement Action Plan and propose an implementation framework for RAP to mitigate such effects. The RPF states that involuntary resettlement and land acquisition will be avoided where feasible, or minimized or compensated where it cannot be eliminated. Where involuntary resettlement and land acquisition are unavoidable, resettlement and compensation activities will be conceived and executed as sustainable development programs, providing resources to give PAPs the opportunity to share project benefits.

The Ministry of Energy has partnered with the community who are the owners of the land and the County government of Isiolo in identifying land for the proposed project. The sub-project site will be acquired compulsorily by NLC, and in-kind compensation in form of priority community projects provided to affected communities. Further, A-RAPs has been prepared for this project. The A-RAP stipulates procedures and actions for acquiring land and compensating affected communities. The A-RAP also documents the land acquisition consultations undertaken with affected communities.This document has been annexed in appendix 1 of this report.

3.7 VULNERABLE AND MARGINALIZED GROUPS FRAMEWORK (VMGF) FOR KOSAP

As noted above the KOSAP project trigged O.P 4.10 policy on Indigenous People and therefore a Vulnerable and Marginalized Groups Framework (VMGF) was prepared for use by the Ministry of Energy (MOE) and the implementing agencies KPLC and REREC and other stakeholders. The framework was prepared then because was known that IPs are present in all the 14 target project counties. However, at that stage of project preparation, the exact sub-project sites were not yet identified and the exact impacts of the project on VMGs were not yet completely known. The VMGF describes the policy requirements and planning procedures that during the preparation and implementation of components especially those identified as occurring in areas where VMGs are present.

The purpose of the VMGF is to guide management of issues related to vulnerable and marginalised groups during the development and operation of proposed sub projects and to ensure effective mitigation of potentially adverse impacts while enhancing sharing of benefits.

The Samburu community are the main inhabitants and the sole PAPs of the project. The ESIA did not identify any adverse impact on the communities therefore, a Vulnerable and Marginalized Group Plan (VMGP) will not be required. However, elements of the VGMP such as inclusion of VMGs in the stakeholder engagement process and representation on the locational grievance redress committee will be captured in the ESMP.This will help to ensure that the Gabbra community is able to access culturally appropriate benefits and opportunities from the project in a manner that is gender-sensitive and intergenerationally inclusive. The ESMP will strive to maintain the cultural and social fabric of the Gabbra community while also promoting sustainable development.

3.8 SOCIAL ASSESSMENT (SA)

The KOSAP project has triggered the World Bank Operational Policy (OP 4.10) for Indigenous Peoples, and the relevant laws and regulations of the Government of Kenya concerning Vulnerable and Marginalized Groups (VMGs).

The OP 4.10 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 engages the IPs/VMGs in a process of Free, Prior and Informed Consultations and this is the basis of the public participation in the Counties with the objective obtaining broad community support for the project by the affected IPs/VMGs. In case of any adverse impacts, these should be avoided or reduced where possible and where not feasible, they should be mitigated or compensated.

The Government of Kenya through REREC has undertaken a Social Assessment (SA) in order to ensure that the VMGs are not disadvantaged by the project, excluded from benefiting and participating from the project, and to develop alternative plans to enhance project benefits.

3.9 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 3-4: 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	Similar- displacement in projects should be avoided to the extent possible by exploring alternatives.	WB policy is more elaborate than the Kenyan Law.

	exploring other alternatives.		
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 and ensure negative impacts do not disproportionately fall on them. The policy requires these groups to be consulted separately to enhance their participation.	The COK 20.10 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 all issues as they are often overlooked and left out. Emphasis is also on consulting with them.	Similar- both seek to promote inclusion of these group so that they 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.
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 from the 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	Under EMCA, an ESIA must be conducted before the implementation of any development project that is likely	Similar-Both focus on protection of natural habitats and the assessment impacts of development	The World Bank policy is more detailed, and the two are used in a complementary manner

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.	to have significant adverse impacts on the environment.	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	

4 BASELINE SETTINGS – PHYSICAL AND SOCIO-ECONOMIC ENVIRONMENT

4.1 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, REREC 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 compensation in kind 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 Kipsing Village which according to the administrative structure falls within Kipsing 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).

4.1.1 Project Footprint Area

The project falls in Kipsing village, Kipsing sub-location, Kipsing location, Isiolo North sub-county in Isiolo County. The site is relatively flat; however, the surrounding areas within the location has undulating slopes of average estimated slope of 0.7%.

4.1.2 Study Area

Locations of ecological and social surveys were also selected based on receptor locations; in addition, special emphasis is given to areas within 1.5 km radius of the project site and distribution lines. Based on the secondary information of the region, the following baseline information on environment, ecology and social has been discussed under the sections below:

4.2 PHYSICAL ENVIRONMENT

4.2.1 Topography

Most of the land in the Isiolo County is flat low lying plain. The plains rise gradually from an altitude of about 200 M above sea level at Lorian swamp (Habaswein) 300M above sea level at Merti Plateau and 1100 M above the sea level at Isiolo town.

4.2.2 Hydrogeology and Drainage

There are six perennial rivers in the county namely; Ewaso Ngiro North, Isiolo, Bisan-gurach, Bisanadi, Likiundu and Liliaba rivers. Ewaso Ngiro North River has its catchments area in the Aberdare ranges and Mount Kenya. It also serves as a boundary mark between Isiolo North and Isiolo South constituencies. Isiolo River originates from Mount Kenya and drains into Ewaso Ngiro River. Bisan- gurach and Bisanadi Rivers are found in the southern part of the county and drains into the Tana River. Likiundu and Liliaba originate from Nyambene hills and drains into Ewaso Ngiro North River.

4.2.3 Flora and Fauna

According to the Isiolo County Integrated Development Plan (2018-2022), The county lies in two ecological zones namely semi-arid and arid. The semi-arid zone has medium

potential. It has become an area of sedentarized agro-pastoral activities that covers part of Wabera Ward, Bulla Pesa Ward and some parts of Burat Ward in Isiolo North Constituency. It also covers some southern part of Kinna Ward in Isiolo South Constituency. The county receives rainfall ranging between 400 – 650 mm annually. Arid zone covers Oldonyiro, Ngare Marasome parts of Burat, Chari and Cherab Wards in Isiolo North Constituency and Garbatulla, Oldonyiro Ward Oldonyiro Ward and northern part of Kinna Ward in Isiolo South Constituency..

The Only gazetted forest in the county is Koitim forest. The other ungazetted dry land forests include; Badha-gudho, Badhasothowesa, Badha-Bulfayo, Badha-galan waso and Lekuruki. These forests are indigenous and are key in sustaining the biodiversity hence should be protected. The project area is dominated by *prosopis Juliflora* shrubs which are invasive species. There is no forest within a close proximity to the proposed minigrid site.

The main wildlife species found in the county includes: African wild dog (Lycaon pictus), giraffe, elephant, ostrich, monkeys, antelopes, impala, giraffe, leopard, waterbuck, lesser kudu, greater kudu, hippo, grevy zebra, buffalo, lion and over 300 species of birds.willife species observed in the project area includes; Ostrich, Velvet monkeys, impala and dick dick. Birds observed during ESIA visit includes; Somali ostrich, African Swift, Guinea fowls, Kori Bustard, Red eyed dove, Cardinal woodpecker, broad biked roller etc.

The county has three game reserves namely; Shaba, Buffalo Springs, Bisanadi. Samburu and Meru national park also borders the county forming part of the northern tourist circuit. The parks and game reserves in Isiolo County are famously known for their natural beauty and abundance of fauna and flora including species which are endemic.

4.2.4 Water Resources

Water is sourced from a borehole and it is utilized for drinking and domestic uses but it is brown in color.

4.2.5 Ambient Air Quality

The proposed project area which can be described as generally rural with interfaces of natural vegetation. Most of the areas are vegetated and there are no major industrial developments. The air quality at the proposed project sites is therefore considered to be generally good.

4.2.6 Ambient Noise Quality

In general, the project area is a rural setting where the main source of noise is from motorists and from machines such as the generators used to supply power. The noise quality of Kipsing is considered to be within the Kenyan limits for a mixed residential zone.

4.2.7 Soil Type

The soil at Kipsing is primarily sandy.

4.3 SOCIO-ECONOMIC ENVIRONMENT

4.3.1 Demographic Profile

The demographic profile in terms of total population, number of households, household size and sex -ratio of the selected villages surveyed in study area has been discussed in section below:

According to the 2019 Kenya Population and Housing Census (KNBS), Kipsing sub-location has an area of approximately 215.7 Km^2 with a population estimate of about 3400 people distributed as 1876 males and 1524 females with a population density of about 16 people per square kilometre. The average gender ratio for the population within the project area is estimated to be 55% male and 45% female. ***Table 4-1*** below presents a summary of demographic profile of Kipsing.

Table 4-1: Summary of demographic profile

Attribute	Magnitude/Number
Approx. population	1700
Households	335
Gender.	Male – 55% Female – 45%
Ave. No. per household	7
Dominant ethnic group	Samburu
Primary religion	Christianity

4.3.2 Educational Infrastructure

As per the observation and information sought from Kipsing Location, the area has one school; Kipsing primary. Most of the young people below 18 years of age can generally read and write while most of those above that age cannot. The school is not currently connected to power and it is anticipated that they will benefit from the project by getting connected to the electricity once the project has been implemented.

4.3.3 Access to health

The village is served by Kipsing dispensary that was reported to be understaffed and inadequate medicine during the FGDs. Despite its condition, the residents prefer the dispensary as compared to the traditional methods of treatment. The dispensary is currently served by 4 staff- 2 nurses, 1 lab officer and a community health volunteer. The main health issues include:
For children:

- URTI

- Diarrhoea
- Pneumonia

For women:

- Anemia
- Pneumonia
- Common cold

For women:

- URTI
- Pneumonia

The implementation of the project will generate a reliable source of power that will improve healthcare in Kipsing by mostly powering the medical equipment.

4.3.4 Occupation and Livelihood Profile

The community is mainly pastoralists,They move with their livestock in search for pasture and water. Other sources of income are small retail businesses. The project will bring direct job opportunities to the locals during the construction phase and other indirect forms of employment throughout the cycle of the project.

4.3.5 Land Use

According to Isiolo CIDP, more than 80% of the land is communally owned and is under the trust ship of the county government. Public land constitutes 10 percent of total land and includes land for schools, administration, army barracks, health facilities and game reserves. The remaining less than 10% of the land is under private ownership and was alienated for private investment in housing, industrial and commercial purposes. During the public participation, all the respondents reported communal land ownership as the dominant land tenure system in the area exception of land where public amenities such as schools which were categorized as public land. Land in the community is mainly communal and is used mainly for livestock grazing. The other land use is seasonal maize and beans farming.

4.3.6 Energy Access

The main source of energy for the residents of Kipsing is wood fuel. 85% of the households rely on fire wood as their main source of power, mainly for cooking. This has partly contributed to a decline in tree cover. 10% of the 335 households in the study area have access to electricity (portable soalr systems) including the Kipsing trading centre. Enery from the Soalr system connected to the Kipsing Dispensary was purposely used for lighting.

Kipsing area is not covered by the national grid and hence the proposed solar project. In Kipsing they collect firewood that they use for cooking and heating water. They use torches for lighting and solar to charge their phones at the business centre.

4.3.7 Social and Physical Infrastructure

Transportation and Road network: Kipsing area can be accessed by earth road at about 45kms from Iisolo. The main forms of transport are Private vehicles,motorbikesand animal carts.

Sanitation: Open defecation (OP) is widely practiced in the village. There are however few pit latrines.

Mobile Network Coverage: Kipsing has no mobile network signal.

4.3.8 Housing Types

The statistics on dwelling structures in Isiolo indicate poor housing conditions with no water or sanitation facilities. At Kipsing, most of the houses are made using mud, grass and Iron sheets. These dwellings are called "Manyatta" and are temporary in nature. Most of these structures at the project site are made of mud and sticks walls with a few made up of grass and sticks walls. Permanent housing structures are only found in Isiolo town and other upcoming urban Centres. The County government will work closely with the national government, to ensure the local population have decent homes. This will in turn create jobs, provide market for manufacturers and suppliers and raise the contribution of real estate and construction sector to GDP. The County government is in the process of developing a proper county spatial planning framework

4.3.9 Vulnerable Individuals and Households

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:

- ✓ Poor Female headed households
- ✓ Child headed households
- ✓ The elderly (80 years and above)
- ✓ Persons living with disability (PLWD)

The vulnerable households can hardly access the basic needs and most of them rely on well-wisher within the community. The project should consider such households for electricity connection. Most of them cannot afford the one thousand shillings' connection fees.

4.3.10 Gender based vulnerability

The society in the project area is characterized by a patriarchal family structure. Women continue to be rooted in traditional norms of social behavior which include minimal participation in household or economic decision making, lesser economic freedom and limited opportunity to socialize with other females in the village. During the Focus Group Discussion with women, it was reported that men have more control over household resources such as land, assets and equipment. 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. The women on the other hand are responsible for household activities such as fetching water, cooking, cleaning, taking care of the children and also grazing of animals.

4.3.11 Gender Based Violence

Discussion with women at Kipsing, intimate partner violence is common in the area and is mostly attributed to male chauvinism and Samburu cultural believes. Early marriages among girls is also practised in the Area. This has led to low school attendance rates and very low completion rates. GBV cases are normally reported to village elders and the chiefs since there is no support centres for GBV cases. The forms of GBV that may arise during project implementation include Sexual Harassment (SH) and Sexual Exploitation and Abuse (SEA). A SEA/SH Prevention and Response Action Plan needs to be prepared and implemented in all the phases of the project.

4.3.12 Culture and heritage

There is no cultural site of significance that was reported/observed near the project area. Kipsing is made up majorly by the Samburu community which make up 98% of the total population. The community values keeping of cattle, sheep and goats while the other 1% communities are settlers and are involved in businesses and others are civil servants employed. The community in the project area are a patriarchal society; men typically speak for women and make decisions in the family. The Samburu community members still practice polygamy.

4.3.13 Religion in the project area

The community members at Kipsing represent mainly Christians. The day of worship is usually Sundays therefore, the contractor is expected to put in to consideration the time of worship and the place to have the prayers.

4.3.14 HIV/AIDs prevalence

Exact number of people infected with HIV/AIDs in Kipsing was not known. According to National AIDs Control 2020, HIV prevalence in Isiolo was (1%) lower than the national prevalence of 7% (Kenya HIV Estimates 2020). The county contributed 1% and 1.4 % of the total new HIV infections in Kenya among adults and children respectively. The threat posed by HIV and AIDS is the increase of orphaned and vulnerable children and death of productive population. It also increases demand for health services and health care provision. The Interventions to address the threat should be multi-sectoral. The county and constituency AIDS technical committees must mobilize all stakeholders in the fight against new infections and promote community based care for those infected and affected by AIDS. HIV and AIDs related issues must further be mainstreamed in all the development activities in the county and also need to focus more on health education for prevention of mother to child transmission.

4.3.15 Community Organizations/Non-State Actors

Isiolo county has 65 registered co-operatives societies (Isiolo county CIDP 2018-2022), According to information sort from the community, there was none at Kipsing. NGOs, INGOs, FBOs and special interest groups working in the area are Cash transfer, Inua Jamii and Nawiri. These organizations intervene in the social sector mainly in the informal settlements. They contribute considerably towards community empowerment, protection of human rights awareness creation and civic education. Most women groups operate in uninformal revolving funds (merry go round, table banking). The level of activity of women and youth groups in the county depends on funding from various donors and government funded initiatives.

5 STAKEHOLDER ENGAGEMENT

This section profiles the key stakeholders of the Kipsing mini-grid site 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

5.1 STAKEHOLDER CONSULTATION AND DISCLOSURE REQUIREMENT FOR THE PROJECT

The World Bank OP 4.01 Environmental Assessment- 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. The ESIA report will be made available in public places that are accessible to project-affected groups and local NGOs (NEMA website and Respective NEMA County offices). Further, the summaries of the ESIA findings will be disseminated to affected persons in languages that can be understood by all those affected, using feasible techniques such as public barazas, FGDs, etc. In addition, the disclosure process will consider any mobility, disability, and literacy challenges affected persons may have.

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 collected, has been presented below. The consultations were conducted in form of:

- Meeting with the client
- Consultation with the county commissioner and the county officials
- Key stakeholder interviews with the county officials
- Public meeting in Kipsing
- Focus Group Discussions

5.2 STAKEHOLDER CHARACTERISATION AND IDENTIFICATION

A stakeholder is "a person, group, or organization that has a direct or indirect stake in a project/organization because it can affect or be affected by the Project/organization's actions, objectives, and policies" Stakeholders thus vary in terms of degree of interest, influence and control they have over the project.

5.2.1 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;

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

Table 5-1: Identified Stakeholders

Stakeholder Category	Stakeholder Group	Connection to the KOSAP	Consultation tool
Project Affected Persons	Local Community	Local communities to be affected either directly or indirectly by the project Vulnerable Individuals and Households Health institutions Education institutions	**Public Meeting** 2 public meetings was held in Kipsing Sub-location The meeting was held with attendance of 55 people. **Focus Group Discussions (FGD)** The FGDs were conducted with the men, women, youth. **Key Informant Interviews (KII)** The KIIs for Kipsing primary school, Kipsing dispensary, were conducted through one-on-one interviews. The chief was also interviewed on the Community Profile of Kipsing.
Interested Parties	Government agencies National regulatory bodies	National Government are of primary importance in terms of establishing policy	**Meeting** A meeting was held with the Isiolo County Commissioner

	County government	County government are also of primary importance in county energy requirements and proposed interventions They will play an important role in implementation and sustainability of 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 5-2 below.

Table 5-2: 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

5.3 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 5-3:Summary of Stakeholder Influence

Stakeholder Category	Relevant Stakeholders	Magnitude of Influence	Urgency/Likelihood of Influence	Overall rating of stakeholder rating
Interested Parties	National Government agencies	Large	High	Major
	National regulatory bodies	Large	Medium	Major
	County Government	Large	Medium	Major
Project affected Persons	Local communities to be affected either directly or indirectly by Projects	Large	High	Major
	Vulnerable Individuals and Households	Medium	High	Major
	Education and Health institutions	Medium	Low	Minor

5.4 INFORMATION SHARED TO THE COMMUNITY MEMBERS

The MoE representative assisted by the REREC representative gave a description of the

Project Benefit	Social Impacts of the minigrid	Environmental Impacts associated with the minigrid
➲ Reliable electricity in rural communities ➲ Enhance local ownership of infrastructure ➲ Reduced indoor air pollution ➲ Employment opportunities ➲ Reduction of energy marginalization ➲ Access to water and sanitation service sin	➲ Labour influx ➲ Child labour ➲ Elite capture ➲ Impacts on cultural heritage ➲ Land acquisition ➲ Gender based violence ➲ Exclusion	➲ Environmental exposure to Hazardous & toxic materials ➲ Operation of standby generators and heavy machinery ➲ Occupation health and safety risks ➲ Impact on air quality ➲ Visual intrusion impacts ➲ Impacts on local biodiversity

KOSAP projects and clarified that its objective was to electrify Kipsing because the area is not connected to the national grid. They also informed the community that they would access the electricity at a subsidized cost and that the public facilities such as the schools, dispensaries and public boreholes would also be connected. The environmental and social experts also shared with the community the ESIA process and discussed the potential impacts associated with the project and the proposed mitigation measures that would reduce their significance.

Table 54: Summary of Information shared with community

5.5 KEY FEEDBACK RECEIVED DURING STAKEHOLDER CONSULTATION PROCESS

The general stakeholder consultation was done in a public meeting (Baraza) organized at Kipsing under a big acacia tree. The meeting was chaired by the area Senior chief. The meeting was attended by 55 members and the feedback received during the stakeholder consultation process has been summarized below:

5.5.1 Summary of feedback

The table below presents the issues /comments raised by the stakeholders during the public meeting and the responses given by the study team.

Table 5: Summary of Feedback

No.	Issues discussed	Comments discussed	Response given by consultants
1.	Power distribution	Will the power from the minigrid be extended/Distributed to the neighboring village?	The minigrid is limited to a radius of 1.5km but other altenative solution of providing portable solar systems at an affordable price to those beyond the minigrid coverage.
2.	Labour & materials	Will the contractor source labour and construction materials from the community?	Consultant assured the community that the contractor will source unskilled and semi skilled labour from the community where need be as its required by the law. Where possible readily available materials will be sourced from the community organization or enterprises to promote local economic growth and development of the area
3.	Compensation	Will the contractor Compensation the community for the land acquired and used to construct the minigrid?	The proponent will compensate the community in kind form for the land acquired, community to give three options they'd like the proponents to compensate them for the land, they chose construction of chief's office.

The minutes of the baraza meeting have been appended in Appendix 2 of this report.

Public participation "Baraza" Session

Focused Group Discussion with the Men

Focused group discussion with Women

Youth Focused Group Discussion

Plate 5-1: Stakeholder's engagement process

5.1SUMMARY FEEDBACK RECEIVED DURING FOCUSED GROUP DISCUSSION

The Focus Group Discussions were held with Men, Women and the Youth, below are key concerns and expectations that were raised during the FGDs have been summarized below in Table 5-6;

Table 5-6: Issues and concerns raised during the FGDs

Groups	Issues/comments discussed
Men	✓ The men confirmed that they were fully aware and well conversant with of the project. They added that the project has been disclosed to them a couple of times during land acquisition period and were concerned that the project is taking too long to be implemented; ✓ They asked the client to implement the project as soon as possible and that they were not willing to engage the client on any other meeting/public participation-A sign of stakeholder fatigue; ✓ Top three community needs according to Men FGD are construction of Chiefs office, equipping of community borehole,, Electricity and improvement of Kipsing primary school classrooms.
Women	✓ The women reported they had heard about the project before and feel they knew what it was about. ✓ The project is worthwhile because it would benefit them. They emphasized that the project would lead to business growth in the area and availability of cheap electricity. They stated that the project negative impacts can be mitigated significantly to negligible levels hence the development should process. ✓ The women requested that the contractor to consider them for employment during construction period. ✓ Top three community needs according to Women FGD are Water project, Maternity ward improvement at Kipsing dispensary and electrification of the area. They requested for a project on water sector e.g., water reticulation to curb on their water challenges as their project of choice in compensation in kind.
Youth	✓ The youth reported that they were well conversant with the project and that the project had been disclosed to then severally in 2021. ✓ They added that the project will help create jobs for them and improve the security of the area.

	✓ They were concerned that the project is taking too long to implement and wanted to know the distance coverage of the power connection. ✓ They asked to be considered for jobs during the project implementation.

5.2DISCLOSURE OF ESIA TO THE STAKEHOLDERS

The final ESIA report will be shared with the stakeholders by way of making it available to the target PAPs and other interested parties. The ESIA report will be shared through the county headquarters (a copy will be availed) or will be accessible through the CREO office and REREC website. In addition, a copy of the ESIA should be availed by CREO to the chief's office for access by the local community and other stakeholders.

The findings of the ESIA will be shared or disseminated to the target community in a culturally appropriate format such as using local language and through public meetings and focus group discussions.

5.2.1 Consent

The Community members present unanimously accepted the proposed project.

6 IMPACT ASSESSMENT AND MITIGATION MEASURES

6.1 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. To facilitate the reading of the ESIA, the same heading structure in terms of environmental indicators, receptors or resources affected by the project activities were considered as the ones used in the baseline. All the mitigation measures identified in this chapter have been collated into the Environmental and Social Management and Monitoring Plan ('ESMMP') matrix, including Occupational Health and Safety.

6.2 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:

6.3 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.

6.4 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 in **Error! Reference source not found.** below based on five levels;

Table 6-1: 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 **Error! Reference source not found.**.

Table 6-2: 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.

6.5 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 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).

6.6 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.

6.7 LIKELIHOOD

Terms used to define likelihood of occurrence of an impact are explained in **Error! Reference source not found.** below.

Table 6-3: 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	As far as possibly recurring impacts are concerned, such

	slowly developing effects are concerned (e.g., impacts on local life style)	as accident or unplanned events (e.g., traffic accident, fire)

6.8 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.

6.9 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 **Error! Reference source not found.** and **Error! Reference source not found.** 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.

6.10 KEY SOCIAL IMPACTS – PRE-CONSTRUCTION PHASE

6.10.1 Land Acquisition

The proposed project will entail the acquisition of a 1.20702 hectares land parcel 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 PAPs 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. After implementing the embedded controls, the impact magnitude is assessed to be minor.

6.10.1.1 Source of Impact and Overview of Baseline Conditions

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

6.10.1.2 Embedded/In-built Controls

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

6.10.1.2.1 Significance of Impact

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

6.10.1.3 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 Education sector within a radius of 10 km. During the public meetings the community requested for the construction of a chief's office and equipping of community borehole.

6.10.2 Impact on Acquisition of Way leaves

Supply of electricity will involve passing of low voltage (LV) lines to connect the customers to power. It is estimated that a total of 10.9 km of LV circuit will be constructed.

6.10.2.1 Embedded/In-built Controls

The LV lines will be constructed mainly along the road reserve and along the boundaries to supply power.

6.10.2.1.1 Significance of Impact

The impact significance is assessed minor considering no acquisition of land is anticipated.

6.10.2.2 Mitigation measures

- Consultations with the community during construction of the low voltage lines

6.10.3 Impact Related to Stakeholder identification and consultations

This impacts are associated with these risks:

1. *Inexhaustive stakeholder identification, stakeholder mapping and stakeholder information needs basis.*

   Mitigation measures

   - Prior to construction works, identify and map all primary and secondary stakeholders (the various segments of the subproject area community – men, women, PWDs, elders, religious leaders, etc., community level CSOs, sub-county level CSOs with interest in the subproject, county level CSOs with interest in the subproject etc.).
   - Assess the interest of each stakeholder category in the subproject
   - Assess each stakeholder category's subproject information needs at the various subproject phases

2. *Risks related to disclosure of appropriate information in line with the subproject phase*

   Mitigation Measures

   - In consultation with the identified stakeholders, prepare a stakeholder engagement plan (SEP) that is based on their locations (maps) and their information needs at the various subproject phases
   - Undertake timely and prior disclosure of relevant project information to the various stakeholder categories in line with their information needs and the project phase
   - Carry out robust consultations with all identified community level (primary) stakeholders in a gender, intergenerational and culturally sensitive manner, using appropriate participatory consultative techniques
   - Consult with other relevant (secondary) stakeholders (as appropriate) based on their information needs, project phase and the SEP
   - Document the information disclosure and stakeholder consultation processes (including venues, dates, minutes of discussions detailing consultation agenda, issues/concerns raised for each agenda item, and responses by the implementing agency)

3. *Risks related to inadequate consultations with all segments of the community and exclusion of VMGs and vulnerable individuals and households in subproject activities and implementation structures*

   Mitigation measures

   - Ensure adequate consultations prior to construction, and throughout the project cycle with all segments of the community and other relevant stakeholders. This should be based on the SEP, using appropriate consultation techniques
   - Ensure all concerns or grievances raised are responded to in a timely manner.

4. *Risks related to establishment of subproject governance structures, e.g., selecting individuals into management or GRM committees who have not been elected by all segments of the community, or imposing people who are not trustworthy into community level leadership positions*

   Mitigation measures

   - Consult with all segments of the community and agree on the criteria to be used to elect leaders into the subproject governance structures
   - Facilitate each segment of the community to elect their representatives to the various governance structures based on the agreed criteria
   - Train members of the various governance structures on their roles and responsibilities

5. *Risks related to exclusion of some stakeholder categories (VMGs, minority clans, disadvantaged individuals, women, youth, PWDs) from the consultation processes and the established subproject implementation structures*

   Mitigation measures

   - Facilitate the various stakeholder groups to establish representative and proportionate subproject implementation structures (implementation committee, GRM Committee etc.) composed of people of integrity who have the interest of their stakeholder category at heart, while ensuring that there is no conflict of interest, e.g., one person should not represent the stakeholder category in more than one structure)
   - Train the members of the implementation structures in their respective roles and responsibilities
   - Sensitise the various stakeholder categories on the existence, roles and responsibilities of the various implementation structures

6.10.3.1 Embedded/In-built Controls

Stakeholder engagements regarding the project to get their views and consent done prior to construction works. The consultations include public barazas, focus group discussions and key informant interviews.

6.10.3.1.1 Significance of Impact

The impact significance would be major, however, if the mitigation measures are used the residue impact is minor.

6.11 POSITIVE IMPACTS- CONSTRUCTION PHASE

6.11.1 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, 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 be given 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 arise if the community feels left out in employment opportunities.

6.11.1.1 Impact Significance

The impact significance will be 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.

6.11.1.2 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.

6.12 KEY NEGATIVE ENVIRONMENTAL IMPACTS – CONSTRUCTION PHASE

6.12.1 Change in Land Use

The study area consists of communal land with patches of open scrubland. The internal distributions lines will be laid by REREC. The land procured for the project site was uncultivated, and undeveloped. During consultation, it was established that the land belongs to the community. The community has since offered the land in kind for project use. The establishment of the mini-grid 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 mini-grid. There is no major dependency for grazing or agriculture on the land offered for the project. The magnitude 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.

6.12.1.1 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 Kipsing will be used for access to the project site.

6.12.1.2 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.

6.12.1.3 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.

6.12.2 Impact on Topography

The topography of the project site is an open area with gentle slope of about 1.7% and mild undulations. 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 undulating topography, study area may exhibit presence of micro drainage channels. Therefore, the impact magnitude has therefore been assessed as minor.

6.12.2.1 Embedded/In built Control

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

6.12.2.2 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.

6.12.2.3 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.

6.12.3 Impact on Soil

6.12.3.1 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.

6.12.3.2 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.

6.12.3.3 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

6.12.4 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.

6.12.4.1 Embedded/in-built control

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

6.12.4.2 Significance of Impact

There are few Receptors (settlements) within 500 m of the project site 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.

6.12.4.3 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.

6.12.5 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.

There are some residents within the 200m from the site and will most likely be affected by increasing noise levels. 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.

6.12.5.1 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.

6.12.5.2 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.

6.12.5.3 Significance of Impact

The impact significance has therefore been assessed tob e 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 Kipsing Primary and few residential houses nearby.

6.12.5.4 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 8am 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.

6.12.6 Visual Intrusions and Changes in Landscape Impact

The project site is located on plain terrain with slight undulation. 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 mini-grid 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 pastoralism as a primary activity. Although the solar panels, inverter 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 then 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.

6.12.6.1 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 settlement around besides Kipsing primary school and residential homes.

6.12.6.2 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 residents near the site. The impact magnitude will however be low hence the visual change during construction phase will be assessed as minor.

6.12.6.3 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.

6.12.7 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 generator 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.

6.12.7.1.1 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.

6.12.7.1.2 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.

6.12.7.1.3 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.

6.12.8 Impacts on Water Quality and Scarcity

During construction, excavation activities will involve soil exposure which results in soil erosion due to wind and surface runoff due to rains. Seepage from spilled fuels and oils and leaking machinery can also negatively impact groundwater water which could lead to potential contamination.

6.12.8.1.1 Significance of Impact

Generally, due to the localized area of impact, the overall significance of the related impacts on water quality is considered to be minor, provided the necessary mitigation/ management measures are implemented.

6.12.8.1.2 Mitigation Measures

Measures shall be put in place to minimize erosion and sediment mobility, especially during construction. These measures include:

- ❖ Clear the necessary areas only.
- ❖ Appropriate remedial measures shall be implemented by the contractor in the event of erosion.
- ❖ Infrastructure shall be designed to ensure that contaminated run-off does not reach watercourses.
- ❖ In the event of an oil spill the procedures contained in the emergency response plan of the contractor will come into effect.
- ❖ No vehicle maintenance and service shall be done at project site but in approved garages or service stations to avoid any possible oil and fuel spills that could contaminate soils and possibly ground water quality.
- ❖ Ensure that potential sources of petro-chemical pollution are handled in such a way to reduce chances of spills and leaks.
- ❖ Construction activities to avoid any unchanneled flow of water at the site
- ❖ Storage areas that contain hazardous substances should be bundled with an approved impermeable liner and provision for a pit to be made in case of oil spill.

- ❖ The excavation and use of rubbish pits during construction should be strictly prohibited.
- ❖ 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,
- ❖ Areas contaminated by spilled concrete and/or fuels and oils leaking from vehicles and machinery should be cleaned immediately.
- ❖ The contractor to source for alternative source of water for construction purposes to avoid potential conflict with the community.

6.12.9 Impacts from Hazardous Materials

Some hazardous materials will be used during construction phase of the project. They include insulating oil, paints, solvents and oils. Spilled chemicals can contaminate soil as well as pollute water resources. Additionally, hazardous and flammable substances if improperly stored and handled on site become potential health hazard for construction workers and the public.

6.12.9.1.1 Significance of Impact

The amount of hazardous waste generated will be minimal. The significance of the impact will be minor due to a low magnitude and medium sensitivity.

6.12.9.1.2 Mitigation Measures

- ❖ Maintenance of construction vehicles will not be done on site
- ❖ All hazardous products and waste should be labelled and handled properly to avoid contact with the ground
- ❖ Material handling to be done by trained and qualified staff
- ❖ The contractor site should have designated area (concrete bunded) for storing hazards materials

6.12.10 Fire Hazards

During construction of the project, fire hazards are likely to occur especially when precaution measures are not taken to account. Smoking is one of causes of fires and this can happen if cigarette butts are left carelessly. Additionally, keeping of fuels onsite during construction can be a potential cause of fire.

6.12.10.1.1 Significance of Impact

This impact is evaluated to be of moderate significance. All the construction activities will be confined at the project site hence high sensitivity and low magnitude.

6.12.10.1.2 Mitigation Measures

The following measures should be put in place to prevent fire hazards:

- ❖ Create awareness to the construction workers on potential fire hazards
- ❖ Provision of firefighting equipment (extinguishers) on site during construction.
- ❖ No smoking shall be done on construction site

- ❖ 'No smoking' signs shall be posted at the construction site
- ❖ A fire evacuation plan must be posted in various points of the construction site including procedures to take when a fire is reported.

6.12.11 Impacts of construction material sourcing (e.g., quarrying)

The construction of the project will utilize materials such as; stone, ballast, sand and hardcore. It is anticipated that they will be obtained from quarry and mining operations. Conscious or unwitting purchase of these materials from unlicensed operations indirectly supports, encourages and promotes environmental degradation at the illegal quarry sites and causes medium to long term negative impacts at source, including landslides.

6.12.11.1.1 Significance of Impact

The significance of this impact will be moderate due to high sensitivity and low magnitude.

6.12.11.1.2 Mitigation Measures

- ❖ The contractor should source all building materials such as stone, sand, ballast and hard core from NEMA approved sites.
- ❖ Ensure accurate budgeting and estimation of actual construction materials to avoid wastage.
- ❖ Reuse of construction materials where possible.

6.12.12 Impact on Energy Consumption

The construction works will consume fossil fuels (mainly diesel) to run transport vehicles and construction machinery. Fossil energy is non-renewable and its excessive use may have serious environmental implications on its availability, price and sustainability.

6.12.12.1.1 Significance of Impact

This impact will be negligible owing to the size of the project that will require very few trucks during the construction phase.

6.12.12.1.2 Mitigation Measures

- Proper planning of transportation of materials will ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts. Complementary to these measures, the contractor shall monitor energy use during construction and set targets for reduction of energy use.
- Regular maintenance of vehicles to ensure efficient consumption of fuels.

6.13 KEY NEGATIVE SOCIAL IMPACTS – CONSTRUCTION PHASE

6.13.1 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 Kipsing Village.

6.13.1.1 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 animals

6.13.1.2 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.

6.13.1.3 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.

6.13.2 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 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 e.g., power line, fire safety and management of emergency situations.

6.13.2.1 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).

6.13.2.2 Significance of Impact

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

6.13.2.3 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.

6.13.3 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).

6.13.3.1 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.

6.13.3.2 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

6.13.4 Child labour

Implementation of the Kipsing 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.

6.13.4.1 Significance of Impact

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

6.13.4.2 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.

6.13.5 Impacts on Cultural Heritage

Cultural and paleontological artifacts 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.

6.13.5.1 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.

6.13.5.2 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.

6.13.6 Gender Based Violence, SEA & SH

Gender Based Violence (GBV), Sexual Exploitation and Abuse (SEA) may be committed against the communities by the construction workers. Incidences of Sexual Harassment (SH) may occur among the staff during construction phases of the project. This may be experienced while the women are searching for jobs and those giving the jobs may ask for sexual favours.

Gender-based violence (GBV) is an umbrella term for any harmful act that is perpetrated against a person's will and that is based on socially ascribed (i.e., gender) differences between males and females. It includes acts that inflict physical, sexual or mental harm or suffering, threats of such acts, coercion, and other deprivations of liberty. GBV in project may manifest in terms of sexual exploitation and abuse (SEA) and workplace sexual harassment (SH).

Sexual Exploitation and Abuse (SEA) is any actual or attempted abuse of a position of vulnerability, differential power, or trust, for sexual purposes, including but not limited to, profiting monetarily and socially from the sexual exploitation of another. Sexual abuse is further defined as "the actual or threatened physical intrusion of a sexual nature, whether by force or under unequal or coercive conditions." Women, girls, boys and men can experience SEA.

Workplace sexual harassment (SH) includes unwanted sexual advances, request for sexual favours and sexual physical contact. Sexual exploitation and abuse (SEA) of community members by project workers and sexual harassment (SH) among project workers are forms of GBV that are a potential risk and impacts to this proposed project. GBV has serious and far-reaching negative effects including physical injuries resulting in death or disfigurement, psychological trauma, infection with HIV/AIDS, unwanted pregnancies, social stigmatization and exclusion and economic deprivation among others. Consequently, it is incumbent that preventive measures be mooted to prevent occurrence of such cases.

6.13.6.1 Significance of Impact

GBV cases 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.

6.13.6.2 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.

6.13.7 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 individuals and households 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 the MG, 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 PAPs 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 the people and households considered vulnerable in the community as:

- ✓ Women headed households
- ✓ Orphans
- ✓ Persons Living with Disabilities -
- ✓ The elderly (80 years and above)

6.13.7.1 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. However, it is important to put into account the project site inhabitants are predominantly the Samburu community.

6.13.7.2 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

6.13.8 Risk of Communicable Diseases

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, STIs and COVID-19 through risky behaviours involving job seekers and people employed on the project.

6.13.8.1 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.

6.13.8.2 Mitigation measures

- The Contractor should develop and implement pre-employment screening measures for workers, which should include communicable 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 Communicable Diseases Policy and an information document for all workers directly related to the Project. The document should address factual health issues as well as behaviour change issues around the transmission and infection of diseases.
- 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.
- Sensitize all community segments and project workers on Covid 19 and precautionary measures that need to be observed;
- Restrict site access to only Authorised persons; and
- Continuously adhere to the MoH, WHO and World Bank guidelines on Covid-19 management.

6.13.9 Increased Water Demand

During the construction of the project there will be increased demand for water by the construction workers and the construction works. Water will be mostly used in the construction works and for wetting surfaces or cleaning completed structures. It will also be used by the construction workers to wash themselves and even drink.

6.13.9.1 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 negligible magnitude of the impact.

6.13.9.2 Mitigation Measures

- ❖ Prudent use of available water
- ❖ Consultations with the project local committee on use of water in the community to avoid conflicts with the community
- ❖ Contractor to make own arrangements to provide water for construction works different from the community dam to avoid any conflicts with community.

6.13.10 Forced Labor

During construction of the mini-grid the risk of forced labor is likely to occur and precaution is need to safe guard the community from being subjected to forced labor.

6.13.10.1 Significance of Impact

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

6.13.10.2 Mitigation Measures

- ❖ Contractor must adhere to the employment Act which outlaws any form of forced labor
- ❖ Community to report any form of forced labor at the site
- ❖ Contractor to ensure that all workers have a national ID card or documentation to show they are adults (above 18 years).

6.14 POSITIVE IMPACTS- OPERATION PHASE

6.14.1 Impact on Economy and Employment

Community consultations and observations made during the site visit suggest that the existing scenario of the agriculture in the study area is not capable enough to meet requirements of the people who are solely dependent upon it; especially due to limited water availability and growing population.

During the operations phase, the requirement for unskilled and semi-skilled labour is expected to reduce significantly . 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.

6.14.1.1 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.

6.14.1.2 Additional Enhancement 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

6.14.2 Quality, Reliable Power Supply

There is no electricity in Kipsing. This is a maiden project with an aim of supplying power through solar because the area is far away from the national power grid. Once operational, household and public institutions in the area will greatly benefit from the stable power supply.

6.14.2.1 Significance of Impact

The impact significance is high as it will provide power where it wasn't for a long period

6.14.2.2 Enhancement Measures

- O&M Contractor and KPLC ensure that they have a functional customer support team and a field response team;
- O&M Contractor and KPLC should ensure that they communicate power outages early to consumers

6.14.3 Reduction of Pollution Associated with Thermal Power Generation, Kerosene and Wood Fuel Usage:

Residents in the area use different sources of energy. Electricity supply will imply that as many as are willing can apply for connection and get connected. This will result in reduced individuals and organizations using diesel generators, less reliance on kerosene, wood fuel and charcoal. This would mean less carbon dioxide is released to the environment and destruction of forests will be reduced hence decreasing greenhouse gases.

6.14.3.1 Significance of Impact

The impact significance is high as it will provide cleaner energy over a long period of time for many households

6.14.3.2 Enhancement Measures

- O&M Contractor and KPLC should ensure that the power provided cost is competitive to discourage the locals from using unclean source of power.
- O&M Contractor and KPLC should ensure that they communicate power outages early to consumers

6.14.4 Improvement of Local and National Economy

The mini-grid project will ensure supply of a stable power that will reduce damage to the electronics and this will result in promotion of businesses both in the formal and informal sectors. Availability of power will enable businessmen to scale up their

businesses while making it is possible to set up businesses such as salons, barber shops, photocopying machines, cyber cafes, welding, refrigeration of drinks among others. This will result in income improvements at the individual level and for the national economy. More customers will be connected and retail of reliable electricity by the power utility firm will attract increased tax revenues to the government.

6.14.4.1 Significance of Impact

The impact significance is low as it will buy few materials over a long period of time

6.14.4.2 Enhancement Measures

- O&M Contractor and KPLC should ensure that their contractors/suppliers remit taxes and have a tax compliance certificate
- Prioritise local purchases over imports.
- Remit taxes on behalf of employees

6.14.5 Impact on Education

Access to electricity at the household level and schools will create opportunities for children be able to study even for longer hours. Additionally, children in households can also access education programs being aired through different radio and T.V. channels. Schools will be able to take advantage of information technology and communication that are becoming a way of life in education sector and learning in general.'

6.14.5.1 Significance of Impact

The impact significance is high as it will provide power to schools over a long period for additional study time in the night and morning

6.14.5.2 Enhancement Measures

- O&M Contractor and KPLC should consider having the transmission lines are closer to schools for them to benefit from the power supply;
- O&M Contractor and KPLC should consider partnering with the county government in providing street lighting to improve security for children and teachers leaving for school early or leaving late for home

6.14.6 Health Benefits of the Project

Solar energy for lighting is better than kerosene lamps that are in use currently. This is because kerosene lamps emit particles that cause air pollution. The health risks posed by this indoor air pollution mainly include acute lower respiratory infections. Additionally, insufficient illumination (low light) conditions can cause some degree of eye strain and reading in these conditions over long periods of time may have the potential to increase the development of near-sightedness in children and adults. The project will result in many families replacing kerosene lamps for lighting with electricity there-by reducing chances of the afore mentioned disease incidences.

6.14.6.1 Enhancement Measures

- Educate the consumers on the benefits of lighting with electricity as opposed to the other sources of lighting

6.14.7 Improved Standard of Living

Availability of power will result in lifestyle changes through improved night lighting, pumping of water instead of manual pumping and refrigeration to maintain food safety and quality.

6.14.7.1 Enhancement Measures

- Educate the consumers on the uses of electricity to improve their lifestyles

6.14.8 Impact on Security

The area will benefit from improved security since houses, businesses and public institutions will be well lit using electricity. This is as a result of more security flood lights bulbs which helps keep off opportunistic crimes including gender-based violence.

6.14.8.1 Enhancement Measures

- O&M Contractor and KPLC should consider partnering with the county government in providing street lighting to improve security of the area.

6.14.9 Impact on Communications

Access to electricity will lead to improved communication. This will be enabled by the fact that charging of mobile phones will be easier and cheaper. Access to mass media like radio and T.V will provide opportunity for the households to access a wide range of information which is useful for decision making.

6.14.9.1 Enhancement Measures

- Ensure that the power supply is reliable.

6.15 KEY NEGATIVE ENVIRONMENTAL IMPACTS – OPERATION PHASE

6.15.1 Impact on Soil

6.15.1.1 Soil compaction and Erosion

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 considered to be 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.

6.15.1.1.1 Embedded/in-built control

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

6.15.1.1.2 Significance of Impact

The overall impact significance on soil erosion and compaction has been assessed as negligible. Both the receptor sensitivity and the impact magnitude will be low.

6.15.1.1.3 Additional Mitigation Measures

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

6.15.2 Waste Generation and management

During operation phase, the waste generated from project includes domestic solid waste building 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 too small.

6.15.2.1 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.

6.15.2.1.1 Additional Mitigation measures

- 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

6.15.2.2 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.

6.15.2.3 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.

6.15.3 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. 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 Kipsing confirmed that water is a major concern in the area. As noted earlier, the local community rely on ground water sources; borehole, with no feasible alternative. 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.

6.15.3.1 Embedded/in-built control

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

6.15.3.2 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 negligible magnitude of the impact.

6.15.3.3 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 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

6.15.4 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.

6.15.4.1 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.

6.15.4.2 Suggested mitigation measures

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

- Signage related to the 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;
- Landscaping area around the site with the participation of the local community.

6.15.5 Increased oil Consumption

The proposed Mini-grid shall consume fuel/oil in the process of backing up the solar energy required. The fuel is produced mainly through non-renewable resources, implying this will have adverse impacts on these non-renewable resources base and their sustainability.

6.15.5.1 Significance of Impact

The impact will be of minor significance.

6.15.5.2 Mitigation Measures

To ensure efficient energy consumption during the operation phase of the project, the contractor to install an energy-efficient lighting system at the project site facilities. This will contribute immensely to energy saving during the operational phase of the project.

In addition, the plant operators will be sensitized to ensure energy efficiently in their daily operations.

6.15.6 Increased Storm Water Flow

The panels, building roofs and pavements of the proposed Mini-grid will lead to increased volume and velocity of storm water or run-off flowing across the area covered by the solar panels during operation phase. This will lead to increased amounts of storm water entering the drainage systems.

6.15.6.1 Significance of Impact

The impact will be of minor significance.

6.15.6.2 Mitigation Measures

- Construct the drainage system in a way to follow natural drain of the water
- Concrete only the required area and leave the rest of the land with vegetation like grass
- Construct rain harvesting system on the control buildings/office and harness into storage tanks for use

6.15.7 Fire Outbreaks

Carelessness and negligence both at the solar mini-grid and by the PAPs of electricity may cause fires.

6.15.7.1 Significance of Impact

With the mitigation measures in place the impact is evaluated to be of moderate significance due to high sensitivity and low magnitude.

6.15.7.2 Mitigation Measures

- The power plant must contain firefighting equipment (Portable fire extinguishers) of recommended standards and in key strategic points
- Detection/alarm systems that can detect fire should be considered and installed
- A fire risk assessment and evacuation plan should be prepared and posted at strategic points and should include procedures to take when a fire is reported.
- Workers especially operators of the plant must be trained on fire fighting and management
- 'No smoking' signs shall be posted within the Mini-grid area
- A fire Assembly point should be identified and marked

6.15.8 Water demand

During this period the demand for water will be lesser than that used in construction. However, some amounts of water will be needed in wiping of the panels and use at the solar plant facility. Therefore, caution need to be exercised to ensure prudent use of water.

6.15.8.1 Significance of Impact

The impact is assessed to be negligible due to very low magnitude of the impact.

6.15.8.2 Mitigation Measures

- There is need to source for a sustainable water source for use
- Install water-conserving automatic taps
- Encourage water harvesting from rooftops and storage for cleaning purposes (washing the panels off dust)
- Any water leaks through damaged pipes and faulty taps should be fixed promptly.

6.15.9 Sanitation waste

Although there are few people who will be running the Mini-grid during operation phase provision for disposal of sanitation waste must be put in place through septic tanks.

6.15.9.1 Significance of Impact

The impact is assessed to be negligible due to very low magnitude of the impact.

6.15.9.2 Mitigation Measures

The area is not served by a sewer system and sanitation waste will be drained through use of septic tanks.

6.15.10 Flooding

Flooding may occur and cause damage to the plant and other associated infrastructure but the risk of occurrence is low since the area is not known for regular flooding.

6.15.10.1 Significance of Impact

The impact is assessed to be negligible due to very low magnitude of the impact.

6.15.10.2 Mitigation measures

- Ensure drainage channels are free of any obstruction at all times i.e., not blocked
- Construct more channels and or expand existing ones
- Raise foundations of the solar panels and ensure a proper and firm concrete base
- Create flooding diversions and or spill ways to divert water from getting into the solar power facility

6.15.11 Noise and Vibration

Negligible noise and vibration will be produced during operation phase of the project and would be from the backup generator.

6.15.11.1 Mitigation Measures

The generator room should be made sound proof to ensure no noise of a nuisance level will be produced. The contractor should also monitor noise levels by taking tests and putting in appropriate measures.

6.15.12 Electric and magnetic fields (EMFs)

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.

6.15.13 Dust emissions

During operation phase not much dust will be generated from the facility but wind and dust storms are potential impacts. This impact will be negligible because there will be no activities on site that will have the potential to generate dust.

6.15.13.1 Mitigation Measures

- 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
- Ensure planting of grass around and within the facility compound

6.15.14 Vehicle exhaust emissions

Exhaust emissions are likely to be generated by the vehicles coming to the facility though on a low risk.

6.15.14.1 Significance of Impact

Due to the low magnitude of the impact and the low sensitivity, the significance will be minor.

6.15.14.2 Mitigation Measures

- Drivers of the vehicles must be sensitized so that they do not leave vehicles idling so that exhaust emissions are lowered.
- Company vehicles should be well maintained

6.16 KEY NEGATIVE ECOLOGICAL IMPACT- OPERATION PHASE

6.16.1 Collision and Electrical hazards from Distribution Infrastructure

A number of birds' species were identified during the impact assessment. These include Speckled Pigeon, Purple-crested Turaco, Common Swift, Black-headed Heron, Speckled Mousebird, European Roller, Cardinal Woodpecker, Black-crowned Tchagra, Red-backed Shrike, Hunter's Sunbird among others.

The distribution lines and poles can potentially constitute an electrocution and collision hazard to birds. Some birds also utilize the distribution towers for nesting.

6.16.1.1 Embedded/ in-built Control

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

6.16.1.2 Significance of Impacts

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

6.16.1.3 Additional Mitigation Measures

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

- Design of distribution towers 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.

6.17 KEY NEGATIVE SOCIAL IMPACTS – OPERATIONS PHASE

6.17.1 Impact on Occupational Safety and Health

During the operation phase, maintenance and repair will be done on the site. Therefore, there will be potential impacts on workers' health and safety due to exposure to risks through such 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; heat stress and working during high temperatures
- Safety risk due to working at heights during installation of power lines
- Exposure of workers to electro-magnetic field (EMF) during operation and maintenance of the mini-grids

6.17.1.1 Embedded/in-built control

- All maintenance 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;
- Lifting equipment should be operated by trained and authorized persons;
- Training of the workers on climbing techniques, and rescue of fall-arrested workers;

6.17.1.2 Significance of Impacts

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.

6.17.1.3 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 the 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.

6.17.2 Impact on Community Safety and Health

The receptors for impacts on community health and safety include settlements in the close proximity of the project which will be exposed to health impacts from the project activities. The operation phase activities that involve maintenance of the mini-grid components may result in impacts on the health and safety of the community.

The major community health and safety risks include electrocution, structural failure of project infrastructure e.g., power line, fire safety and management of emergency situations.

6.17.2.1 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 mini-grid site will be properly fenced for safety and sign boards in local languages will be put up;

6.17.2.2 Significance of Impact

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

6.17.2.3 Additional Mitigation Measures

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

- Implementing the existing grievance redress mechanism
- The local community recommended that a technical operator should be stationed within or near the site in order to handle emergencies in the event that they occur

6.17.3 Gender Based Violence, SEA & SH

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

6.17.3.1 Significance of Impact

GBV cases cannot be ruled out during project operational and maintenance phase. Thus, the significance of this impact is considered to be Minor considering low sensitivity of the receptor and low magnitude of the impact.

6.17.3.2 Mitigation measures

To manage GBV risks, the contractor will prepare a SEA/SH Prevention and Response Action Plan that will include a GM that ensures confidentiality. The plan should have an Accountability and Response Framework. The plan will include the necessary

measures for prevention and response. The contractor can make reference to World Bank's Good Practice Note for Addressing Gender-based Violence in Investment Project Financing involving Major Civil Works (Sept 2020) for further guidance.It should be noted that the decision to report a GBV case lies with the survivor or the guardians if the survivor (in case of a minor) and such a decision must be respected. Therefore, the contractor or project will only refer the survivor of guardian to the established referral pathway, including the nearest police station with a gender desk for handling GBV cases. Also, should a survivor choose legal redress, the project will similarly facilitate him/her by referring him/her to the nearest established legal support facility that offers legal support to GBV survivor. Other way to mitigate GBV arising from the projecti Kipsing include;

- Prepare an Awareness Raising Strategy, which describes how the staff and local communities will be sensitized to GBV risks, and the staff'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.

6.17.4 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 individuals and households 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.

There is a high likelihood that the targeted PAPs 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:

- ✓ Single mothers
- ✓ Orphans and children under 5 years
- ✓ Persons Living with Disabilities
- ✓ The poor elderly people

6.17.4.1 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. However, it is important to put into account the project site inhabitants are predominantly the Samburu community.

6.17.4.2 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
- 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

6.17.5 Risk of Communicable Diseases

The operation and maintenance phase 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, STIs and COVID-19 through risky behaviours involving job seekers and people employed on the project.

6.17.5.1 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.

6.17.5.2 Mitigation measures

- The Contractor should develop and implement pre-employment screening measures for workers, which should include communicable 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 Communicable Diseases Policy and an information document for all workers directly related to the Project. The document should address factual health issues as well as behaviour change issues around the transmission and infection of diseases.
- The Contractor will make condoms available to employees
- 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.
- Sensitize all community segments and project workers on Covid 19 and precautionary measures that need to be observed;
- Restrict site access to only Authorised persons; and
- Continuously adhere to the MoH, WHO and World Bank guidelines on Covid-19 management.

6.17.6 Shocks and electrocutions to the PAPs

Majority of the PAPs who will be customers and users of the power have not used electricity before. Failure to take appropriate precaution while interacting with electricity can result in electric shocks, fires and even electrocution/death.

6.17.6.1 Significance of Impact

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

6.17.6.2 Mitigation Measures

The following precaution/preventive measures need to be observed in order to prevent risk of electric shocks, fires and electrocutions.

- Inspect the wiring of the houses before connecting power
- 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

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

6.17.7 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.

6.17.7.1 Significance of Impact

With the implementation of the mitigation measures the impact significance is minor to negligible.

6.17.7.2 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

6.18 DECOMMISSIONING PHASE

6.18.1 Preparation for decommissioning

The solar power plant may be decommissioned due to various reasons and there are impacts that will need to be mitigated. Once the REREC makes the decision for decommissioning the following will be required;

- Prepare a Decommissioning Plan and submit to NEMA and the County Governments of Isiolo to obtain approval for implementation.
- Implement the decommissioning plan including backfilling, revegetation, disposal of waste material, recycling of recyclable material among others

Some of the positive impacts associated with the proposed project during its decommissioning phase include;

6.18.2 Employment Opportunities

Once the project has served its purpose it will then be decommissioned. This will involve demolition and removal of the facility. During demolition, unskilled, semi-skilled and skilled employment opportunities will be available to the public.

6.18.2.1 Significance of Impact

Impact magnitude is considered to be small considering the decommissioning period to last for a short duration. The overall impact significance is envisaged to be Minor

due to low sensitivity and medium magnitude.

6.18.2.2 Enhancement Measures

- Notify the GRC, Local leadership, the County Government reps of the specific jobs and the skills required for the work
- Prioritize the employment of unskilled labour from the local communities.
- Prioritize the procurement of goods and services from within Isiolo 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.

6.18.3 Site Rehabilitation

After demolition of the proposed project, rehabilitation of the project site will be carried out to restore it to its original status or to a better state than it was. This will include replacement of topsoil and re-vegetation which will lead to restoration of the visual, vegetative and aesthetic state of the site.

6.19 KEY NEGATIVE ENVIRONMENTAL IMPACTS – DECOMMISSIONING PHASE

6.19.1 Impact on Soil

The project activities that may impact the environment during the decommissioning phase are described include: removal of PV modules, and removal of associated infrastructure including battery and generators.

6.19.1.1 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 the decommissioning activities will be confined in the small project area.

6.19.1.2 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 demolition site and protect the soil to prevent the waste soils and other debris from being washed away by surface runoff and wind.
- Any soil potentially contaminated by chemicals, oils, fuels to be collected and disposed of by a NEMA authorized waste handler

6.19.2 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 demolitions and demolition waste handling etc.;
- Fugitive emission from traffic movement;
- Exhaust emission from operation of machineries like pile drivers, vehicles; and
- Point source emission from diesel generator.

6.19.2.1 Embedded/in-built control

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

6.19.2.2 Significance of Impact

There are few Receptors (settlements) within 500 m of the project site and the impact magnitude will be medium and sensitivity medium hence the impact significance will be moderate.

6.19.2.3 Additional Mitigation Measures

- Periodic access road wetting to reduce nuisance dust levels.
- Visual inspection of dust pollution from roads and the demolition site and appropriate intervention if dust levels are high.
- Speed restriction of the 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 the site workers.
- All demolition wastes will be transported in designated trucks which will be covered.

6.19.3 Impact on Ambient Noise

The sources of noise in the decommissioning phase include demolition activities, operation of generator sets and movement of vehicles. There will also be increased noise levels because of increased anthropogenic movement in the area.

6.19.3.1 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:

- Demolition activities;
- Transportation of demolition wastes materials, machinery and personnel; and
- Operation of generator sets.

6.19.3.2 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.

6.19.3.3 Significance of Impact

The impact significance has therefore been assessed minor. This due to the fact that the impact magnitude is low and the receptor sensitivity is medium.

6.19.3.4 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 equipment that may be in intermittent use should be shut down or throttled down during non-work periods;
- Minimal use of vehicle horns and heavy engine breaking in the area needs to be encouraged;
- The 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; and
- Sensitize the truck drivers to switch off vehicle engines while loading materials.

6.19.4 Impacts on Waste Generation and Soil Contamination

General demolition 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 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. Therefore, the receptor sensitivity has been assessed as medium.

6.19.4.1.1 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.

6.19.4.1.2 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.

6.19.4.1.3 Additional Mitigation Measures

- Contractor should ensure that no unauthorized dumping of used oil and other hazardous waste is undertaken at the site;
- 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.

6.20 KEY POSITIVE SOCIAL IMPACTS – DECOMMISSIONING PHASE

6.20.1 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) who will be affected.

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

6.20.1.1 Significance of Impact

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

6.20.1.2 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 Isiolo 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.

6.20.2 Impact on Occupational Health and Safety

There will be potential impacts on workers' health and safety due to exposure to risks through demolition 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 demolition; 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.
- Risks of road accidents during the transportation of material and equipment to and from the project sites.

6.20.2.1 Embedded/in-built control

- All demolition 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;

6.20.2.2 Significance of Impacts

The impact on occupational health and safety during the decommissioning 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.

6.20.2.3 Additional mitigation measures

- All workers (regular and contracted) should be provided with training on Health and Safety management system of the contractor during decommissioning 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 lifting equipment are 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.

6.20.3 Gender Based Violence, SEA & SH

Gender Based Violence (GBV), Sexual Exploitation and Abuse (SEA) may be committed against the communities by the workers. Incidences of Sexual Harassment (SH) may occur among the staff during decommissioning phases of the project. This may be experienced while the women are searching for jobs and those giving the jobs may ask for sexual favours.

6.20.3.1 Significance of Impact

The significance of this impact is considered to be Minor considering low sensitivity of the receptor and low magnitude of the impact.

6.20.3.2 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.

6.20.4 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 individuals and households 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 during the decommissioning phase.

6.20.4.1 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. However, it is important to put into account the project site inhabitants are predominantly the Samburu community.

6.20.4.2 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 any restrictions and negative impacts

    - Provide support to VMG participation arrangements in the project
- 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
- Monitor performance in engagement
- Enlist the services of reputable advisers with good local knowledge
- Implement the existing grievance redress mechanism

6.20.5 Risk of Communicable Diseases

The decommissioning of the mini-grid may lead to increased migration of labour into the mini-grid site. Local communities can be exposed to increased risk of communicable diseases such as HIV/AIDS, STIs and COVID-19 through risky behaviours involving job seekers and people employed on the decommissioning of the project.

6.20.5.1 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.

6.20.5.2 Mitigation measures

- The Contractor should develop and implement pre-employment screening measures for workers, which should include communicable 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 Communicable Diseases Policy and an information document for all workers directly related to the Project. The document should address factual health issues as well as behaviour change issues around the transmission and infection of diseases.
- The Contractor will make condoms available to employees and communities neighbouring the site during decommissioning.
- 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.
- Sensitize all community segments and project workers on Covid 19 and precautionary measures that need to be observed;
- Restrict site access to only Authorised persons; and
- Continuously adhere to the MoH, WHO and World Bank guidelines on Covid-19 management.

6.21 CUMULATIVE IMPACTS

6.21.1 Cumulative Impact Assessment

It was observed during the site survey that there are no other similar solar projects within the projects site. Therefore, 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.

7 ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN (ESMMP)

7.1 ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN

A detailed Environmental and social management and monitoring plan for preconstruction, construction, operation and decommissioning phase is well illustrated in the table below:

Table 7-1: ESMMP

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
Social Impacts						
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	Contractor O&M Contractor and KPLC	-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

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
Local Sourcing	-Source materials from local businesses/communities, and where necessary give opportunities to businesses owned or operated by vulnerable individuals.	Construction Decommissioning		-Number and types of businesses sourced from, businesses owned and operated by vulnerable individuals, types and quantities of materials etc.	Quarterly	No additional cost
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, and 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	Pre-Construction	Contractor-*(contractors' facilities, workers camps)* Proponent-*(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	Quarterly	1,000,000

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	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. -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.			the use and restoration of their land.		

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
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 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	Construction Decomissioning	Contractor; O&M Contractor and KPLC	-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)
	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. -Put visible signage on site "**No Jobs for children**"	Construction Decomissioning	Contractor, O&M Contractor and KPLC	-Updated employment register indicating locals employed, their ages, national identification numbers etc. -Grievances raised, aggrieved persons and status on resolution etc.	Quarterly	20,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	-Do not allow children at the project site.					
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 Decomissioning	Contractor; O&M Contractor and KPLC	-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.	Construction Decomissioning	Contractor O&M Contractor and KPLC	-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)
	-Ensure that all workers have a national ID card or documentation to show they are adults (above 18 years).					
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	Construction Operations Decomissioning	Contractor; O&M Contractor and KPLC	-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),	Quarterly	30,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	mechanism to deal with grievances. -The grievance redress committee to include representatives from the community. -Sensitize stakeholders on SEP and GRM.			grievances raised and status on resolution etc. -Concerns raised andactons raised.		
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.	Pre-construction Construction Operations Decomissioning	Contractor O&M Contractor and KPLC	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)
	• 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 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	O&M Contractor and KPLC	-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	Quarterly	No additional cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
				appropriate and accessible. Grievances raised and status on resolution etc		
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 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	Construction Operations Decomissioning	Contractor O&M Contractor and KPLC	-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 -Number of grievances reported -Number of grievances resolved in a timely manner -Number of grievances escalated to national courts and the World Bank Grievances	Quarterly	No additional cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	particularly sensitive social aspects such as GBV, as well as anonymity.			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 ***5.*** Re-vegetation including planting of trees around the plant/facility	Construction	O&M Contractor and KPLC	-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)
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 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	Construction	O&M Contractor and KPLC	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)
	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	O&M Contractor and KPLC	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	Construction	O&M Contractor and KPLC	-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)
	7. Keep stockpiles and exposed soils compacted and re-vegetate as soon as possible. 8. Construction trucks moving materials to site, 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,	Construction	O&M Contractor and KPLC	-Engine maintenance records - inspection of stacks	Quarterly	100,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	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 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	Construction	O&M Contractor and KPLC	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)
	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 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					

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	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	O&M Contractor and KPLC	-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	Construction	O&M Contractor and KPLC	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

	from vehicles and machinery should be cleaned immediately					

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	O&M Contractor and KPLC	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	Construction	O&M Contractor and KPLC	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)
	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 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	Construction	O&M Contractor and KPLC	-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)
	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					
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	O&M Contractor and KPLC	Sources of raw materials (from local community)	Quarterly	Part of contractor's cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
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	O&M Contractor and KPLC	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 equipment or appliances when they are not being used. 2. Proper planning of transportation of materials will ensure that fossil fuels (diesel,	Construction	O&M Contractor and KPLC	Energy consumption records	Quarterly	No additional cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	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 6. Close supervision of workers	Construction	O&M Contractor and KPLC	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)
	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	Construction	O&M Contractor and KPLC	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)
	4. Maintain records of any person who comes to site					
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	Construction	O&M Contractor and KPLC	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)
	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 education/information about HIV/AIDS transmission and prevention measures. 8. Ensure equal treatment of workers 9. Provide all appropriate COVID-19 preventive measures including					

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	campaign to maintain individual measures at the workplace.					
Sanitary waste	**1.** Construct/ install pit latrines for both genders clearly labelled	Construction	O&M Contractor and KPLC	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 handler to collect and dispose solid waste	Operation	O&M Contractor and KPLC	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)
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	O&M Contractor and KPLC	-Engine maintenance records -Oil spill containment plan	Quarterly	200,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
Increased oil Consumption	1. Efficient energy consumption 2. Install an energy-efficient lighting system	Operation	O&M Contractor and KPLC	Energy consumption records	Quarterly	No additional cost
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	O&M Contractor and KPLC	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	Operation	Contractor	-Provision of serviced fire equipment, evacuation plan	Quarterly	50,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	and in key strategic points 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			and safety signages -Records of fire safety training		

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
Visual Impacts	1. Fence round the solar Mini-grid to keep off/screen the solar panels.	Operation	O&M Contractor and KPLC	Presence of a perimeter fence	Quarterly inspections	No additional cost
Water demand	1. Ensure prudent use of water. 2. Install water-conserving automatic taps. 3. Any water leaks through damaged pipes and faulty taps should be fixed promptly.	Operation	O&M Contractor and KPLC	Water usage records	Quarterly	20,000.00
Sanitary waste	1. Provide sanitary waste facilities for both genders clearly marked 2. Disposal of waste through septic tanks	Operation	O&M Contractor and KPLC	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	Operation	O&M Contractor and KPLC	-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)
	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					
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.	Operation	O&M Contractor and KPLC	-Provision of PPEs and WIBA cover -Environmental audit reports	Quarterly	100,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	3. Operators must be skilled on firefighting management 4. Annual environmental audits should be done 5. WIBA cover for staff is mandatory					
Hazardous waste-damaged panels	1. Segregation from other waste streams 2. Proper disposal through a NEMA approved/licensed handler	Operation	O&M Contractor and KPLC	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. 2. Monitor noise levels	Operation	O&M Contractor and KPLC	Noise levels- Records of noise measurements done by contractor within the project area and at distances of 30m from the Solar mini-grid	Quarterly	Part of contractor's cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
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	Operation	O&M Contractor and KPLC	-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)
	electricity infrastructure e.g., not tying livestock on 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	O&M Contractor and KPLC	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	Operation	O&M Contractor and KPLC	Grievance records	Quarterly	20,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	6. Monitoring the pattern of grievances to come up will long term measures					
Gender Based Violence –SEA and SH	To manage GBV risks, the contractor will prepare a SEA/SH Prevention and Response Action Plan that will include a GRM that ensures confidentiality. The plan will include the necessary measures for prevention and response and must ensure survivor-based approach	Operation	O&M Contractor and KPLC	-SEA/SH Prevention and Response Action Plan -Grievance records	Quarterly	20,000.00
Public Health Impacts – HIV/AIDs	1. Sensitize workers and the community on prevention and mitigation of HIV/AIDS and other sexually	Operation	O&M Contractor and KPLC	Number of awareness creation sessions conducted.		20,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	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			-Availability of and distribution of condoms		
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 and any other person coming to site 4. Enforce wearing of masks	Operation	O&M Contractor and KPLC	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)
	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					
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	O&M Contractor and KPLC	Visual inspection	Quarterly	50,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
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	O&M Contractor and KPLC	Engine maintenance records	Quarterly	No additional cost
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	Decommissioning	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)
	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.					
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	Decommissioning	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)
	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					
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	Contractor	Visual inspection	Daily	20,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
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	Contractor	Records of awareness creation sessions conducted. -Availability of and distribution of condoms	Once off	20,000.00
	Total					5,380,000.00

Table 7-2: Institutional Framework and Compliance/Implementation of the ESIA/ESMMP

No	Institution	Role/Function
1	The National Environment Management Authority (NEMA)	NEMA: • Approves the ESIA Report; • Issues EIA License for project implementation; and • Carries out independent Audit to determine compliance with ESMMP.
2	Directorate of Occupational Safety and Health Services (DOSHS)	DOSHS: • Provides OSH permits for workplaces of the project including campsites and quarries; and • Conducts inspections to ensure conformance to OSHA.
3	Water Resources Authority (WRA)	WRA: • Provides necessary water abstraction permits for boreholes and surface water sources (rivers, streams etc.); and • Monitors water use in the region and provide guidance water use.
4	National Land Commission (NLC)	NLC: • Verifies the identified land for the purposes of ascertaining land ownership; and • Transfer of land ownership details to the proponent.
5	National Gender and Equality Commission	The Commission: • Ensures that there is gender equality and equity throughout the implementation of the project; and • Representatives will monitor and evaluate gender quality and equity with regards to job provision and harassment cases on site to ensure compliance with the law
6	County Government of Isiolo	County Governments will: • Provide approval for the project & project site; • Approval of community land consent & verification; and • Provide support.
7	Supervision Consultant	Supervising Consultant: • Will engage the following dedicated full-time safeguards staff to support risk management: ✓ Supervising Engineer (RE) ✓ Social Safeguards Specialist ✓ Environmental Safeguards Specialist • Review and approval of the ESMMPs and other plans; • Day to day supervision of Contractor implementation of the ESMMPs and other plans; • Regular reporting on the ESMMP implementation; and • Has full time Environmental, Health and Safety and Social Specialists

8	Contractor	Contractor: • Will engage the following dedicated full-time safeguards staff; ✓ Environmental Safeguards Specialist ✓ Social Safeguards Specialist ✓ Registered Occupational Health and Safety (OHS) Expert ✓ Community Liaison officer to act as link between the community and contractor and to support the social specialist. • Will Prepare the C-ESMPs informed by the proponent's ESMMP and other plans before commencing construction; • Will Operationalize and implement the C-ESMPs; • Carries out day to day management of ES, H& S risks; and • Reports on incidents and accidents to the Resident Engineer and regulators.

7.2 MANAGEMENT PLAN DURING CONSTRUCTION PHASE

The contractor will prepare targeted management plans to deal with specific environmental and social aspects guided by the ESMMP and any other emerging issues on the ground. The contractor shall prepare these plans and have them approved by both the proponent and the Bank before they mobilize to the site:

- Construction management plan
- Rehabilitation and site closure plan
- Local recruitment plan
- Workplace health and safety plan
- Community safety plan
- Emergency management and response plan
- SEA/SH Prevention and Response plan
- Stakeholder Engagement plan
- Grievance Redress mechanism
- Labor influx management plan

7.2.1 Construction Management Plan

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

a) 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.

b) 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

c) 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 REREC.

d) Management of Air Quality

- The Contractor shall institute appropriate measures to minimize or avoid air quality impacts. This can be achieved through formulation of air quality management plan.

e) Neighbouring Land Owner and Occupier Relations

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

f) Complaints Register

The contractor shall establish and maintain a register for periodic review by the REREC that logs all the complaints raised by the neighbours 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.

g) 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 up-to-date 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.

7.2.2 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.

7.2.3 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 local recruitment plan contractor shall:

- Comply with the provisions of Employment Act, 2007
- Wherever possible, give priority to qualified local people when hiring employees.

The mitigation measure is:

- Prepare a local recruitment strategy that is fair and transparent to ensure all community segments - men, women, vulnerable individuals, minority clans, and VMGs who meet OP 4.10 criteria) - can access subproject benefits during construction and that prioritizes hire of locals for skilled, semi-skilled and unskilled labour.

7.2.4 Workplace Health and Safety Plan

The workplace health and safety plan to be implemented by the contractor and REREC 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).
- 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.

7.2.5 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 to ensure that health and safety of immediate neighbours and the public is not threatened.
- The 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.

7.2.6 Emergency Preparedness Plan

The Contractor shall develop an emergency plan that will enable rapid and effective response to all types of environmental emergencies 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.

7.2.7 SEA/SH Prevention and Response Action Plan

The contractor will prepare a SEA/SH Prevention and Response Action Plan that will include a GM 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 GM for use by workers and community members (as appropriate).
- The GBV GM should allow for anonymous incident reporting and should be GBV survivor-centric
- Sensitize community members and workers on contractor GMs
- 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

7.2.8 Stakeholder Engagement Plan

A Stakeholder Engagement Plan is a formal approach to communicate with project stakeholders to achieve their support for the project. The plan prepared shall specifies

the frequency and type of communications, media, contact persons, and locations of communication events. The SEP is a useful tool for managing communications between the contractor and other stakeholder. The plan should meet the following objective of a SEP.

- To help improve project design and implementation
- To inform third parties about changes that affect them
- To take their views into account in the implementation of projects
- To identify adverse impacts and mechanisms to enhance project benefits
- To identify risks from and to a project
- To increase project ownership and sustainability
- To comply with Bank policies that require consultations

The plan shall put this measure in to consideration:

- In consultation with the identified stakeholders, prepare a stakeholder engagement plan (SEP) that is based on their locations (maps) and their information needs at the various subproject phases

7.2.9 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

7.2.10 Grievance Redress Mechanism

Grievance mechanisms should receive and facilitate resolution of the affected institutional or communities' concerns and grievances. Community concerns should be

addressed promptly using an understandable and transparent process that is culturally appropriate and readily acceptable to all segments of affected communities, at no cost and without retribution. Mechanisms should be appropriate to the scale of impacts and risks presented by a project. Grievances can be an indication of growing stakeholder concerns (real and perceived) and can escalate if not identified and resolved. The management of grievances is therefore a vital component of stakeholder management and an important aspect of risk management for a project. Projects may have a range of potential adverse impacts to people and the environment in general, identifying grievances and ensuring timely resolution is therefore very necessary. As such the project has developed a grievance management process to serve as a guide during project implementation.

7.2.10.1 Grievance 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 established under the Land Act 2012 (Part VIIIA 133A) 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.

7.2.10.2 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)-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.

7.2.10.3 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.

7.2.10.4 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

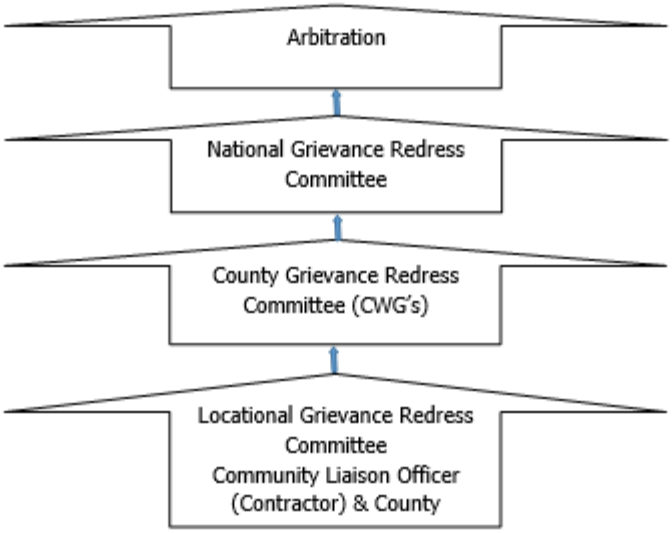


Figure 7-1: KOSAP Grievance Redress Mechanism

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

Existence of a Local Grievance Redress Mechanism in Kipsing

A Local grievance redress committee was constituted in September 2021 consisting of 7 members. It is anticipated that the committee shall become active during the construction and operation phase of the project. The LGRM is composed of the following members of the project committee:

1. The area chief;
2. 2 Youth representatives;
3. 2 Female representatives; and
4. 2 Male representatives.

The names of the nominated members has been appended in Appendix 5 in this report.

8 IMPACT SUMMARY AND CONCLUSION

8.1 INTRODUCTION

This chapter gives a summary of impacts conclusion and recommendations

8.2 SUMMARY OF IMPACTS IDENTIFIED AND ASSESSED

8.2.1 Pre-construction Phase Impacts

A number of impacts have been identified as a result of the pre-construction of the proposed Kipsing project. The impacts in this phase will be associated to land acquisition and stakeholder engagements.

The significance of the land acquisition is minor prior to the application of appropriate mitigation measures, while that of stakeholder engagement is of major significance. With the application of appropriate mitigation measures, the significance of all the identified negative impacts associated with this phase will be reduced to minor or negligible.

8.2.2 Construction Phase Impacts

A number of impacts have been identified as a result of the construction of the proposed Kipsing project. Of these, impacts on local economy and employment 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.

8.2.3 Operational Phase Impacts

A number of impacts have also been identified to be associated with the operational phase of the proposed Kipsing project. Of these, impacts on Economy and Employment 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.

8.2.4 Decommissioning Phase Impacts

A number of impacts have been identified as a result of the decommissioning of the proposed Kipsing project.

The significance of the identified negative impacts associated with the pre-construction phase is moderate to 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 decommissioning phase will be reduced to minor or negligible.

8.3 CONCLUSION AND RECOMMENDATIONS

An Environmental and Social Management and Monitoring Plan (ESMMP) 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 ESMMP 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 ESMMP 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 Project Proponent and Contractor should 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 ESMMP.

9 REFERENCES

The following list of references was referred to in preparing this Project Report:

1. Environmental Assessment Source Book, 1999 (World Bank),
2. George, C. and Lee, N., 2000 Environmental Assessment in Developing and Transitional Countries, Willey: Chichester, UK
3. Government of Kenya (GoK), 1999. The Environmental Management and Co-ordination Act, 1999. Government Printer.
4. Government of Kenya (GoK), 2003. The Environmental (Impact Assessment and Audit) Regulations, 2003.
5. Government of Kenya (GoK), 2009. The Environmental Management and Co-ordination Act, Regulations 2009, Legal Notice No. 61, 2009. Government Printer
6. Government of Kenya (GoK). The Public Health Act Chapter 242 Laws of Kenya.
7. Government of Kenya (GoK), 2002. The Water Act 2016. Government Printer, Nairobi, Kenya.
8. Government of Kenya (GoK), Building code, Building order 1968 and Grade 11 Building Order 1968
9. Government of Kenya: The Physical Planning Act 2019
10. Government of Kenya: Occupational Safety and Health Act,2007
11. Government of Kenya: Factories and Other Places of Work (Safety and Health Committee) Rules 2004
12. Government of Kenya: Water Quality Regulations, 2006
13. Government of Kenya: Waste Management Regulations, 2006
14. Government of Kenya: The Occupational Safety and Health Act, 2007
15. Government of Kenya: Noise Prevention and Control Rules 2005
16. Government of Kenya: Hazardous Substances Rules, 2007
17. Government of Kenya: Factories and Other Places of Work (Noise Prevention and Control) Rules 2005
18. British Standard (BS) 5228 Part 4, 1997: Noise Control on Construction and Open Sites: Code of Practice for Noise and Vibration Control applicable to piling operations
19. International Labor Organization 1983: Encyclopedia of Occupational Health and Safety Vol. II, Geneva.
20. Sombroek WG, Braun HMH & Van der Pouw BJA, 1982: Exploratory Soil Map and Agro-climatic Zone Map of Kenya, 1980 (Kenya Soil Survey, Nairobi),
21. Community Land Act, 2016
22. The Land Registration Act, 2012
23. The Land Act, 2012
24. The Energy Act, 2019
25. The Constitution of Kenya, 2010
26. The Isiolo County Integrated Development Plan 2018-2022

10 APPENDICES

List of appendices	
APPENDIX 1	A-RAP
APPENDIX 2	Minutes Of Meeting Held During Land Identification Phase
APPENDIX 3	List of Attendance-Land allocation meeting
APPENDIX 4	Minutes of the Meeting Held During ESIA Process
APPENDIX 5	List of Attendance -ESIA meeting
APPENDIX 6	NEMA Firm of Experts Licence and Lead Expert License

10.1 APPENDIX 1 - ABBREVIATED RESETTLEMENT ACTION PLAN

(A-RAP)

1. Kipsing Sub-project Site

The Kipsing sub-project site is on unregistered community land and held in trust by the County Government of Mandera on behalf of the community, in line with the Community Land Act 2016. The proposed site is uninhabited, has no structures, community facilities, or encumbrances. Consultations leading to the identification and selection of the sub-project site are captured in the Environmental and Social Screening report for Kipsing. *Refer to Chapter 4 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 1700 (approximately 335 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 1.2702 Hectares identified for the sub-project will be acquired compulsorily by the National 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 2 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 loss of land and pasture. The Kipsing community requested the construction of a social hall for community activities at the Kipsing centre The value of the priority community project will be proportional to or higher than the value of land under acquisition. In addition, 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 or damage to the above will be compensated/restored at full replacement cost,[1] in line with the provisions of the RPF.	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.		

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)

Figure 1:

[1] A cost basis that will yield compensation sufficient to replace assets, plus necessary transaction costs associated with asset replacement).

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 5 of the ESIA on public consultation and 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 Kipsing Locational Grievance Redress Committee (LGRC), constituting a chairperson, secretary, and three members, was formed through community consensus. The committee's membership comprises 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.

4.3 Summary of Consultations on Land Acquisition and Compensation Options

Date	Objective	Implementing Entities	Land Acquisition and Compensation Aspects Discussed	Key Issues Raised
September 6th 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 Corporation (REREC)	Site identification and land allocation for the sub-project. Criteria for VLD. Community entitlements (forms of compensation and implications for each).	Ni leo mnahitaji hii ardhi? Kama ni leo basi tuongee we decide on where to give land of mode of compensation.
				We will give land immediately, give us opportunity to deliberate
				Is the compensation on termly basis or one off?-
				This town settlement pattern is not planned so will you do physical planning for us? You need land for project – we have given out land for schools, church, dispensary it's my plea that town is first planned so that we can know the boundaries.-
January 31st 2022	Environmental and Social Impact Assessment.	Consultants MoE KPLC REREC	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 tohe cnstruction of a social hall for community activities at the Kipsing centre.

				Will the contractor Compensation the community for the land acquired and used to construct the minigrid?
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 5 and 7 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.

10.2 APPENDIX 2 – MINUTES OF THE MEETING HELD-LAND ALLOCATION MEETING

MINUTES OF COMMUNITY CONSULTATION MEETING HELD ON 06/09/2021 AT KIPSING VILLAGE STARTING 12.24PM

AGENDA

- Public forum: Welcoming and opening remarks
- Project information: KOSAP and the Kipsing mini grid
- Project Land requirements: Disclosure of community rights and entitlements to compensation, the options and implications)
- Potential environmental and social risks and impacts: positive and negative impacts and project opportunities.
- Grievance Redress Committee
- Focus Group Discussions: Men, Women and Youth.
- Review of feedback from FGDs by all community members.

In attendance (refer to annexed list of participants)

MIN 1.0 WELCOMING AND OPENING

The area Chief Henry Lesokoyo called the Baraza to order at 12.24pm and invited James Nyakarkaranle to lead in prayers. He then requested that he and Abdi Guyo act as interpretors. He said the Baraza had few participants because some community members had gone to tend to livestock. He Invited visitors to introduce themselves.

The visiting team then proceeded to introduce themselves to the community as follows;

No	Name	Title/Institution
1.	Ms. Irene Kawira	Snr. Environmentalist (REREC)
2.	Ms. Agnes Gachoki	Snr. Surveyor (REREC)
3.	Mr. Kioko Maithya	Social Safeguards Officer (REREC)
4.	Ms. Dorothy Kagweria	Ministry of Energy
5.	Mr. Abdi Guyo	CREO Isiolo
6.	Mr. Cheruiyot Kimutai	Physical Planner, Isiolo County

2.0 KOSAP AND KIPSING MINI GRID

Ms. Dorothy Kagweria 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 Kipsing because it recognises energy as an enabler to development.

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 Isiolo County 10 minigrids including one to be sited at Kipsing will be implemented in addition to stand-alone solar facilities (public facilities) and solarisation of boreholes. The agenda of the visit she said 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 architecture and connection requirements, discuss potential environmental/social risks and impacts and mitigation and sensitize community on grievance redress mechanism. The proposed mini grid will comprise a solar system and a thermal unit (generator) and those residing within 1.5 km radius from the project site will be connected to power. Those living beyond this radius can benefit from solar home systems. She said for one to be connected he/she will be required to pay a one-off connection fee of Kshs 1000. Thereafter they shall be buying prepaid tokens in order to access electricity. Tokens can be purchased through a vendor or directly through the mobile money platforms (Mpesa).

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 the project. Land required for the construction of the Mini grid is 1.2702 hectares. Land in Kipsing, 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 land including; allocation, land adjudication process, compulsory acquisition, settlement programs, transfers, and long-term leases.

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

1. They can refuse to give 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, dispensary 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 ie elders, men, women, the marginalised and PLWDs. Land consent 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 was on-going.

MIN 4.0 SOCIAL AND ENVIRONMENTAL ISSUES

The Environmental specialist Ms. Irene Kawira Mate said that there were both positive and potential negative impacts that were likely to emanate due to the construction of the project.

POTENCIAL POSITIVE IMPACTS

1. Employment and Wealth Creation - locals will be prioritized for unskilled and semi-skilled employment opportunities, therefore creating an income source for especially youth. Other services to be procured locally could include accommodation, catering and cleaning,

2. Access to electricity

The area will be supplied with power for domestic and commercial use for those residing within 1.5 kilometre radius from project site,

3. Improved Standard of living

locals to use domestic electric appliances such as iron boxes etc., improved lighting, longer business operating hours, ability for children to study at home, locals can diversify their businesses and create alternative livelihood opportunities, as well as improved security. Access to electricity will also limit exposure to smoke associated with kerosene lamps, a major cause of lower respiratory infections.

4. Reduced disease burden and mortality rates

Residents currently use firewood and kerosene lamps for lighting, causing indoor pollution. Replacing kerosene lamps and firewood for lighting with electricity will reduce disease burden at the family level and on the government.

5. Benefits to Education

Access to reliable electricity at the household level and schools will create opportunities for children to study, access more information through informative TV channels and radios. This will increase the amount of time spent by children studying and accessing valuable information translating into better results and an informed society.

6. Improved Security

There will be enhanced security arising from well-lit social, commercial and individual premises. This is as a result of improved security lighting, which will help ward off opportunistic crimes and gender-based violence.

7. Improved communication and access to information

Access to electricity will lead to improved communication for the PAPs. For example, charging of mobile phones will be easier and cheaper. Project PAPs will have access to information on local, national and international social, economic, political affairs.

8. Gender Considerations

Both men and women will access electricity and benefit from opportunities electrification brings. Lighting, internet and television will improve access to information therefore, women will benefit from information especially on health and nutrition, among others. Women will have an opportunity to engage in productive uses of power e.g. baking bread, blending juices, running salons etc and elevate themselves economically.

POTENNIAL NEGATIVE IMPACTS AND THEIR MITIGATION

NO	POTENTIAL NEGATIVE IMPACT	PROPOSED MITIGATION MEASURES
1.	Dust emission	The Contractor/EHS officer will ensure strict enforcement of on-site speed limit regulations, Cover stock piles of fine materials with tarpaulin during windy conditions and Provide and enforce use of PPEs by construction workers
2.	Exhaust emission	Regular maintenance of equipment to increase their efficiency and reduce generation of exhaust emission Avoiding equipment and vehicles running unnecessarily to reduce emission
3.	Noise Pollution	Construction activities to be restricted to daytime, drivers and machine operators instructed to switch off engines when not in use. Drivers will avoid hooting especially when passing through sensitive areas such as mosque.Noise abatement generators and heavy-duty equipment are insulated or placed in enclosures to minimize ambient noise levels. Use equipment with low noise ratings
4.	Oil spills	Contractor and EHS will ensure proper storage, handling and disposal of new oil and used oil wastes, maintain plant & equipment to avoid leaks which should be carried out in contractors' yard (off the site), provide oil interceptors along the drains leading from potentially oil spill/leak prone areas. Oil absorbent material, traps and storage drums will be used to contain and control any minor releases of engine and other equipment oil and there shall be regular inspection and maintenance of the generator to minimize spillage
5.	Soil erosion	Levelling of the project site to reduce run-off velocity and increase infiltration of storm water into the soil and restriction of construction vehicles to use existing access roads. Any compacted areas are ripped to reduce run-off. Site excavation works be planned in such a manner that a section is completed and rehabilitated before another commences. The contractor will ensure proper compacting of soil when constructing the mini grid.
6.	Visual/aesthetic impacts	Contractor will design structures at the site in such a way as to improve the beauty of the surroundings. Restore site area through backfilling and landscaping and Plant locally occurring trees and shrubs on the open spaces to re-introduce visual barriers
7.	Solid waste	Construction materials left over at the end of construction will be used in other projects rather than being disposed off. Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of construction waste generated over time. Segregate waste according to type & dispose waste by dumping at designated landfills only. Reuse packaging materials such as cartons, cement bags, metal containers and plastic containers to reduce wastes on site. Put up well protected mobile collection units/storage for obsolete batteries before collection by a licensed waste handler by NEMA, which should be properly equipped and shall be protected from solar radiation, humidity and temperature

8.	Increased demand for raw materials	Harness rainwater and storm-water whenever possible for use in dust prevention & construction work. Consultations with the project local committee on use of water in the community to avoid conflicts with the community. Construct borehole to meet water demand. Promote recycling and reuse of water.Ensure that damage or loss of materials at the construction site is kept to a minimum through proper storage and use Employing water conservation techniques and only using the required amounts of water to prevent wastage Providing adequate water storage reservoirs at the construction site to meet project needs during periods of high demands externally and refill tanks during the periods of low demands
9.	Loss of flora & natural habitat	Clearing of vegetation & trees will be strictly controlled & only done if it's absolutely necessary
10.	Occupational health & safety risks	Contractor and EHS officer will enforce adherence to safety procedures and prepare contingency plan for accident response in addition safety education and training shall be emphasized. Provide workmen's compensation cover (WIBA) for construction staff. Register the project site as a workplace with DOSH Develop, document and display prominently an appropriate SHE policy for operation works. Formation & training of a Health and Safety Committee. Provide suitable, efficient, clean and adequate sanitary conveniences for workers Ensure that machinery, equipment, PPEs, appliances and hand tools used in construction and power generation comply with the prescribed safety and health standards and be appropriately installed maintained and safeguarded Train and supervise workers regarding construction and power generation machinery and as well as safe work procedures Equipment such as fire extinguishers MUST be inspected by a government authorized person. The equipment may only be used if a certificate of examination has been issued Ensure that materials are stored or stacked in such manner as to ensure their stability and prevent any fall or collapse Design suitable documented emergency preparedness and evacuation procedures to be used during any emergency; Provide a well-stocked first aid boxes which are easily available and accessible should be provided within the premises Provide sufficient number of trained first aiders with their contacts prominently displayed within the site. Carry out safety and health inductions and toolbox talks for all workers to enhance awareness on safety and health requirements Provide workers with PPEs and training them on equipment use and risks Contractor to register the mini grid construction site as a workplace with the Directorate of Occupational Safety and Health Services (DOSHS) Placing safety signs where there are safety hazards control the movement of vehicles, motorists and pedestrians around the site. Create awareness to the public on the potential impacts of powered lines to prevent electrical hazards

11.	Open excavations	Barricade the proposed project area using high visibility tape to avoid falls into open excavations Pole pits should be dug and poles erected immediately and where inevitable the pit shall be covered to avoid falls and injury to humans and animals or traffic accidents. Contractor to compensate any injuries to the public and animals arising from his negligence Provision of adequate warning signs to promote good safety culture at project site
12.	Increase in social vices	Encourage public participation with the locals Proper training of construction staff on local cultural behaviour and responsible community interaction Prioritize locals for certain jobs for locals. Sensitize workers and communities on HIV/AIDs prevention and mitigation through staff inductions and awareness campaigns
13.	Contractors Yard Site and Workers camp	Liaison with local administration for identification of possible sites for Contractor's Yard. Contractor to consult with community and if required pay compensation for temporal use of site. Contractor to ensure restoration of contractor's yard and workers. Contractor and community to have a written agreement on the above-mentioned mitigation measures
14.	Sanitary waste	Provide clearly marked sanitary waste facilities for both genders and ensure disposal of waste through septic tanks.
15.	Spread of communicable diseases and HIV/ AIDs	Awareness creation and consultations with local communities prior and during construction. Informing workers on local cultural values and health matters. Provision of condoms to workers. Allowing migrant workers time to be with their families. The contractor is impressed upon not to set a construction camp on site. The contractor will provide public education/information about HIV/AIDS transmission and prevention measures. Awareness sensitization and disciplinary action. Ensure equal treatment of workers Develop and implement a STD/HIV/AIDS awareness plan on prevention and mitigation
16.	Risk of Covid-19.	Avoid holding community meetings where many persons congregate until advised so by MoH Sensitize all community segments and project workers on COVID-19 and precautionary measures that need to be observed.
17.	Stakeholder engagement and information disclosure	Contractor to develop and implement the Stakeholder Engagement Plan to guide consultations and information disclosure to stakeholders Contractor to ensure that community engagement and disclosure is done prior to project mobilization Contractor to ensure full disclosure to communities on positive and negative impacts as well as opportunities
18.	Labour influx into project area	The contractor to develop & implement a Labour Influx Management Plan, Workers' Camp & Accommodation Management Plans and as part of C-ESMP and monitor all mitigation measures, including codes of conduct signed by all

		with physical presence on site, prioritization of local recruitment, induction of workers on GBV-SEA/SH, GRM for staff, avoid child and forced labour and enforce sub-contractor compliance of the same. Contractor to develop a recruitment plan Establishment and operationalization of an effective Grievance Redress Mechanism accessible to community members The contractor and the project grievance redress committee to work closely address complains raised on time. Contractor to hire Community Liaison Officers to work closely with the supervision consultant and the community Gender considerations in employment opportunities Appropriate compensation for work done Prompt payments as per the contractual agreements/terms
19.	GBV-SEA/SH	Contractor to develop and implement a GBV(SH &SEA (Sexual Exploitation and Abuse in workplace Sexual Harassment (SH) management plan, (including plans for prevention, response and GRM that is culturally appropriate and accessible and developed in consultation with the affected communities All workers with physical presence on site to sign employment contract including Code of Conduct The contractor to implement provisions that ensure that gender-based violence at the community level is not triggered by the Project e.g. review of specific compensation schemes Develop specific plan for mitigating these known risks, e.g. sensitization around gender equitable approaches to compensation and employment Confidential reporting & responding of incidences of GBV Use survivor centred approaches when responding & dealing with GBV issues Contractor to have referral services when responding to incidences of GBV survivors
20.	Liquid waste generation	Collect the used oils and re-use, re-sell, or dispose of appropriately using expertise from licensed waste handlers Proponent will make sure that storm water channels are maintained regularly to avoid release of the effluent into the land and water bodies Monitor effluent quality regularly to ensure that the stipulated discharge rules and standards are not violated
21.	Fire outbreaks	Ensure compliance with fire safety regulations and install all necessary fire safety equipment Conduct regular trainings on firefighting & emergency response Conduct regular inspection and maintenance to ensure that, there are; - no overloaded electrical systems; no incorrectly installed wiring; no live naked wires; and fuel store areas are continuously monitored Contractor to ensure all fittings are tight and implemented using quality materials to prevent arcing and any loose connections. Adapt effective emergency response plan

22.	Electric shock & electrocution	Premises to be wired by qualified technicians and test certificates maintained Deactivate and properly ground live wires before repair works are performed Ensure that live wire works is conducted by trained personnel Ensure that access to the power plant should only be by authorization and trained personnel Place warning signs on strategic places Conduct periodic awareness and sensitization campaigns for the neighbouring communities on electrical safety
23.	Insecurity	Liaising with area administration to enhance security Create public awareness on the need to protect public infrastructure for continued supply of electricity and to minimize exposure to electrical hazards Employing of security guards/competent security firm from the local population at the site Fencing of the installation area and whole site using a perimeter wall to ward off intruders
24.	Health & safety for workers and community members	Implement an appropriate re-vegetation programme to restore the site to its original status. Indigenous plant species should be prioritized

She said that the project PAPs were the Samburu and Turkana people, who are Indigenous people and are the only VMGs residing near the sub-project area. Other occupants include the Ameru and the Gikuyu.

5.0 GRIEVANCE RESOLUTION COMMITTEE (GRC)

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, accessible and developed in consultation with Kipsing 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.

The summary of the comments/remarks from the community in the meeting held at Kipsing

QUESTION/COMMENTS	ANSWER/REMARKS
Jeremiah Hanison Do we pay monthly or yearly for the services?	This is a Pay you go system where you purchase according to your requirements
Sammy Letupea How much do you pay per day in the token?	Any amount from Kshs 50
Paul Lemorua When will the project start? Do institutions like dispensary, schools etc. pay through token as well?	As soon as land is acquired. Yes, institutions will also pay through token
Soita Lejaale Wageni tumesikia maneno yenu kuhusu stima. We thank you from coming from so far. The topic about power excites us. Some wanted to buy solar but now we won't buy. It will enhance security through lighting. We are going to cooperate with you in implementing this project, just guide us. You said workers will be locals, unless locals are incapable – we can cook for workers us youth and women)	
James Lempatu Ni leo mnahitaji hii ardhi? Kama ni leo basi tuongee we decide on where to give land of mode of compensation.	
Tolonua Leakeri We will give land immediately, give us opportunity to deliberate	
Silveria Karambo Itaru (women) Is the compensation on termly basis or one off?	Compensation is one off

Paul Lemeriwuas (youth) When is this project starting- we got this information from social media that it's coming. When is it starting?	As soon as land is acquired
Jane Karambu Horio This town settlement pattern is not planned so will you do physical planning for us? You need land for project – we have given out land for schools, church, dispensary it's my plea that town is first planned so that we can know the boundaries.	This is mandate of other government departments

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 express their 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, 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 told them the FGD was a good avenue for them 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, select a representatives to the GRC. Matters agreed on and selected representatives would then be presented to the main meeting for adoption.

During the meeting the elders agreed to provide land, chose the construction of a elected the following as their representatives in the GRC;

Name	ID number	Telephone number
James Lempatu	24108532	0713436184
Sammy Letupuya	4200868	0728519894

FGD-WOMEN

	Question, Comment, Suggestion	Feedback/Responses by project team
	Soita Letade Why are we paying for power and it is free from the sun?	For operation and mantainance
	Patrick Lemeriwas Is this project by the government, who is the contractor?	REREC a government agency. Contractor to be identified after tendering

The group was led by Dorothy who was able to explain why a separate discussion was put up in order for them to have the opportunity to freely express themselves.

She explained the agenda of the visit by the officers from National government and county government was to undertake an environmental and social screening of the proposed site to check suitability in terms of environmental, technical, social and health requirements.

The second objective was to undertake community engagement to sensitize the community on the project and the third objective was about land acquisition for the project and the need for a project grievance redress mechanism.

She gave a summary of the project in terms of its positive and negative impacts and their mitigation measures, the safety precautions and the land acquisition process. She also explained the need for the women to select a representative to the project committee who would represent their views/issues to the committee for redress.

She ensured all the women had understood their rights, roles and benefits concerning the project. Further the women were educated on how they can take up economic opportunities that will raise during project implementation. They were also given opportunity to air their issues/ questions and or /give suggestions to make the project implementation process better.

The discussions went further to bring out issues on how the women can take advantage of the project benefits rather than taking a back seat. She explained to them that they would benefit more from the electricity because they will be able to use clean energy to cook and also benefit from access to information through use of radios and TV that are powered by electricity enabling them to make informed choices on different issues such as nutrition, health, farming among others. They were also set to benefit if they could set up small businesses like salons, cold drink kiosks, cooling milk because it spoils easily, children will have time to study and enhanced security due to the fact that the area will be well lit among other benefits. Gender based violence issues were also discussed including; forms of GBV, rationale for addressing GBV, ways in which a project can worsen existing GBV risks or create new risks, the need to report and document any complaints against workers, report incidences of GBV while ensuring survivor centered approach (respect for the choices, wishes, rights and dignity of the survivor). The women were told to be more vigilant to ensure young

girls do not fall prey to GBV incidences. The women were requested to keep talking to the girls on GBV risks and the need to raise alarm in case of risks factors early enough. All the women were in agreement for the project to be brought to their area. They did not ask any questions

After the discussions in the FGD for women, Dorothy requested that they elect 2 women to the GRC.
The women elected were:

Name	ID number	Telephone number
Agnes Salian Lemugesi	24108014	0721334457
Jane Kalotia	Women	11169754

FGD YOUTH

The main aim of the discussion was to know if the youth understood the project and its requirements and to give them a chance to give their opinions and ask questions they had about the project. Abdi Guyo (CREO) explained to the youth that it was important to hold a separate discussion with them so that they have opportunity to freely express themselves as this may have not been possible in the main Baraza. The FGD meeting was to clarify any issues about the project on environmental and social issues as well as request for land from the community. He explained further that there was need for land for construction of a solar mini-grid. The youth were allowed to ask questions, seek clarifications and give suggestions.

After the youth FGD discussions, Guyo requested them to elect 2 youths who will be members of the grievance redress committee. The youths nominated were;

Name	ID number	Telephone number
Francis Lipinayo	31862764	0795076415
Purity Namaiyo	28832426	0714503744

7.0 REVIEW OF FEEDBACK FROM FGD's BY ALL COMMUNITY MEMBERS

After the FGDs the participants convened back to the main meeting to review the respective resolutions from the FGDs.
They resolved to provide land for the project, validated the nominees to the GRC and elected officials to lead the identification of project land and sign the land forms on their behalf.
The community chose the construction of a chief's office as their desired project for compensation.
The community validated the following as members of the GRC:

No	Name	Design.	1D No.	Mobile No.

1	Francis Lipinayo	Youth	31862764	0795076415
2	Purity Namaiyo	Youth	28832426	0714503744
3	Agnes Salian Lemugesi	Women	24108014	0721334457
4	Jane Kalotia	Women	11169754	0711783089
5	James Lempatu	Men	24108532	0713436184
6	Sammy Letupuya	Men	4200868	0728519894

Community Baraza at Kipsing on 06/09/2021

Youth FGD at Kipsing

Land identified for the construction of the Kipsing mini

10.3 APPENDIX 3 – LIST OD ATTENDANCE-LAND ALLOCATION MEETING

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 ...KIPSING.....

MEETING VENUE.....

DATE...26/08/2021

LIST OF ATTENDANCE/PARTICIPANTS LIST

No	NAME	Identification number –ID No	Mobile No.	Gender Male/Female	Village	Person agreeto donation of land Yes/no	SIGN.
1.	IRENE MAKE	26961056	0729081720	F	KIPSING		
2.	JOHNSON MUGESO	2499 0875	0712110779	M	KIPSING		
3.	Dorothy Kaaweka						

1

ID

4.	AMINA ABDI DUNACHA	22910713	0727222351	F	Kipsing		
5.	Sammy						
6.	JAMES Lorogol	11274370	0720133031	M	Kipsing		
7.	Akai Kapua				Kipsing		
8.	Purity Lemungesi	24622110	0797363412	F	Kipsing		
9.	Haldai Ledarkarauke	30586834 0748524377	0746243773	F	Kipsing		
10	Cicilia Ethiny	2605069 0757641129	0757641129	F	Kipsing		
11	Angeta Emoru	88889633	0726254834	F	Kipsing		
12	Jane Ituran	11169754	0711783089	F	Kipsing		
13	Josphine Lenkime	23143458	0710923474	F	Kipsing		
14	Christopher Lemantile	11274337	0748198793	M	Kipsing		
15	Celina Arratuko	31359690	0712416407	F	Kipsing		
16	Chechale Olelgtle	12872693	0759978276	F	Kipsing		
17	Purity Xamaiyo	28832426	0714503744	F	Kipsing		
18	Silvena Karamby	12896780	0727688073	F	Kipsing		

2

19	Lawrence Epeyok	3440902	0728022980	M	Kipsing		
20	James Lempaty	24102537	0713436184	M	Kipsing		
21	Mary Kapus	8053180	0798068783	M	Kipsing		
22	Lucia Lele	26054443	0701424975	F	Kipsing		
23	Christine Lemanyichoi	30092165	0708084068	F	Kipsing		
24	Lucy Tieko	12757825	0748496486	F	Kipsing		
25	Jane Eminge	30125898 1250	0710725647	F	Kipsing		
26	Parsimei Lemantile	2963613	0759141435	M	Kipsing		
27	John Echaiten	39692054	0794632725	M	Kipsing		
28	Stella Kangerche	29535607	0716516455	F	Kipsing		
29	Rono Lemantile	24645207		M	Kipsing		
30	Lepelesian John	14567981		M	Kipsing		
31	Akiru Akene	5891302	0791042266	F	Kipsing		
32	Josephine Emoni	13443257	0714122522	F	Kipsing		
33	Silas Leyole	31364501	0705484836	F	Kipsing		

34	Longoroti Esekon	0005829	N/A	F	Kipsing		
35	Elizabet Lemool	3440009	07175979540	F	Kipsing		
36	Mary Hamkunyao	24112715	0717255587	F	Kipsing		
37	Mary Emekwi	36829003	0729081371	F	Kipsing		
38	Joseph Lemingani	20679862	0723419667	M	Kipsing		
39	Philip Lekodei	24626508	0724765744	M	Kipsing		
40	LESOSTIA PETER	20483784	0726535545	M	Kipsing		
41	Everline Safira Lesontia	39362427	0112507840	F	Kipsing		
42	Wangui Miriam	38325374	0702820679	F	Kipsing		
43	Likarau Lekodei	20613302	0714793318	M	Kipsing		
44	Saluwa Letimaya	29330994 ~~0482027~~	0748202794	M	Kipsing		
45	Maris Loodo	26147858	0714762298	F	Kipsing		
46	Oama Legaak	30096897	0796649814	M	Kipsing		
47	Benta Hangolo	36650421	0748333950	F	Kipsing		
48	Pauline Egilan	21768224	0791479893	F	Kipsing		

4

19	Holangai lolmokor	0184674		F	Kipsing		
20	Mario Esekon	21104558	0715806279	F	Kipsing		
21	Nakoori lodungokiool	4195260	0713004942	F	Kipsing		
22	Agnes Lekurtut	24108014	0721334457	F	Kipsing		
23	Sheila Atabo	36650871	0748751680	F	Kipsing		
24	Namoe Epitel	24869249	0701164520	F	Kipsing		
25	Patric Kapau	24094612		M	Kipsing		
26	Monica Lekishe	36432920	0795531432	F	Kipsing		
27	Lakirope Leparole	—	—	M	Kipsing		
28	Leparion Lotuno	21141463	0798173742	M	Kipsing		
29	Jememiah	25304576	0746500902	M	Kipsing		
30	John Okolla	30508717	0708914658	M	Kipsing		
31	LEELE LOIPETAC	29271760	0726141448	M	Kipsing		
32	Peter Sunday	35007503	0797294688	M	Kipsing		
33	Ekuai N. Johnson	39756000	0710991481	M	Kipsing		

3

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.

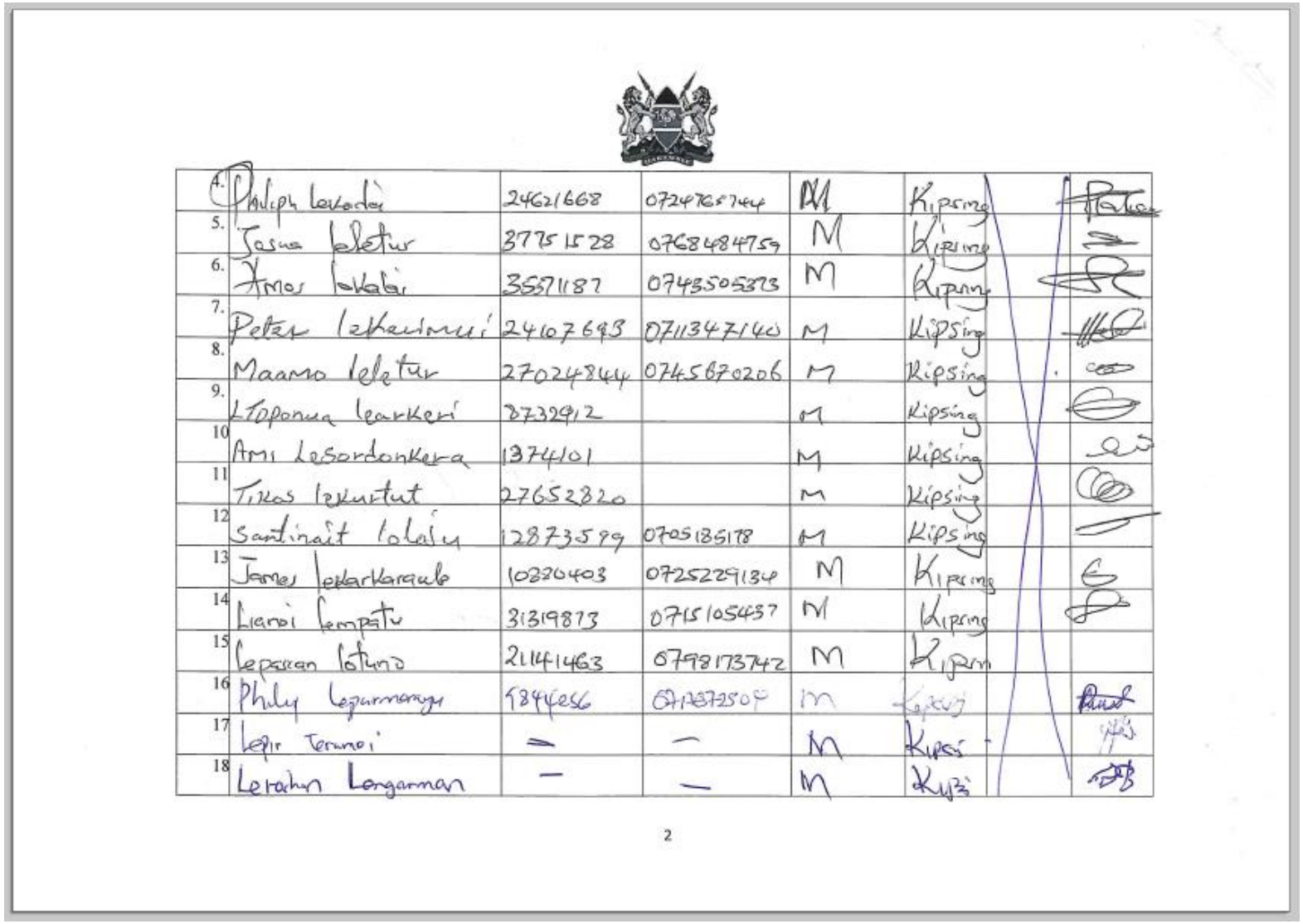
SITE ..... KIPSING .....

MEETING VENUE.....

DATE..... 06/09/2024

LIST OF ATTENDANCE/PARTICIPANTS LIST -FOCUSSED GROUP DISCUSSIONS (MEP)

No	NAME	Identification number –ID No	Mobile No.	Gender Male/Female	Village	~~Do you agree to donation of land~~ Yes/no	SIGN.
1.	JOHNSON MAGOGO	24990875	0712110779	M	KIPSING		
2.	James Lempatu	24102537	0734361840	M	Kipsing		
3.	Joseph Lemingan.	20679862	0723419667	M	Kipsing		



4.	Philip Lekerdi	24621668	0724765744	M	Kipsing		
5.	Joshua Leletur	37751528	0768484759	M	Kipsing		
6.	Amos Lekalei	35571187	0743505373	M	Kipsing		
7.	Peter Lekaulonkei	24167693	0711347140	M	Kipsing		
8.	Maamo Leletur	27024844	0745870206	M	Kipsing		
9.	Loponua Lekakeri	8732912		M	Kipsing		
10	Ami Lesordonkera	1374101		M	Kipsing		
11	Tikas Lekurtut	27652820		M	Kipsing		
12	Santinait Lolaiy	12873599	0705185178	M	Kipsing		
13	James Lekarkarsub	10320403	0725229134	M	Kipsing		
14	Liaroi Lempatu	31319873	0715105437	M	Kipsing		
15	Lepaasan Lotuno	21141463	0798173742	M	Kipsing		
16	Philip Legumnanya	7844256	0712872507	M	Kipsing		
17	Lepir Tennoi	—	—	M	Kipsing		
18	Lerahan Longaman	—	—	M	Kipsing		

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 ...Kipsing...

MEETING VENUE.......................................

DATE...06/09/2021

LIST OF ATTENDANCE/PARTICIPANTS LIST -FOCUSSED GROUP DISCUSSIONS (WOMEN)

No	NAME	Identification number –ID No	Mobile No.	Gender Male/Female	Village	~~Do you agree to donation of land Yes/no~~	SIGN.
1.	Josphut Lenxima	23142868	0710923474	F		X	
2.	Agnes Salian Lemugesi	24180814	0721334457	F		X	
3.	Everline Safira	39362427	0112507840	F		X	

1

4.	Purity Namaiyo	28832426	0714503744	F			
5.	Nakoori lodungokiol	4195260	0713004942	F			
6.	Holongeli lolmakar	0184674	0				
7.	Agatha Emoru	8889633 ~~0726254834~~	0726254834	F			
8.	Josephine Emoru	0714122522	13443857	F			
9.	JANE KALOTIA ITURIU	11169754	0711788089	F			
10	EVA INIVA ISHARATKORO	787293	0711120910	F			
11	MARIA-LUIZA-LODO	26142868	[illegible]	F			
12	MASUNAM MALGAM	30130512	0704967736	F			
13	CELINA LOPEYOL	31359690	0712411644	F			
14	SILVERIA KALAMBU	12616780	0727688073	F			
15	MARY AMUNU LANA	8053160	[illegible]	F			
16	SHESHELE ULETOLE	12872693	0759998276	F			
17	PAULINA ETEILAN	21708824	0721474893	F			
18	ANJELINA MAYETU	20816881	0727391514	F			

2

19	PURITY LEMUNGESI	246210	0792363418	F			
20	LUCY TIELO	12757385	0748496186	F			
21	STELLA ARASELI	29565307	0716516155	F			
22	MPUGUSIAN LESURONKAN	0746412314	1287-1494	F.			
23	NJENWA KANTA	32584204	07	F			
24	AZNO MALAI NZIOKA	26078186	0758063977	F			
25	ESTHER KAPUA	393 48798	0796472066	F			
26	ARAI KAPUA	1090837		F			
27	MARIO GOKON	21154 158	0710806229	F			
28	NAMOE ENITE	24869624	0701164520	F			
29	RATIAE ILAKUA						
30	NTERPESAN LOLOTUMO	1195284	0728083969	F.			
31	Lucia Lele-Gmium	26054443	0701421975 07[illegible]9281	F			
32	Pendina makena	33167479	0708427806	F			
33	Mary Namkunyua	24112715	0717256561	F			

3

34	Cecilia Ngasike Ekiru	26045061	0757641129	F		
35	Nolmugein Lesordongera	39361511	0795127365	F		
36	Mary Apong Emekwi	36829003	0729081371	F		
37	Pamela Tsipo Leparmarai	28460590		F		
38	Tamarose Ekai Ecbone	28753375	0115425541	F		
39	Nyamwas Naboku	26045690	0701848946	F		
40	Cecilia Amonai	0008286	0794192403	F		
41	Scolastica Lakii	30566722	0768134916	F		
42	Rose Kanini	1090927	0703241854	F		
43	Nalayok Lesordongera	1374980	0768134911	F		
44	Nalangu Leshakwat	21141280	0711952729	F		
45	Dorothy Kagwenia	24678685				
46	Longoroti Eskroo	0005829		F		
47						
48						

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 ..KIPSING..

MEETING VENUE.....

DATE..06/09/2021

LIST OF ATTENDANCE/PARTICIPANTS LIST -FOCUSSED GROUP DISCUSSIONS (YOUTH)

No	NAME	Identification number –ID No	Mobile No.	Gender Male/Female	Village	~~Person agree to donation of land~~ Yes/No	SIGN.
1.	Ekirai N. Johnson	39755000	0710991481	M	Kipsing		
2.	Jacob Lokabuyo	36072637	0758043990	M	Kipsing		
3.	Peter Sunday	35007503	0797294685	M	Kipsing		

4.	John Okolla	30508717	0708919658	M	Kipsing	
5.	Jeremiah Lodungokek	20300576	0726569001	M	Kipsing	
6.	John Lopetai	36829443	0757640847	M	Kipsing	
7.	Mary Nampunyou	24112715	0717255557	F	Kipsing	
8.	Jamarose Ellen Edome	12875375	0115925554	F	Kipsing	
9.	Lekuiye Nguan Josephat	26541837	0745813630	M	Kipsing	
10	Patrick Kinpua	24694692	0795662285	M	Kipsing	
11	Agnes Esilei Ngala	26078186	0758043977	F	Kipsing	
12	Henry Maitelia	20822239	0725371982	M	[illegible]	
13	Shuida Joseph	3975 5012	0700757472	M	Kipsing	
14	Michael Ekai Salim	35273211	0111363778	M	Kipsing	
15	Lenah Loripe	8732975	0708122901	F	Kipsing	
16	Ntepresian Lolotuno	9195284		F	Kipsing	
17	John Lekopio	363728020	0745952573	M	Kipsing	
18	Anjelina Karumba	20816881	0717391514	F	Kipsing	

2

19	Naosurai Lerondongera	30130512	07049677364	F	Kipsing		
20	Lfalisen Lemanyechi	30043078	0726167139	M	Kipsing		
21	SEBASTIAN LELESIRA	37091154	0741998922	M	Kipsing		
22	FRANCI LPINATU	31502764	0795076515	M	Kipsing		
23	Nadarian Nabulu Lengusa	3135898	0716519164	F	Kipsing		
24	Nalkori lodungokiri	26091400	0713064444	F	Kipsing		
25	Nalmugein Lesiundere	3936151	0795782365	F	Kipsing		
26	NJANIWASI. Nabulu	26645090	0701548446	F	Kipsing		
27	Mekelina Asunyen	39690450	0741996252	F	Kipsing		
28	PATRICK LEMERIWAS	24741330	0705561799	M	Kipsing		
29	PAUL LOMUGI LEMERIWAS	39602537	0712504874	M	Kipsing		
30	James Lorogor	11274370	0720133031	M	Kipsing		
31	John Loregae	25032745	0798940934	M	Kipsing		
32	Catherine LEKorore	39048153	0792834739	F	Kipsing		
33	IRENE MATE	26961056	0729081220	F			

3

34	Peter lemparta	37919830	0765367775	M	Kipsing		
35	philanta [illegible]	35569373	0745976408	M	Idipsi		
36	Hussein lempima	34322500	0795533601	M	Kipsing		
37	Sheila Atabo	36650371	0743751680	F	Kipsin		
38	Henry lesekoyo	20595302	0710584934	M	Kipsing		
39	Rebecca ASKVV	36828809	0740453478	F	Kipsing		
40	Jane Emmaa	23125898	0710172564	F	Kipsing		
41	Jemima lengew	35621162	0765509390	F	Idipsing		
42	[illegible]	[illegible]	0705185118	M	Kipsick		
43	John [illegible]	39670056	0794632795	M	Idipsing		
44	Elizabeth lesamparoa	36378031	0741437925	F	Kipsing		
45	Jane Heri	29565564	0705180679	F	Kipsing		
46	ABDI Osman Guyo	27903178	0742879955	M	MOE		
47							
48							

10.4 APPENDIX 4 – MINUTES OF THE MEETING HELD-ESIA

Ministry of Energy

REREC

MINUTES OF ESIA CONSULTATION FOR THE PROPOSED KENYA SOLAR MINIGRID PROJECTS IN ISIOLO COUNTY

Date: 21/04/2022	Time:
Venue: KIPSING	

PRESENT

list attached -

AGENDA

1. Introduction
2. Opening Remarks
3. Remarks by the consultant
4. Concerns/ Issues from participants
5. Responses given by the consultant
6. Project Acceptance/Rejection
7. Adjournment

Item No	Description	Action by
Min 1/22	Introduction	
	The meeting was opened by the ass chief who in turn requested a person present in the meeting to open with a word of prayer. The chief then proceeded to thank and welcomed all the attendees and members of the community for taking part of their time to be in [illegible]	

Page 1 of 5

Norken International Ltd

CENTRIC AFRICA LTD

Min 2/22	**Opening Remarks**	
	After the introduction the chief stated the agenda of the meeting as a public participation meeting and welcomed Abdi Osman Ango a representative of Norken who briefed the community on the project and its components and. Later welcomed Lore Kirko a Consultant and from Norken International who in turn introduced the consultants team. and the purpose & importance of Conducting and ESIA/EIA of the Project before implementation.	
Min 3/22	**Remarks by the consultant**	
	- Lore Kirko provided the overviews of the proposed off Grid Solar Access project - The description of the project - The agencies that are responsible in the development - The stake holder project engagement importance before any implementation of a project. She also noted that the project was being financed by the world bank through the Ministry of energy and there was a due procedure followed before implementation After the Explaining the importance of all the stages and steps of project implementation Lore welcomed Martin an environmental Sociologist who explains the impacts that the project would have on them. Some of the impacts that he noted are that the project would Create jobs and cases of labour influx might Come along child labour, Security, gender based violence and Spread of diseases and he also gave mitigation measures to the project some of the mitigation measures listed are that the Contractor will encourage giving jobs to the members of the community and he requested them to take courses that are related to the project on the spread of diseases he asked the Community to always adhere to Covid 19 Precautions measures and must to prevent spread of HIV/AIDS. GRC team will ensure workers adhere to rules of the community. Martin welcomed Lydia to take the Participants through the Environmental Impact of the project to the Community.	

	Lydia a- environmental expert explained to the participants the Environmental impacts that would come with the project. She explained to them why EIA was important. She noted that it was important since the participants can get to know the negative impacts and provide the mitigation measures to these negative impacts Some of the impacts identified are -Noise and vibration during Construction -Construction solid and liquid waste. -Air pollution -Bio diversity loss After identifying the potential environmental impacts of the project, she gave Mitigation Measures which involved providing Corrective Measures for the identified impacts. i.e. the noise pollution she said will be mitigated by the use of PPE's which will be worn by workers. Noisy jobs will be done during specific time and office working during & throughout the project process. planting of vegetation cover to mitigate on soil erosion After Lydia had explained the impacts that would come along with the project & its mitigation measures she open a forum.	
Min 4/22	**Concerns / Issues/Recommendations from participants**	
	Concerns by the Community session was moderated by the chief in this Session two members of the Community & participants were given an opportunity to present their Concerns and recommendations on the project.	
Q1	Stella Akachali stood to ask if the youths and women from the area would be given Jobs to work at the site during the construction phase of the project.	Sociologist
Q2	Moses Napuni asked about the timeline of the project and if the project Proponents will be able to Compensate the Community for clearing their land	REREC
Q3	Purity Namayo Wekesa was that the women may be left out of the project implementation and requested to be included.	Sociologist

	- Ikanai Lengiro asked the distance the project would cover from the site - Elizabeth Nyuwgi wanted to know what alternatives was there for those households that will be a distance away from the grid.	
Min 5/22	**Responses to concerns/issues raised**	
	Mrs Irene Mute on representative from REREC was first give an opportunity to respond to some concerns of the project raised by the community and also to make some clarifications concerning the Project She Noted that the project Timelines wasn't known since the ESIA process of a Project Implementation was still on. She assured the participants that the project will be implemented once the ESIA/EIA regarding had been approved by the proponents and NEMA and also awarded the project would start.	REREC

On the Coverage of the mini grid
Afrens told the participants the project would
Cover a distance of 5(1.5 radius) and
for those household that are outside the
Coverage, the proponent will provid affordable
Solar systems that they will be paying
Some little amount Monthly. REREC

On of Women would be given jobs to
work on the project Sociologist Martin
assured the participants that they will
all be involved and that the project
belongs to the Community. During employment Sociologist
Youths of both genders will be considered
and the GRC Committee will be responsible

After the Question and answer session
the participants were divided to several
groups ~~made up~~ of men, women, youths
and the vulnerable members.
They were asked to choose three projects
they'd want to be helped with
by the project proponents for donating land.

After 30 minutes of the focused
group discussion the groups proposed
three projects to be Compensated
they chose

1 - Construction of Chief ~~camps~~ office
2 Pipping of water to Community
3 Construction of class room &
Maternity ward

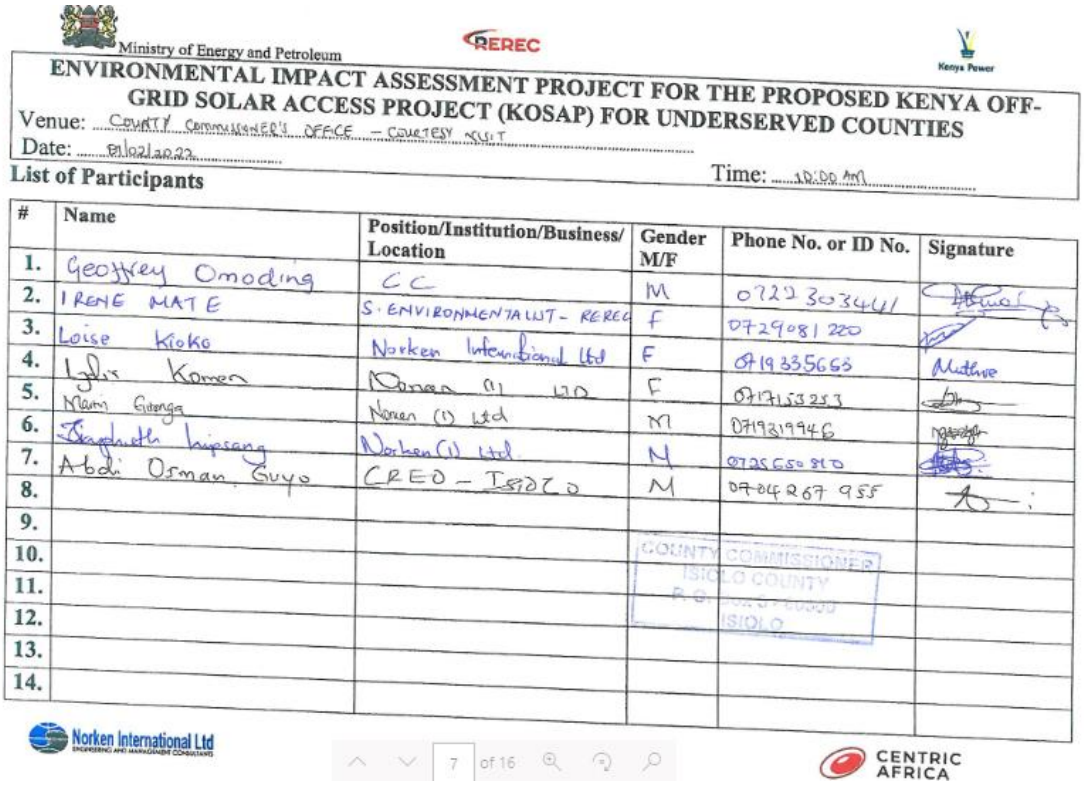
Min 6/22	**Acceptance/Rejection of the project**	
	After the community had been briefed of all the impacts that the project would have they in one heartedly accepted the implementation of the proposed project as far as possible.	
Min 7/22	**Adjournment**	
	There having being no other businesses the Baraza was adjourned at 3:20 PM	

Minutes Prepared By:
Name: Japhath Kipsang Date: 01/02/2022
Position: Environmentalist (Consultant) Signature:

Minutes Confirmed By:
Name: Reuben Lemakin Date: 1/2/2022
Position: SNR CHIEF Signature:

SENIOR CHIEF KIPSING
P.O Box 697 - 60300 ISIOLO

10.5 APPENDIX 5 – PUBLIC MEETING PARTICIPANTS' LIST-ESIA



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: County Commissioner's Office – Courtesy visit

Date: 01/02/2022 Time: 10:00 AM

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	Geoffrey Omoding	CC	M	0722 303441	
2.	IRENE MATE	S. ENVIRONMENTALIST - REREC	F	0729081 220	
3.	Loise Kioko	Norken International Ltd	F	0719335663	Muthive
4.	Lydia Komen	Norken (I) Ltd	F	0717153253	
5.	Mary Gitonga	Norken (I) Ltd	M	0719319946	
6.	Elizabeth Lipesang	Norken (I) Ltd	M	0725650810	
7.	Abdi Osman Guyo	CRED – Isiolo	M	0704267955	
8.					
9.					
10.					
11.					
12.					
13.					
14.					

COUNTY COMMISSIONER ISIOLO COUNTY P.O. BOX 60300 ISIOLO

Norken International Ltd

7 of 16

CENTRIC AFRICA

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: ....

Date: ....

List of Participants Time: ....

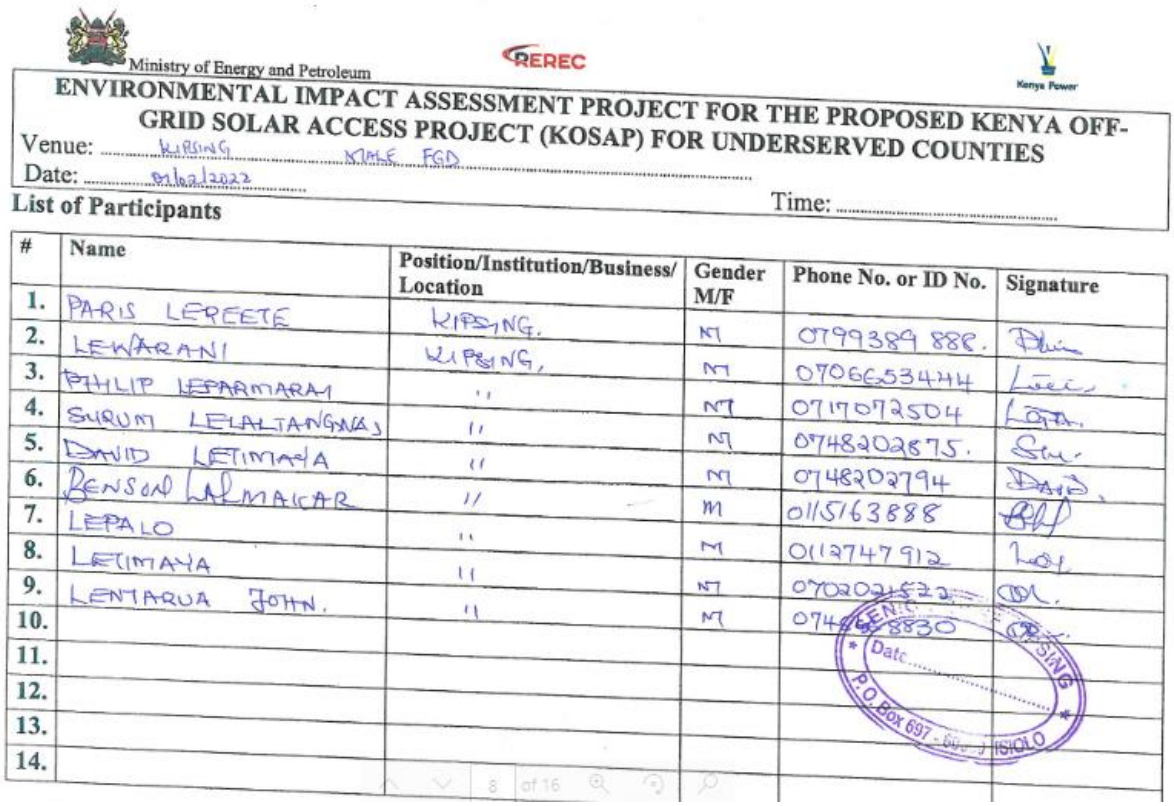
#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	Nalinye Ethuron				
2.	VERO Namat		F	0794158018	
3.	Nalangu Letimaija		F	0716518267	
4.	Stella Akadeli		F	07412921225	
5.	Jamaros Akai		F	0716816455	
6.	Jane Emanae		F	0718516787	
7.	MOSES NAPUNI		F	0710172564	
8.	Nasurai Lesorbongera		M	0797600661	
9.	Cicilia Ngoske		F	07142926810	
10.	Jane Lesorlongepa		F		
11.	NaLipatle Lenaikewo			0798860373	
12.	Lucia Lele		F	0707938784	
13.	TENE HUSSEIN		F	0701421975	
14.	PURITY NAMAIYO		F	0768420734	
			F	0714503744	

SENIOR CHIEF KIPSING ISIOLO Date: P.O. Box 6...

Norken International Ltd CENTRIC AFRICA

FOCUS GROUP DISCUSSION PARTICIPANTS LISTS

Focus group discussion men



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: KIPSING KIMLE FGD

Date: 9/6/2022 Time:

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	PARIS LEREETE	KIPSING.	M	0799389 888.	
2.	LEWARANI	KIPSING,	M	0706534444	
3.	PHILIP LEPARMARAM	"	M	0717072504	
4.	SURUM LELALTANGNAS	"	M	0748202875.	
5.	DAVID LETIMAYA	"	M	0748202794	
6.	BENSON LALMAKAR	"	M	0115163888	
7.	LEPALO	"	M	0112747912	
8.	LETIMAYA	"	M	0702021572	
9.	LENTARUA JOHN.	"	M	0746 8830	
10.					
11.					
12.					
13.					
14.					

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: .....

Date: ..... Time: .....

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	[illegible]				
2.	NKUKU Lefaele				
3.	DAVID Litemaya		M	0717443373	
4.	JANE K. TUBIU		M	0743202294	
5.	Domina Nasieku		F	~~0707~~ 111697 54	
6.	MARY NAMKUNGWA		F	0707025593	
7.	AKUWAM LOMILIO		F	0717255587	
8.	LOGOAOT LEKUTAUT		F	0713865253	
9.	ITEREI LEKITIMA		F		
10.	Josphine Lengima		F	0710923474	
11.	Doris Lemoiwua		F	0798825144	
12.	Peninah Enguan		F	0714479893	
13.	JACKLINE MUSARA		F	0716340222	
14.	MARY AMUM		F	0716 065783	

SENIOR CHIEF KIPSING Date P.O. Box

Norken International Ltd

CENTRIC

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: .....

Date: ..... Time: .....

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	KANORI LENGIRO		M	0746393365	K.L.
2.	Elizabeth Ntunjasi Lesampaya		F	0714437925	
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					

SENIOR CHIEF KIPSING * Date: ..... * P.O. Box 697 - 60300 ISIOLO

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: KIRSING KIMLE FGD

Date: 01/02/2022 Time:

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	PARIS LEPEETE	KIRSING.	M	0799389 888.	
2.	LEWARANI	KIRSING.	M	0706653444	
3.	PHILIP LEPARMARAM	"	M	0717072504	
4.	SHRUM LELALTANGNAS	"	M	0748202875.	
5.	DAVID LETIMAYA	"	M	0748202794	
6.	BENSON LALMAKAR	"	M	0115163888	
7.	LEPALO	"	M	0112747912	
8.	LETIMAYA	"	M	0702021522	
9.	LENTARUA JOHN.	"	M	0748 [illegible]8830	
10.					
11.					
12.					
13.					
14.					

YOUTHS FGD

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: ....

Date: ....

Time: ....

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	Loise Kioko	Norken International Ltd	F	819335653	
2.	Kalenyi Samuel	E.C.D T	m	0768111768	
3.	Veronica Ngimat	Business	f	0716518267	
4.	Melisita Ekula	Business	m	0702290418	
5.	Lopi Lepoona	Business	M	0710653807	
6.	NGELEAI LEMOSESN	Business	M	0797600661	
7.	MOSES NAPUNI				
8.	Tioko Lokuluka		M	[illegible]45692537	
9.	PURITY NAMAYIO	Business	F	[illegible]503144	
10.	TENE HUSSEIN		m	07[illegible]420734	
11.	INCHOM LEMUSEI				
12.	ELizabeth NJUWASI Lesuuronoi	E.C.DE	F	0741457725	
13.	Luca Lele		F	0701421975	
14.	Stella Akadeli		F	0716516455	

SENIOR CHIEF KIPSING, P.O. Box 69, ISIOLO, Date:

Norken International Ltd

CENTRIC AFRICA

10.7 APPENDIX 6 -NEMA PRACTICING LICENCE

FORM 7 (r. 18(3))

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY(NEMA)

THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT

ENVIRONMENTAL IMPACT ASSESSMENT/AUDIT (EIA/EA) PRACTICING LICENSE

License No : NEMA/EIA/EXPL/10260

Application Reference No: NEMA/EIA/EL/23320

M/S **Norken International Limited**
(individual or firm) of address
P.O. Box 9682 - 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.

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