MINISTRY OF ENERGY
Nairobi
Republic of Kenya

THE WORLD BANK

Investment Project Financing Kenya: Off-grid Solar Access Project for Underserved Counties (P160009)

Kenya Power

REREC
RURAL ELECTRIFICATION & RENEWABLE ENERGY CORPORATION

Environmental & Social Impact Assessment, Social Assessment

KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES

Component 1: Mini-grids for Community Facilities, Enterprises, and Households

ESIA REPORT FOR THE PROPOSED KULAN OFF-GRID SOLAR PROJECT

Date: 2023

Norken International ENGINEERING AND MANAGEMENT CONSU
ISO 9001:2015 CERTIFIED

CENTRIC AFRICA LTD

CERTIFICATION

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

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. +254718068517 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:
Ministry of Energy,
P.O. Box 30582-00100,
Kawi Complex, Nairobi, Kenya

Signed: _____ Date: _____

Rodney I. Sultani
Project Co-ordinator – KOSAP

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

CONTENTS

LIST OF TABLES

LIST OF PLATES

LIST OF FIGURES

Abbreviations

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

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

EXECUTIVE SUMMARY

E1- 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 Garissa County, one of the target counties, the Proponent is proposing to develop 17 No. mini grid facilities including Kulan 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 Categorisation 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 Kulan 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 Kulan 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 Proposed Project

The Kulan Mini Grid project aims to provide electricity to approximately 414 residential and 7 non-residential consumers in Kulan Village at Kulan Sub-location, Dagahaley Location, Liboi Ward in Garissa County. The project will utilize solar photovoltaic panels, a Battery Energy Storage System, and a Diesel Generator to generate electricity.

The heart of the project, solar panels with a capacity of 115 kWp will capture solar energy. Solar power, a clean and renewable source, is harnessed effectively to meet the energy needs of the community. A battery with a capacity of 373 kWh will store excess solar energy. This energy storage ensures a continuous and stable power supply, even during periods of low solar irradiation. The project includes a PV inverter with a capacity of 96 kW, which converts DC electricity generated by the solar panels into AC electricity suitable for consumer use. With a capacity of 67 kW, the battery inverter charger manages the energy flow to and from the battery storage system, optimizing the performance of the system. A diesel generator with a capacity of 50 kVA is integrated into the system to provide backup power during periods of low solar generation or high demand. A 2,000-liter fuel tank is provided to store diesel fuel for the generator, ensuring uninterrupted power supply during extended periods of low solar generation.

The project is designed to meet a monthly energy demand of 12,755 kWh, effectively addressing the specific energy needs of the community. Daily Energy Demand: A daily energy demand of 425 kWh is proposed, ensuring a consistent and reliable power supply for various applications. The system is tailored to accommodate a peak demand of 39 kW, effectively addressing high-demand periods and ensuring uninterrupted access to electricity.
A 9-kilometer low voltage power distribution network will be established to efficiently transmit

electricity to consumers. This network ensures a stable and reliable power supply while minimizing energy losses. In this project, no medium voltage network is required, as the focus is on low voltage distribution.

The estimated cost of the project is around USD 590,046, 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 Mini Grid, approximately 1.55 hectares of land will be compulsorily acquired by NLC. This un-registered community land is part of the community's designated public purposes area. The Proponent engaged with the community during the land acquisition process, and there were no objections to transferring 1.55 hectares of land to Kenya Power and Lighting Company (KPLC) for the management of the solar mini-grid. In accordance with the World Bank's Operation Procedure 4.12 on Involuntary Resettlement, an abbreviated Resettlement Action Plan (A-RAP) was prepared, outlining the principles and procedures for land acquisition and compensation (***Annex 5***). This plan is annexed to the project report.

E-5 Analysis of Alternatives

Solar energy is identified as a non-polluting and site-specific option, and the proposed site for Kulan 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 neighbouring countries are considered as alternative methods of power generation but are found to have limitations or environmental concerns. Solar energy is favoured due to its low production costs, versatility, clean nature, and economic savings. The "No Project" alternative is deemed unfavourable 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-6 Baseline Information

The project area in Kulan sub-location, Liboi Ward in Garissa 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.

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-7 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-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 (KP). 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 October 20, 2021 at Kulan Primary school, a total of 99 stakeholders attended. The meeting provided an opportunity to discuss project details, including the preliminary design, positive and negative impacts, and mitigation measures. Stakeholders were encouraged to share their views and provide feedback on the project.

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

E-10 – 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 0-1 to 0-5 below present summaries of anticipated impacts and their corresponding levels of significance, both pre- and post-mitigation.

Table 1: Summary of Pre-construction Impacts

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

Table 2: Summary of Construction Phase Impacts

Impact	Significance Of Impact (pre-mitigation)	Residual Impacts (Post-Mitigation)
Impacts on Local Economy and Employment	Positive	Positive
Change in land use	Moderate	Negligible
Topography	Minor	Negligible
Soil environment	Minor	Negligible
Air Quality	Moderate	Negligible
Ambient noise	Minor	Negligible
Visual intrusion and change in landscape	Minor	Negligible
Waste generation and soil contamination	Minor	Negligible
Impact on water environment	Minor	Negligible
Impacts from hazardous materials	Minor	Negligible
Fire hazards	Moderate	Minor
Impacts of construction material sourcing	Moderate	Minor
Energy consumption	Negligible	Negligible
Occupational safety and health	Moderate	Minor
Community safety and health	Moderate	Minor
Labor influx	Minor	Negligible
Child labor	Minor	Negligible
Cultural heritage	Minor	Negligible
Gender based violence, SEA and SH	Minor	Negligible
Exclusion of VMGs, Vulnerable individuals and households	Major	Minor
Risk of communicable diseases	Minor	Negligible
Increased water demand	Negligible	Negligible
Forced labor	Minor	Negligible

Table 3: Summary of Operation Phase Impacts

Impact	Significance Of Impact (Pre-Mitigation)	Residual Impacts (Post-Mitigation)
Impact On Economy and Employment	Positive	Positive
Quality, reliable power supply	Positive	Positive
Reduction of pollution associated with thermal power generation, kerosine and wood fuel usage	Positive	Positive
Education	Positive	Positive
Health benefits	Positive	Positive
Improved standard of living	Positive	Positive
Security	Positive	Positive
Communication	Positive	Positive
Soil environment	Minor	Negligible
Waste generation and management	Minor	Negligible
Water environment	Negligible	Negligible

Impact	Significance Of Impact (Pre-Mitigation)	Residual Impacts (Post-Mitigation)
Landscape and visual impacts	Minor	Negligible
Increased oil consumption	Minor	Negligible
Increased storm water flow	Minor	Negligible
Fire outbreaks	Moderate	Minor
Water demand	Negligible	Negligible
Sanitary waste	Negligible	Negligible
Flooding	Negligible	Negligible
Noise and Vibration	Negligible	Negligible
Electric and magnetic fields (EMFs)	Negligible	Negligible
Dust Emission	Negligible	Negligible
Vehicle Exhaust emission	Minor	Negligible
Collision and electrical hazards from distribution infrastructure	Minor	Negligible
Occupational safety and health	Moderate	Minor
Community safety and health	Moderate	Minor
Gender based violence, SEA and SH	Minor	Negligible
Exclusion of VMGs, Vulnerable individuals and households	Major	Minor
Risk of communicable diseases	Minor	Negligible
Shocks and electrocution to the beneficiaries	Moderate	Minor
Risks related to poor and inadequate stakeholder engagement (conflict)	Minor	Negligible

Table 4: Summary of Decommissioning Impacts

Impact	Significance Of Impact (Pre-Mitigation)	Residual Impacts (Post-Mitigation)
Employment opportunities	Positive	Positive
Site rehabilitation	Positive	Positive
Soil environment	Minor	Negligible
Air quality	Moderate	Negligible
Ambient Noise	Minor	Negligible
Waste generation and soil contamination	Minor	Negligible
Occupational 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

E-11 Environmental and Social Management and Monitoring Plan

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

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

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

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

Following the project's commissioning, it is mandatory to conduct statutory Environmental and Safety Audits in accordance with national legal requirements. These audits serve to evaluate the environmental performance of the site operations and assess their compliance with the recommended mitigation measures.

E- 12 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.

Recommendations

- The KPLC and the contractor must adhere to relevant legal and regulatory framework to ensure compliance and success of the project
- Adherence to the mitigation measures as spelt out in the ESMMP and monitoring of the same is mandatory to ensure environmental and social sustainability of the project.
- Cultivate and maintain a good working relationship with the community members
- Ensure social inclusion of the vulnerable groups by paying attention to the most vulnerable and provide ready boards as spelt
- Contractor to plant a minimum of 200 trees to promote environmental sustainability
- Environmental Audits should be carried annually or as prescribed by the Authority during the operational phase and submission of report to NEMA.
- Diligence on the part of the contractor and proper supervision by the KPLC is crucial for mitigating the potential impacts and ensuring structural strength, safety, and efficient operation of the project.

The expert is of the opinion that on purely 'environmental' grounds (i.e., the project's potential socio-economic and biophysical implications) the application as it is currently articulated in the applicant's proposal should **be approved** provided the essential mitigation measures are implemented. 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, Narok, Tana River, Samburu, Isiolo, Marsabit, West Pokot, Turkana, Taita Taveta, 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 Garissa 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).

Garissa 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 stand-alone solar systems in areas where load clusters do not exist and the best technical and financial solution is standalone solar systems.
- Component 3- US$40M: Stand-alone Solar Systems and Solar Water Pumps for Community Facilities; This component will support electrification of public institutions and community facilities using standalone systems. This component will also support the installation of solar PV-powered water pumps for consumptive purposes.
- Component 4- US$22M: Implementation Support and Capacity Building; This component will finance various technical assistance and capacity building activities to ensure the sustainability and measure the impact of the interventions devised and implemented within the other components of K-OSAP.

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

1.2 PROJECT OVERVIEW

The project site is located in Kulan sub-location, Kulan location, Liboi Ward in Garissa County at latitude 0°09'48.9"N and longitude 40°25'39.5"E. The proposed solar mini grid will be located on a 1.55 Hectares piece of land. The solar mini grid will comprise Solar panels, batteries, inertors, perimeter fence and 8.7 kilometers distribution line to cover a radius of approximately 3km. The project is expected to serve 421 consumers of which 414 are residential and 7 are non-residential.

1.3 PURPOSE AND SCOPE OF WORK

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

1.4 ESIA METHODOLOGY

1.4.1 Screening and Scoping

Evaluation of ESIA procedure was undertaken as a fundamental procedure to implementation of the solar power 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.

1.4.2 Environmental Impact Assessment

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

1) 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.

2) Desk based review and baseline assessment

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

3) <u>Project Description</u>

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.

4) <u>Baseline Condition</u>

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 focused on describing the flora and fauna resident in the Garissa 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.

5) <u>Impact Assessment (IA) Prediction</u>

The anticipated impacts generated by the project and subsequent evaluation of their significance is provided by this report. A suite of field data collection methods was deployed

including public forums discussions, Focus Group Discussions, Key Informant Interviews incorporating questionnaires for social risks assessment. Based on the outcome of the evaluation, the need for emphasis on critical areas was discussed. In order to accomplish this task an initial listing of the range of all issues and concerns identified during the study has been undertaken subsequently followed by analysis of the identified potential environmental and social impacts in terms of type (direct, indirect, cumulative, positive, negative), magnitude (local, widespread, random, severity) and duration (temporary, permanent, long term, short term). Consequently, an evaluation system was used to categorize these impacts and evaluate them. This aided in determining the significance of the identified potential impacts in relation to established criteria or standards, geographic extent of effects, cumulative nature of the impact, community tolerance and preferences, etc. This culminated into generation of a short list of the most critical issues in terms of environmental, ecological and social impacts both positive and negative associated which the different phases of the project activities that are likely to affect the baseline environmental and social conditions presently occurring at the mini-grid sites.

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

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

1.4.3 Environmental and Social Management Plan (ESMP)

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

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

The ESMP include an implementation schedule and budget cost estimates for the mitigation measures. It also describes institutional arrangements with regard to the implementation of the ESMP among the implementing agencies, and the mini-grid contractor(s). This has

specific responsibilities, procedures and resources required by each institutional actor engaged in implementing the ESMP.

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

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

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

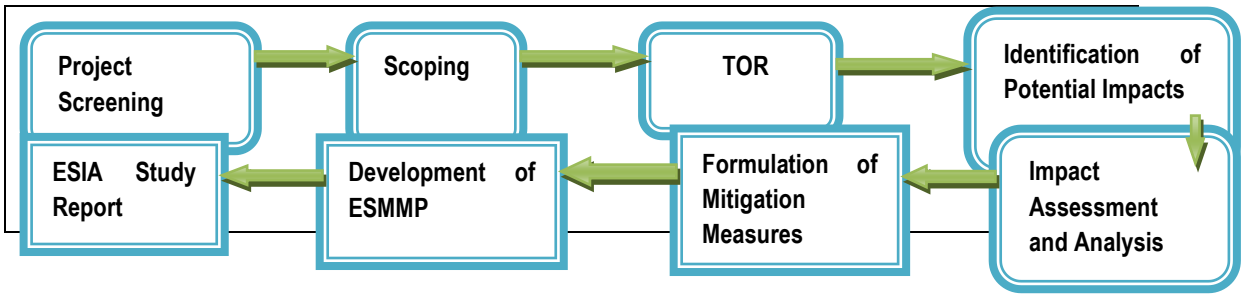


Figure 1: Summary of Environmental and Social Impact Assessment Methodology

1.4.4 Target Group for the ESIA Report

The ESIA Report has been prepared for use by different stakeholders to be involved in the construction and operation of the proposed Mini-Grids project. This report contains useful information on policies and procedures to be adhered to, implementation modalities, analysis of potential environmental and social impacts and suggested mitigation measures at various stages of project activities. The information will be useful in planning, implementation, management and maintenance of the project.
In this regard, the report is useful to the following stakeholders:

- Engineers to be involved in preparation of designs and plans for the proposed solar Mini-grid.
- Contractors to be engaged in the construction works for the project
- MOE and other relevant government ministries and implementing agencies such as; KPLC, etc.
- County Government of Garissa
- Funding agencies
- Project affected persons and other stakeholders

1.4.5 Screening and ESIA Study Team

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

Team 1 – 24/06/2021-first round of detailed consultations with the community was done during the screening process and it involved disseminating the project information to the community, site identification and screening for the mini-grid and constitution of the GRM and selection of GRM committee.

S/No	Names	Position
1	Engineer Benson Mwakina	Ministry of Energy -MOE
2	Dorothy Kagweria	Environmental Social safeguards Expert-MOE
3	Muruiki Marangu	Property Officer KPLC
4	George Nyambane	Surveyor Garisaa County
5	Amin Bishar	County Business manager Garissa
6	Dr. Adan Mohamed	Chief Officer Garissa County
7	Urbanus Muthoka	Surveyor-KPLC
8	Simon Mwangangi	Environmental and Social specialist-KPLC
9	Onesmus Maina	Engineer-KPLC
10	Samuel Mbugua	Environmental and Social specialist-KPLC

Team 2 -30/09/2021- progressed the ESIA study.

NAME	Position	ORGANISATION
Simon Mwangangi	Environmental and Social Specialist	ESS KPLC
Hottensia Kabuki	Social Specialist-KPLC	Norken International Limited
Allan Owino	Environmental and Social Specialist-KPLC	Centric Africa Limited
Umulkheir Abdi	Environmental Specialist	Norken International Limited
Martin Gitonga	Environmental Specialist	Centric Africa Limited

1.5 LIMITATIONS/UNCERTAINTIES

The limitation experienced during the study are illustrated below.

- ✓ Risk of being infected or transmitting COVID-19. The teams had to adopt preventive measures by wearing face mask and providing the community members with face mask and sanitizers during the public meetings and interactions.
- ✓ The changes that may occur in baseline conditions, due to external factors over the lifetime of the project;
- ✓ Uncertainty related to Proponent's policy initiatives that might influence the assessment of future baseline and post-development conditions;
- ✓ Uncertainty in design information which should be dealt with by the definition of design parameters for the development by the Contractor and Proponent;
- ✓ Uncertainty in relation to project planning and implementation as the detailed

program and means of construction may be influenced by the choice of Contractor and the detailed design of the development; and Uncertainty in the understanding of who the VMGs are, and their population

1.6 LAYOUT OF THE REPORT

Table 5: Structure of the ESIA Report

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

2 PROJECT DESCRIPTION

2.1 INTRODUCTION

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

Table 6 below provides a summary of the pertinent information of the proposed Kulan solar mini grid;

Table 6: Summary Information of the proposed Kulan Solar Mini-grid

S. NO.	PARTICULARS	DESCRIPTION
1.	Project location	The project is located in Kulan sub-location, Liboi Ward in Garissa County. Geographically, the site is located on latitude 0°12'49.4"N and longitude 40°38'06.5"E. The length of distribution line will cover a radius of approximately 1.5 km. The project site is approximately 635.25m from the Kulan Market and approximately 808.38m from Kulan Primary School.
2	Land Size/Tenure	The proposed solar mini grid will be located on a 1.55 Hectares piece of land. The land is unregistered community land. The land is set aside for public use.
	Approx. population	9000
	Households	1500
	Dominant ethnic group	Somali Community
	Other minor ethnic groups	Meru and Kamba
3.	PV Capacity	115 kWp
4.	LV Network	9 km
5.	MV Network	0
6.	Target Consumers	421 (414 Residential and 7 Non-Residential)
7.	Climatic condition	In Garissa, the summers are short, sweltering, oppressive, and mostly cloudy; the winters are short, warm, humid, extremely windy, and partly cloudy; and it is dry year-round. Over the course of the year, the temperature typically varies from 22.2°C to 36.7°C and is rarely below 21.1°C or above 37.78°C.
9.	Site Conditions	The project site is generally in open area with minimal fauna and flora.
10.	Road Accessibility	Murram road which branches off A3 Road.
11.	Nearest Airport	Daadab Airstrip at approximately 39.37 km
12.	River/canal/nallah/ pond present in project footprint	None

S. NO.	PARTICULARS	DESCRIPTION
13.	Protected areas (National Park/ Sanctuary)/ Forest land within 10 kms	None
	Vulnerability within the community	• Poor female headed households (Approximately 300 households) • Orphans (Approximately 200) • Persons Living with Disabilities (Approximately 250) • The elderly (Approximately 150)
	Existing grievance redress mechanisms	There are elders in the community who provide leadership and oversight to the community. These elders are responsible for dealing with conflicts or grievances or any issue in the community. Any of the grievances that is difficult to resolve is referred to the office of the Chief. Most of the grievances are solved by the elders and we rarely have any cases going to the chief

2.2 PROJECT LOCATION

The project site is located approximately 635.25m from the Kulan shopping centre at Kulan sub-location, Dagahaley location, Liboi Ward in Garissa County. Geographically, the site is located on latitude 0°12'49.4"N and longitude 40°38'06.5"E. The proposed power MG will be constructed on approximately 1.55 Hectares of land. The site is neighboured by Kulan Primary and Kulan Trading Centre. The site soil is primarily sandy loam within the area
Figure 3 present the location of the proposed project site.

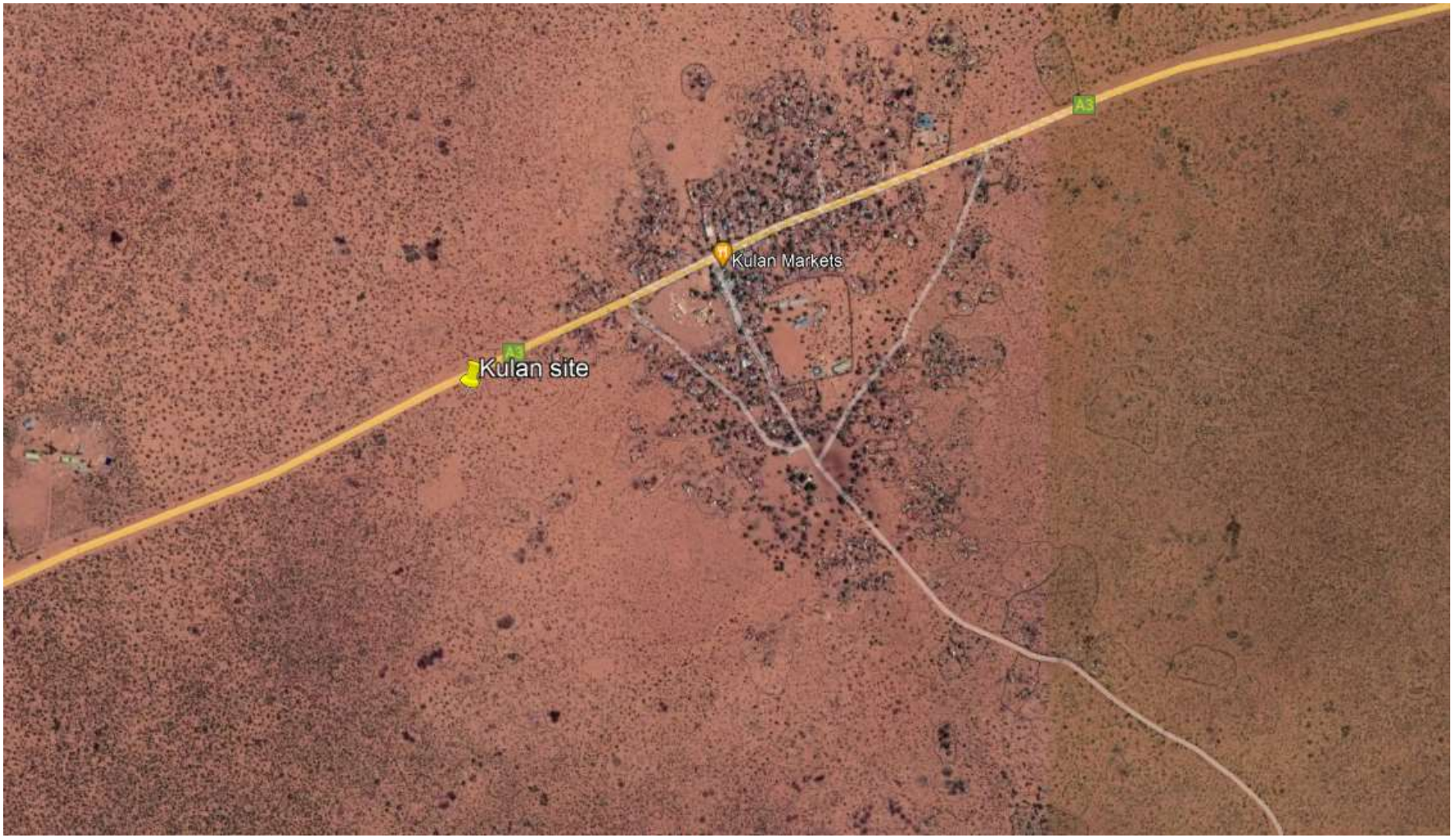


Figure 2: Project Location

2.3 DESCRIPTION OF PROJECT FACILITIES, COMPONENTS AND ACTIVITIES

Project Components

2.3.1.1 Solar PV modules

The project will use PV Array (DC-kW) 190 polycrystalline silicon module with three strings connected in series. Each string will have five sets of panels connected in series, with output converged at the six-way combiners. The life expectancy of the PV modules is estimated at 25-30 years.

Solar Panels: The heart of the project, solar panels with a capacity of 115 kWp will capture solar energy. Solar power, a clean and renewable source, is harnessed effectively to meet the energy needs of the community.

Battery Energy Storage System: A battery with a capacity of 373 kWh will store excess solar energy. This energy storage ensures a continuous and stable power supply, even during periods of low solar irradiation.

Inverters: The project includes a PV inverter with a capacity of 96 kW, which converts DC electricity generated by the solar panels into AC electricity suitable for consumer use.

Battery Inverter Charger: With a capacity of 67 kW, the battery inverter charger manages the energy flow to and from the battery storage system, optimizing the performance of the system.

Generator: A diesel generator with a capacity of 50 kVA is integrated into the system to provide backup power during periods of low solar generation or high demand.

Fuel Tank for Diesel Generator: A 2,000-liter fuel tank is provided to store diesel fuel for the generator, ensuring uninterrupted power supply during extended periods of low solar generation.

2.3.1.2 Power Demand Metrics

Monthly Energy Demand: The project is designed to meet a monthly energy demand of 12,755 kWh, effectively addressing the specific energy needs of the community.
Daily Energy Demand: A daily energy demand of 425 kWh is proposed, ensuring a consistent and reliable power supply for various applications.

Peak Demand: The system is tailored to accommodate a peak demand of 39 kW, effectively addressing high-demand periods and ensuring uninterrupted access to electricity.

2.3.1.3 Power Distribution Network

Low Voltage (LV) Network: A 9-kilometer low voltage power distribution network will be established to efficiently transmit electricity to consumers. This network ensures a stable and reliable power supply while minimizing energy losses.

Medium Voltage (MV) Network: In this project, no medium voltage network is required, as the focus is on low voltage distribution.

Transformer Step-up: The project does not include a step-up transformer, as it is not

required for voltage adjustment.

2.3.1.4 Battery Energy Storage System

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

2.3.1.5 Inverters

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

2.3.1.6 Distribution lines

Kulan site will have a distribution line circuit of 8.0 km in total. Supply of concrete poles for the distribution lines will be based on detailed survey and accessories like phase plates, circuit plates, number plates, danger plates, anti-climbing devices as per KPLC requirements/specifications. Erection of the Poles, fixing of insulator strings, stringing of conductor and earth wires along with all necessary line accessories and earthing will be as per KPLC requirements/specifications.

2.3.1.7 Project Activities

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

2.3.1.8 Construction Procedures

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

The project inputs will include the following;

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

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

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

Construction activities will include the following:

-Contractor mobilization;

-Site Preparation;

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

-Storage of PV modules delivery and their installation;

- Laying of internal electrical connections;

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

2.3.1.9 Construction Contractor

The construction contractor is responsible for building the physical infrastructure required for the mini-grid project. In this case, the infrastructure includes the installation of solar panels, battery storage systems, a diesel generator, inverters, and the low voltage power distribution network.

Their specific responsibilities will include site preparation, installation of solar panels, setting up the battery storage system, configuring the diesel generator, and laying down the distribution network.
The construction contractor will be responsible for ensuring that the components are installed correctly and meet the required standards for safety and performance. They may also manage the workforce, logistics, and project timeline to ensure that construction proceeds smoothly and is completed within the specified timeframe.

2.3.1.10 Operation and Maintenance (O&M) Contractor

The O&M contractor will be responsible for the ongoing operation and maintenance of the mini-grid system once it is operational. The construction contractor will also double up as the O&M contractor
In this project, their responsibilities include monitoring the performance of the solar panels, battery storage system, and the diesel generator to ensure the continuous and reliable supply of electricity to the consumers. The O&M contractor must carry out regular maintenance tasks, such as cleaning and servicing solar panels, inspecting and maintaining the battery energy storage system, and ensuring the diesel generator is in good working condition for backup power needs. They are responsible for addressing any technical issues or faults that may arise, as well as responding to consumer complaints and inquiries related to the electricity supply. The O&M contractor plays a crucial role in maximizing the system's efficiency and longevity by ensuring all components operate optimally.

The contractor will be required to have their own Environment, Health, and Safety (EHS) policy and an EHS officer on site. In the context of the mini-grid project, it will outline the contractor's dedication to upholding safety standards, minimizing environmental impact, and adhering to legal requirements. The presence of an EHS officer on site will be equally essential. Their role will be to oversee and manage all EHS concerns directly at the project location.

2.3.1.11 Project Details and Cost

The project cost is estimated at USD 590,046.
Note: *The Solar Mini-grid will be installed operated and maintained by the contractor for the first seven (7) years and then handed over to KPLC. So, for the seven years KPLC will be monitoring the operations of the contractor.*

2.3.1.12 Land Tenure

Kulan site is on unregistered Community Land. The community has since offered the land to the project proponent for Mini grid construction.

2.3.1.13 Compensation Details

ARAP as been undertaken to address the compensations concerns. In Kulan, the community requested additional support as illustrated below:

- Water reticulation from the existing water sources to serve the community by installing solar powered pumps, dispensing unit and other amenities.
- Provision of enough health care needs for example power connection which will help serve the health centre.
- Schools within the project area lack infrastructure and enough teachers that can accommodate all the students.
- Power connection to the amenities at the project area for use by the community for example the shopping centre and the school.

2.4 RESOURCE REQUIREMENT

2.4.1 Workforce Requirement

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

2.4.2 Water Requirement and Source

2.4.2.1 Construction Phase

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

2.4.2.2 Operation Phase

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

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

2.4.3 Raw Material Requirement

2.4.3.1 Construction Phase

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

2.4.3.2 Operation Phase

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

2.4.4 Power Requirement

Power requirement during the construction phase will be met through Diesel Generators sets. The exact number of Diesel Generator sets to be used, as well as the quantity of fuel, will be ascertained once the project design is finalized.

2.4.4 Fire Safety and Security

2.4.4.1 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.

2.4.4.2 Operation Phase

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

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

3 ANALYSIS OF ALTERNATIVES AND PROJECT JUSTIFICATION

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

a) Geophysical Factors-Proximity to Hills-Shade effect, Soil erosion, Drainage of the area, Flooding etc.
b) Land identified is free from any dispute on ownership or any other encumbrances
c) Proximity to public Utilities-Schools, Dispensaries, Places of worship and community settlements
d) No squatters, encroachers or other claims to the land
e) 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.
f) The Land identified should be on spaces set aside for public use within the community centres.
g) 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.
h) The site identified was considered against the criteria highlighted above and was found suitable for Minigrid construction.

3.1 Power Scenario in Kulan

This option involves maintaining the status quo. The no construct/no project alternative will not achieve the objectives of the project since the listed benefits will not be achieved. Failure to construct and operate the mini-grid will lead to the failure of achieving one of the Kenya's national long-term development policies that aims to transform Kenya into a newly industrializing, middle-income country, by providing a high quality of life to all its citizens by 2030 in a clean and secure environment. Beneficiaries will be households, public and community institutions, enterprises and community facilities that cannot access electricity through the national grid and whose use of electricity will replace kerosene and other fuels for lighting and other activities like pumping water.

3.2 Alternative Sources of Energy

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

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

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

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

Solar energy was a desirable option because:

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

3.3 Zero or No Project Alternative

The No Project option in respect to the proposed project implies that the status quo is maintained. This option is the most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions. This option will however, involve several losses both to Kulan centre and the community as a whole. The centre will continue to have no electricity and this will not help maximize usage and utilization of this centre. It will involve several losses both to Kulan village, Kulan Location and Garissa as a whole. The village and the surrounding area will continue to have no electricity and this will not help in maximizing and utilizing the area facilities. The No Project Option is the least preferred from the socio-economic and partly environmental perspective due to the following factors:

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

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

3.4 Alternate Location for Project Site

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

The community was requested to propose a piece of land 1.55 hectares for the project. The appropriateness of potential Mini-grid sites identified by the KPLC during the initial site visits was assessed in terms of various suitability criteria and technical restrictions stipulated by KPLC, as outlined below:

- Load growth - the location of Mini-grid first and foremost is informed by the existing and also load growth of an area. Technical studies show that the area will experience load growth over time and there is need to supply electricity.
- Size – proposed potential sites need to be sufficient for the average size of Solar Mini-grid and associated auxiliary facilities. Therefore, the size acquired must meet the required size. The proposed site is 1.55 hectares.
- Topography – consideration is given to the topography of potential sites whereby flat or gently sloping topography is preferred. An ideal gradient for the natural ground is 1:100. A gentle slope facilitates surface drainage and movement of vehicles and people on-site during construction. A steep slope requires costly levelling (cut and fill) for the construction of the solar Mini-grid. In addition, a steep slope inhibits movement, makes vehicle access problematic and increases the potential for environmental impacts during construction as well as operation e.g., steeper slopes have higher surface water flow rates and therefore higher erosive potential. The proposed site is flat and cost-effective during construction.
- Hydrology – consideration is given to the proximity of potential sites to adjacent water courses and wetlands where there may be potential impacts in terms of erosion and siltation of water courses, as well as implications associated with storm-water control at

the Solar Mini-grid site. The site is not close to water resources or wetland and so no impact to water sources through siltation. Further, construction of drainage is not complicated.

- Geology and soils – consideration is given to the soil type present within the potential site whereby stable soil and founding conditions are preferable. Less stable soils, i.e., shallow, dispersive soils and soils with poor drainage present an erosion hazard if not managed correctly, and also require the instalment of additional, costly foundation infrastructure. The soils at the site are well drained.
- Flora and fauna – potential sites need to be assessed in terms of their ecological value at both a macro and micro scale i.e., within the site and the environment surrounding the site. Both a faunal and floral investigation may be required, with particular emphasis on ensuring the protection of endemic and red data species and their habitat, should they be present. An identified site that has a high ecological value may be excluded from the list of potential sites. The site is not of a high ecological value.
- Visibility – highly visible sites i.e., on a ridge / elevated terrain are considered less favourable in that they have a high visual impact on the surrounding landscape. Sites that are hidden or out of site e.g., behind a hill, may be considered more suitable; the site is on flat part near chief's office and may not create sharp visual impact because it is not on an elevated point.
- Access – it is preferable that potential sites are located in close proximity to existing public roads so as to avoid the need for construction of new access roads of considerable length. Access is also important particularly as it relates to the transportation of the solar panels, batteries and generator to the site, which are heavy weights and requires the use of a low-bend vehicle. As such, long access routes with sharp bends are to be avoided and the site should not be located in an area that has excessively steep inclines or declines that could hinder access, particularly during periods of heavy rainfall; the site is well accessible as it along the road.
- Adjacent land use – adjacent land use has implications for access and required clearances for the power lines extending from the solar plant site, i.e., it is important that the land surrounding the Mini-grid is relatively clear of obstructions which might otherwise inhibit / obstruct the path of the power lines out of the Mini-grid. Current and future development planning of adjacent land use should therefore also be considered. The site and the developments around do not pose a hindrance for incoming and outgoing feeders.
- Public acceptability – public acceptance criteria relate to such issues as the possible adverse impact on public health, quality of life, and local land and property values. During the public consultations there was overwhelming support for the project with mitigation measures being put in place for the negative impacts.

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

3.5 Analysis of Alternative Construction Materials and Technology

The proposed project will be constructed using modern, locally and internationally accepted materials to achieve public health, safety, security and environmental aesthetic requirements. The materials will include all consumables, tools, testing instruments or any other equipment required for successful commissioning of the project. These may not be desirable from a cost

and durability perspective. The technology to be adopted will be the most economical and one sensitive to the environment. The technology will involve a Battery Energy Storage System (including battery Inverter and charger).

3.6 Solid waste Management Alternatives

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

3.7 Conclusion

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

4 APPLICABLE AND REGULATORY FRAMEWORK

4.1 INTRODUCTION

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

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

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

4.2 KENYA ELECTRICITY SUPPLY INDUSTRY (ESI)

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

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

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

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

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

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

4.3 NATIONAL LEGAL FRAMEWORK REVIEW

The applicabe legal framework is illustrated in table 7 below.

Table 7: Legal framework National

No	Legislation/ Guidelines	Description of the Legislation/Guideline	Relevance of the legislation/regulations in terms of license, permits, and other requirements
	NATIONAL POLICY FRAMEWORK		
1.	Vision 2030	Kenya Vision 2030 is the current national blueprint for development from its inception in 2008 until the milestone year of 2030. This plan is the national long-term development policy that aims to transform Kenya into a newly industrialised, middle-income country by 2030. The Vision is comprised of three key pillars (economic, social, and political), two of which are projected to be positively affected by project implementation.	Under Vision 2030, Energy is identified as one of the key sectors that form the foundation for sociopolitical 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 social development. The integration process was to be achieved through multi-sectoral approach to develop a comprehensive framework to ensure that environmental management and the conservation of natural resources forms an integral part of societal decision-making.	• The NEMA does not approve a development project unless the impacts of the proposed project are evaluated and mitigation measures proposed for incorporation in the project 's development plan, which is in line with the requirements of the NEAP. • The project will be reviewed by NEMA for approval before implementation.

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 so as to ensure sustainability. The paper provides comprehensive guidelines and strategies for government action regarding environment and development. The Government will: 1. Ensure Strategic Environment Assessment (SEA), Environmental Impact Assessment, Social Impact Assessment and Public participation in the planning and approval of infrastructural projects. 2. Develop and implement environmentally-friendly national infrastructural development strategy and action plan. 3. Ensure that periodic Environmental Audits are carried out for all infrastructural projects	The proponent: • is undertaking an Environmental Impact Assessment, Social Impact Assessment and Public participation as part of the planning and approval of infrastructural projects. • Will ensure that periodic Environmental Audits are carried out for the project
5.	The National Energy and Petroleum Policy 2015	The overall objective of the energy and petroleum policy is to ensure affordable, competitive, sustainable and reliable supply of energy to meet national and county development needs at least cost, while protecting and conserving the environment. This policy stipulates the transformation of the Rural Electrification Authority (REA) to Rural Electrification and Renewable Energy Corporation (REREC) to be the lead agency for development of renewable energy resources.	The policy is relevant to the project in the sense that the project will provide sustainable and reliable energy supply and measures will be put in place to protect and conserve the environment during its development. REREC will be in charge of the development of the minigrid and maintenance.

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

		along which all national and sectoral legislative documents are drawn.	
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 operationalised 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 AND 2016 AMENDMENTS	These regulations provide the framework for undertaking EIAs and EAs in Kenya by NEMA licensed Lead Experts and Firms of Experts. An EIA or EA Study in Kenya is to be undertaken by a firm duly licensed by the National Environmental Management Authority (NEMA). The EIA/EA Regulations also provide information to project proponents on the requirements of either an EIA or EA as required by the EMCA.	• The proposed project is subject to relevant provisions of these regulations and subsequently, the ESIA has been undertaken in accordance with the requirements.
4.	L.N. 120: WATER QUALITY REGULATIONS, 2006	These regulation provides for the sustainable management of water used for various purposes in Kenya. For effluent discharges into the environment and aquatic environment, a Proponent needs to apply directly to the NEMA. For discharges into public sewers, a Proponent needs to apply for the license to the relevant county. The regulation contains discharge limits for various environmental parameters into public sewers and the environment.	• These regulations will apply to the proposed project during the construction and operational phases. The contractor will be required to properly manage the effluent from construction activities in accordance with the above regulations prior to discharge into the environment.

5.	L.N. 121: WASTE MANAGEMENT REGULATIONS, 2006	These regulations are comprehensive and cover the management of various kinds of waste in Kenya. Generally, it is a requirement under the regulations that a waste generator segregates waste (hazardous and non-hazardous) by type and then disposes the them in an environmentally acceptable manner. Under the regulation, it is a requirement that waste is transported using a vehicle that has an approved "Waste Transportation License" issued by NEMA. Wastes generated in Kenya must be disposed of in a licensed disposal facility. Such a facility will require annual environmental audits to be undertaken by NEMA registered Lead Experts. The regulation requires that prior to generating any hazardous waste, a proponent shall undertake an EIA Study and seek approval from the NEMA. Labelling of hazardous wastes is mandatory under the regulation and the specific labelling requirements are provided in Rule 18. The treatment options for hazardous waste disposal provided in Rule 19 include incineration or any other option approved by the NEMA.	• During the construction and operation phases, the proposed project will generate various streams of wastes. For the most part, it is expected that the wastes will be non-hazardous in nature and can be disposed of in accordance with these regulations.
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. The regulations further provide factors that will be considered in determining whether or not noise and vibration is loud, unreasonable, unnecessary, or unusual.	• Rules 13 and 14 of the regulations define the permissible noise levels for construction sites. These noise limits will be applicable to the proposed project.

7.	LICENSES AND PERMITS REQUIRED UNDER THE EMCA	The subsidiary legislations under the EMCA are partially monitored through the use of permits and licenses. Subsequently all licenses and permits required during the construction phase shall be the responsibility of the individual contractors and their agents. During the operational phase, all permits and licenses required to operate the project will be the responsibility of the proponent.	The subsidiary legislations under the EMCA requires some or all the following types of permits to be available for inspection during the construction and operational phases of the project: ✓ Effluent Discharge License under Legal Notice 120: The Environment Management and Coordination (Water Quality) Regulations 2006; ✓ Waste Transport License under Legal Notice 121: The Environment Management and Coordination (Waste Management) Regulations 2006 for disposal of all types of wastes; and ✓ Noise Permit under Legal Notice 61: The Environment Management and Coordination (Noise and Excessive Vibration Control) Regulations, 2009.
8.	OCCUPATIONAL HEALTH AND SAFETY ACT, 2007	The Occupational Safety and Health Act (OSHA) was enacted to provide for the health, safety and welfare of persons employed in workplaces, and for matters incidental thereto and connected therewith. Part II of the Act provides the General Duties to which the occupier must comply with respect to health and safety in the workplace. Such duties include undertaking safety and health (S&H) risk assessments, S&H audits, notification of accidents, injuries and dangerous occurrences. A number of sections under this part shall be applicable to the proposed project. Part IV deals with the enforcement provisions that Directorate of Occupational Safety and Health Services (DOSHS) has under the Act. It discusses the instances when Improvement and Prohibition Notices can be issued as well as the powers of Occupational S&H officers. This part of the Act will be	The proposed project will be undertaken in compliance with the OSHA-2007 during the construction, design, and operational phases. During the construction phase, the contractors will be required to fully comply with the requirements of Legal Notice 40 titled: Building Operations and Works of Engineering Construction Rules, 1984 (BOWEC). Each contractor will develop and implement a formal construction health and safety plan for the entire construction phase duration in alignment with the OSHA and international health and safety best practices.

mandatory for the occupier to comply with for the proposed project.

Part V of the Act requires all workplaces to be registered with the DOSHS. This part will be applicable for the proposed project as the Occupier will have to apply for registration of their project with the DOSHS on completion of the construction phase and before the operational phase of the project.

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

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

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

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

		Part XIII of the Act stipulates various fines and penalties associated with non-compliance with the Act. It includes those fines and penalties that are not included in other sections of the Act and will be important for the Occupier to read and understand the penalties for non-compliance with S&H provisions. Part XIV of the Act is the last section of the Act and contains miscellaneous provisions which are not covered elsewhere in the Act. Some sections under this part of the Act will apply to the proposed project and it is in the interest of the occupier to read, understand, and ensure compliance.	
9.	L.N. 31: The Safety and Health Committee Rules, 2004	These rules came into effect on April 28, 2004, and require that an Occupier formalise a S&H Committee if there is a minimum of 20 persons employed in the workplace. The size of the S&H Committee will depend on the number of workers employed at the place of work. For the Proponent and Contractor, the OSHA and the S&H Committee Rules 2004 are important as they require compliance with the following measures: ○ Posting of an Abstract of the Factories and Other Places of Work Act in key sections of each area of the factory or other workplace; ○ Provision of first aid boxes in accordance with Legal Notice No. 160 of 1977; ○ Ensuring that there are an appropriate number of certified first aiders trained by an approved institution and that the certification of these first aiders is current;	The contractor will be required to constitute Health and Safety Committee to oversee safety and health at the construction site. The number of the committee members will be deacted by the number of staff hired by the contructor. The S&H Committee must meet at least quarterly, take minutes, circulate key action items on bulletin boards, and may be required to send a copy of the minutes to the DOSHS provincial office. Appropriate recordkeeping including maintenance of all current certificates related to inspection of critical equipment such as cranes, air compressors, lifts, pulleys, etc. Such inspections need to be undertaken by an approved person registered by the Director of the DOSHS.

		○ Provision of a General Register for recording, amongst other things, all incidents, accidents, and occupational injuries; ○ Appointment of a S&H Committee made up of an equal number of members from management and workers based on the total number of employees in the workplace; ○ Training of the S&H Committee in accordance with these rules; and ○ Appointment of a S&H management representative for the Proponent.	
10.	L.N. 24: Medical Examination Rules, 2005	These rules provide for Occupiers to mandatorily undertake pre-employment, periodic, and termination medical evaluations of workers whose occupations are stipulated in the Eighth Schedule to the OSHA and the First Schedule to this Rules. Workers that fall under the above two schedules are required to undergo medical evaluations by a registered medical health practitioner duly registered by the DOSHS.	Some construction activities such as metal cutting and grinding, repair or maintenance of construction equipment could expose the construction workers during construction phase and operations and maintenance workers during operation phase to physical and chemical hazards The contractor should that the workers exposed to such hazards undergo requisite medical examinations as required by these rules
11.	L.N. 25: Noise Prevention and Control Rules, 2005	The rules set the permissible level for occupational noise in any workplace (which includes construction sites) as follows: • 90 dB(A) over an 8-hour time weighted average (TWA) period over 24-hours; and • 140 dB(A) peak sound level at any given time. Additionally, the rules set permissible limits for community noise levels emanating from a workplace as follows: • 50 dB(A) during the day; and • 45 dB(A) at night. The Proponent is to ensure that	It is expected that during the construction phase of the project, there may be plant equipment that exceeds the threshold levels of noise stipulated under the Rules. It will therefore be incumbent on the contractor and his or her sub-contractors to ensure that their equipment is serviced properly and/or use equipment that complies with the threshold noise values given above. Alternatively, each contractor will be required to develop and implement a written hearing conservation programme during the construction phase.

		• 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.	
12.	L.N. 59: Fire Risk Reduction Rules, 2007	A number of sections of the rules apply to the proposed project as enumerated below. • Regulation 5 requires Proponents to ensure that fire resistant materials are used for construction of new buildings. A number of minimum specifications of materials are provided in this rule. • Regulation 6 requires that all flammable materials be stored in appropriately designed receptacles. Some of the flammable materials anticipated at the project site including; fossil fuel using running construction equipment and vehicles (during construction phase) and stand by generator (operation phase) • Regulation 7 requires that all flammable storage tanks or flammable liquid containers be labelled with the words "Highly Flammable" in English or Swahili. It is therefore practical for the Proponent to use a system similar to the Hazardous Material Identification System of labelling their product containers. The regulation requires a Proponent to consult the product's MSDS for appropriate labelling requirements.	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. Put in place protection measures if there are flammable or explosive materials used or stored on the premises. iv. Developing an emergency plan should a fire occur which includes evacuation procedures etc

- Regulation 8(3) requires a Proponent to have a Spill Prevention, Control, and Countermeasures (SPCC) plan. This may be important if there will be chemicals stored in the refuelling area at the construction site.
- Regulation 16 requires Proponents to ensure that electrical equipment is installed in accordance with the respective hazardous area classification system. It is also a requirement that all electrical equipment is inspected every six months by a competent person and the Proponent is required to keep records of such inspections.
- Regulation 22 provides a description of the functions of a fire-fighting team.
- Regulation 23 requires Proponents to mandatorily undertake fire drills at least once a year.
- Regulation 33 requires Proponents to have adequate fire water storage capacity. As a minimum this regulation requires Proponents to have at least 10 cubic meters of dedicated fire water storage capacity.
- Regulation 34 requires Proponents to develop and implement a comprehensive written Fire Safety Policy. This policy should contain a Fire Safety Policy Statement signed by the CEO, a Fire Safety Policy Manual and a brief summary of the Fire Safety Policy of the company.
- Regulation 35 requires a Proponent to notify the nearest Occupational S&H area office of a fire incident within 24 hours of its occurrence and a written report sent to the Director of DOSHS within 7 days.

13. THE ENERGY ACT, 2019	The Energy Act deals with all matters relating to all forms of energy including the generation, transmission, distribution, supply, and use of electrical energy, as well as the legal basis for establishing the systems associated with these purposes. The Energy Act also established Energy and Petroleum Regulatory Authority (EPRA) in place of the Energy Regulatory Commission (ERC), whose mandate is to regulate all functions and players in the energy sector. One of the duties of the EPRA is to ensure compliance with environmental, health, and safety standards in the energy sector, as empowered by Section 99 of the Energy Act, 2019. In this respect, the following environmental issues will be considered before approval is granted: • The need to protect and manage the environment and conserve natural resources; and • The ability to operate in a manner designated to protect the health and safety of the project employees, the locals, and other potentially affected communities. An ESIA approved by NEMA must support licensing and authorisation to generate and transmit electrical power. • Part VI Section 121 (1a) stipulates that the EPRA shall, before issuing a license, take into account the impact of the undertaking on the social, cultural or recreational life of the community. • Part VI Section 121(1b) stipulates that the EPRA shall, before issuing a license, take into account the	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.

		need to protect the environment and to conserve natural resources in accordance with the Environmental Management and Coordination Act. • Part VI Section 136 (1a) stipulates that it shall be the duty of a transmission licensee to operate, maintain (including repair and replace if necessary) and protect its transmission grid to ensure the adequate, economic, reliable and safe transmission of electricity; and	
14.	THE ENERGY (SOLAR PHOTOVOLTAIC SYSTEMS) REGULATIONS, 2012	These regulations shall apply to a solar PV system manufacturer, importer, vendor, technician, contractor, system owner, a solar PV system installation and consumer devices. The Regulations prohibits any person from designing or installing any solar PV system unless he/she is licensed by EPRA.	The Regulations regulates, the design and installation of PV systems. The Proponent will ensure that persons engaged in the the designing and installation of the Mini-Grid are licensed by EPRA
15.	THE PUBLIC HEALTH ACT (CAP. 242)	The Act prohibits the project proponents from engaging in activities that cause environmental nuisance or those that cause danger, discomfort or annoyance to inhabitants or is hazardous to human and environmental health and safety.	The proponent will be in line with the regulations of this act and will ensure suppression of infectious diseases and maintain proper sanitation during all the phases of the project.
16.	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	The proposed project site falls on an unregistered community land and the land belongs to the Somali community of the Kulan. The community has since offered to the land in kind for project use. The establishment of the mini-grid will convert communal land to industrial use for long term. Further, based on community need assessment the proponent will undertake

	of any unregistered community land'. Therefore, the proposed road project can access land or water resources in community land that may be unregistered and pay compensation to the County Government which the law authorizes to hold such monies in trust for the communities. Section 30(1) states that 'Every member of the community has a right to equal benefit from community land'. Section 26(1) provides that 'a community may set aside part of the registered community land for public purposes and Sub-section (2) holds that 'where land is set aside for public purposes under Sub-section (1), the (Land) Commission shall gazette such parcel of land as public land'. 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	in kind development project to support the community water needs. The proponent should adhere to the provision of this legislation

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

Administrative Framework

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

Table 8. Administrative stakeholders and their roles

Stakeholders	Role
NEC	The **National Environmental Council** is responsible for policy formulation and directions for the purposes of EMCA. The Council also sets national goals and objectives and determines policies and priorities for the protection of the environment. *The proponent should ensure that the project abides by the set goals and objectives of the Council.*
NEMA	The responsibility of NEMA is to exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of Government in the implementation of all policies relating to the environment. *This ESIA has been prepared for submission to NEMA for review and approval prior to the commencement of the Project activities, in compliance to the EMCA.*
PCC	EMCA has also established a Public Complaints Committee, which provides the administrative mechanism for addressing environmental harm. The Committee has the mandate to investigate complaints relating to environmental damage and degradation. The members of the **Public Complaints Committee** include representatives from the Law Society of Kenya, NGOs, and the business community. *The proponent should address all issues arising from the Project in accordance with the above requirements, including a clear policy of stakeholder engagement and feedback.*
WRA	Water Resources Authority is responsible for regulation of water resources issues such as water allocation, source protection and conservation, water quality management and pollution control and international waters. One of its functions among others is to receive water permit applications for water abstraction, water use and recharge and determine issue, vary water permits; and enforce the conditions

	of those permits as well as formulate and enforce standards, procedures and Regulations for the management and use of water resources and flood mitigation. *The project area experiences serious water scarcity. The proponent will have to outsource water for use during the construction period*
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 a factory and there is a possibility for connection to the national grid and sale of excess power to the government, the project requires a license from the EPRC to generate electricity as stipulated in the Energy Act, 2019. The Energy and Petroleum Regulatory Authority (Authority) together with industry stakeholders have developed the Draft Energy (Mini-Grid) Regulations, 2021 (the 'Regulations'). The Regulations have been developed within provisions 10, 11 and 208 of the Energy Act, 2019 (the 'Act') and shall constitute Regulations to the Act. The Regulations will amongst others, provide guidance to mini-grid developers and other stakeholders on the tariff approval and licensing requirements. This will be directly applicable to the Tuum site.

4.4 INTERNATIONAL SAFEGUARDS REQUIREMENTS

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

Table 9: World Bank Operational OPs to the proposed project in Kulan site

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

		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.	minority are the Meru and Kambas who are also the marginalized. The proponent will continue to engage the beneficiaries in a culturally appropriate way and allow for decision making in a free, prior and informed consent manner throughout the phases of the project.
4.	Involuntary Resettlement (Operational Policy, OP/BP 4.12)	The objective of this policy is to (i) avoid or minimize involuntary resettlement where feasible, exploring all viable alternative project designs; (ii) assist displaced persons in improving their former living standards, income earning capacity, and production levels, or at least in restoring them; (iii) encourage community participation in planning and implementing resettlement; and (iv) provide assistance to affected people regardless of the legality of land tenure.	The policy is triggered for the entire project because there is land acquisition for the Mini-grid, Wayleaves, contractor facilities and worker's camps.

4.5 LICENSES AND PERMITS REQUIRED

The subsidiary legislation under the EMCA is partially monitored through the use of permits and licenses. Subsequently all licenses and permits required during the construction phase shall be the responsibility of the individual contractors and their agents. During the operational phase, all permits and licenses required to operate the project will be the responsibility of the proponent.

Before the contractor mobilizes to the site, there are certain permits that he will need to put in place. Some permits may be obtained during construction since they will be determined as need arises. Table 9 overleaf lists the environment-related permits required for this projec

Table 9 Project Permit and License Requirements

No.	Relevant activity	Statute	Permit and License Requirement	Competent Authority	Responsible Agency for Obtaining Clearance	Date of Acquisition	Duration
Pre-Construction Stage							
1	Construction and operation of the solar mini grid	Environmental Management and Coordination Act (EMCA) Cap 387, Rev 2018	Need to submit ESIA report to obtain EIA license	NEMA	Proponent	Upon approval of ESIA report	Max 90 Days from date of submission of ESIA Report
2	Construction activities	Occupational Safety and Health Act (OSHA), 2007	Need to apply registration of premises	DOSHS	Contractor	Before commencement of construction	1 – 4 weeks
3	Setting up of construction camp sites	Environmental Management and Coordination Act (EMCA) Cap 387, Rev 2018	Need to submit Project report for the Camp Sites to obtain EIA License	NEMA	Contractor	Before commencement of construction	1– 1.5 months
6	Storage, transport and disposal of ordinary domestic and office waste	Environmental Management and Coordination Act (EMCA) Cap 387, Rev 2018	Need to obtain waste license through submission of Waste Management Plan	NEMA	Contractor	Before commencement of construction	1 – 1.5 months

No.	Relevant activity	Statute	Permit and License Requirement	Competent Authority	Responsible Agency for Obtaining Clearance	Date of Acquisition	Duration
7	Storage, transport and disposal of hazardous waste	Environmental Management and Coordination Act (EMCA) Cap 387, Rev 2018	Need to obtain hazardous waste license through submission of Waste Management Plan	NEMA	Contractor	Before commencement of construction	1 – 1.5 months
Construction stage							
4	Food handling in the campsite	Public Health Act	Obtain Food Handler Certificate	County Government	Contractor	Before handling of food in the campsite	6 months
5	Workplace registration	Occupational Safety and Health Act, 2007	Apply for Registration of a Workplace	DOSHS	Contractor	Before utilizing the campsite	Annual

5 BASELINE SETTINGS - ENVIRONMENT, ECOLOGY AND SOCIAL

5.1 AREA OF INFLUENCE

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

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

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

Air Quality

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

Noise

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

Water

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

Flora and Fauna

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

Socio-economic/Social

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

5.1.1 Project Footprint Area

The proposed solar microgrid station is in Kulan Village, Kulan Sub location, Liboi Sub County in Garissa County. The proposed project site is approximately 301 m from the Kulan shopping centre. The area is characterised by sandy loam soils.

Land in the study area is primarily communal

5.1.2 Study Area

The project site is located in Kulan Village, Kulan Sub location, Dadaab Sub County in Garissa County. Based on the secondary information of the region, the sampling locations were identified to obtain the representative baseline information. Soil sampling locations were selected based on the land use and land cover of the study area. In addition, special emphasis is given to areas within 1.5 km radius of the project site and distribution lines.

5.2 ENVIRONMENT BASELINE

5.2.1 Land and Land Use

Kulan site is an unregistered community land Kulan sub-location, Liboi Ward in Garissa County. The project site is approximately 635.25m from the Kulan Market and 808.38m from Kulan Primary School. The main economic activity in the project area is livestock keeping. The land is currently unoccupied and used for grazing animals, including Cattle, Camels, Goats and Sheep. During the assessment, it was observed that so many cattle had died along the roads due to severe droughts in the project area. These community's livelihoods will not be affected by the project. This is because the land identified by the community to set up the mini-grid had already been set aside for community facilities/services. The total estimate of the land proposed for the mini-grid is 1.55 hectares. There was no farming in the area due to the long period of drought in the area. Therefore, livelihoods are not affected, and no livelihood restoration measures are needed. The beneficiaries of Kulan mini-grid live permanently in the area and are the main users of the land.

An abbreviated Resettlement Action Plan (A-RAP) outlining the principles and procedures for land acquisition and compensation is annexed to this ESIA (***Annex 5***). An A-RAP applies where affected persons are not physically displaced, and less than 10% of their productive assets are lost, or fewer than 200 people are displaced. In the case of KOSAP sub-projects, there is no physical displacement of affected persons, and the foreseen impacts on livelihoods, such as grazing occasioned by mini-grid construction, wayleaves acquisition, and implementation of community projects, are considered minor. A-RAPs will be implemented for sub-project sites on the unregistered community land

The proposed project will supply power within a small radius of about 3 km. Preliminary estimates indicate that the following villages will be supplied, namely; Kulan, Liboi and Dadahaley. The main tribe in these villages is the Somalu Community. Other community members from the area include the Meru and Kamba. The area is majorly arid, with a sparse population within the area.

5.2.2 Topography

The topography within 2 miles of Garissa contains only modest variations in elevation, with a maximum elevation change of 144 feet and an average elevation above sea level of 489 feet.

Within 10 miles also contains only modest variations in elevation (456 feet). Within 50 miles contains only modest variations in elevation (1,191 feet).

The area within 2 miles of Garissa is covered by grassland (40%), cropland (24%), artificial surfaces (18%), and trees (13%), within 10 miles by shrubs (45%) and grassland (39%), and within 50 miles by shrubs (44%) and grassland (37%).

The topography of the project site is an open area with very gentle slope

5.2.3 Hydrogeology and Drainage

Geologically, major parts of the Daadab sub county is occupied by sedimentary rocks mainly sandstones/ quartz sand with vast deposits of sand along the river basin the is at a close proximity to the project site (1km northwards). The project site lies near the Kulan shopping centre and represent the similar geological formation of sandstone. The sandstone, shale and limestone are of sedimentary origin but are mostly hard and compact due to which the rocks behave similar to consolidated crystalline rocks and the aquifer are formed due to weathering and fracturing.

5.2.4 Ecology

The project area located in Liboi Ward, Daadab sub county in Garissa County, the area encompasses scarce tree species. Garissa County is principally a semi-arid area falling within ecological zone V-VI and receives an average rainfall of 275 mm per year. There are two rain seasons, the short rains from October to December and the long rains from March to May. Rainfall is normally in short torrential downpour making it unreliable for vegetation growth. The southern parts of the County such as Hulugho, Masalani and Bura receive more rainfall than the northern parts. Balambala and Fafi Constituencies practice rain-fed agriculture on small scale. During the dry season, there is a general migration of livestock from the hinterland to areas near River Tana where water is readily available. However, some pastoralists move with their livestock to adjacent counties of Tana River and Lamu in search of pasture. Much of the County's livestock population are indigenous sheep, goats and cattle, found in the southern parts which receive more rain while camels occupy the drier north.

The project site encompasses scarce tree species eg. Mathenge tree spp. The area's ecological conditions are influenced by the soil type, altitude, vegetation, rainfall pattern and human activities. The dominant vegetation type in the area include shrubs and a little bit of grasslands. Grasslands are suitable for livestock rearing. Various plant species were identified at the project during the ESIA study.

Plate 1: Project area flora presentation

5.2.5 Water Resources

The project area has no permanent rivers, however, there are a number of seasonal streams. Tana River runs on the South Eastern side of the project site.

5.2.6 Soil Type

The soils found in the project area are predominantly clay and loamy. Sandy soils are only found in a long narrow stretch from Modogashe to Dadaab because of the influence of the Ewaso Ngiro lagga and, and down south in Bura and Hulugho. The soils are deep to very deep. The soils are well drained because clay to sandy silts are prevalent at the top in these areas. A soil sample was collected from the site and submitted to a NEMA designated Laboratory for analysis of Petroleum Hydrocarbons. The results obtained and which are presented in table 8 below shows that the pollutants of concern were not detected in the sample. The further indicates that the site has not been impacted by petroleum hydrocarbons.

Table 10: Soil Analysis results

Test	Method	Results	Units	Limit
BTEX				
Benzene	PQA/LIM/002	<0.01	mg/kg	<0.01
Toluene	PQA/LIM/002	<0.01	mg/kg	<0.01
Ethyl benzene	PQA/LIM/002	<0.01	mg/kg	<0.01
Xylene	PQA/LIM/002	<0.01	mg/kg	<0.01
PAH				
Naphthalene	PQA/LIM/004	<0.01	mg/kg	<0.01
Acenaphthylene	PQA/LIM/004	<0.01	mg/kg	<0.01
Acenaphthene	PQA/LIM/004	<0.01	mg/kg	<0.01
Fluorene	PQA/LIM/004	<0.01	mg/kg	<0.01
Phenanthrene	PQA/LIM/004	<0.01	mg/kg	<0.01
Anthracene	PQA/LIM/004	<0.01	mg/kg	<0.01
Fluoranthene	PQA/LIM/004	<0.01	mg/kg	<0.01
Pyrene	PQA/LIM/004	<0.01	mg/kg	<0.01
Benzo(b)anthracene	PQA/LIM/004	<0.01	mg/kg	<0.01

Chrysene	PQA/LIM/004	<0.01	mg/kg	<0.01
Benzo(b)fluoranthene	PQA/LIM/004	<0.01	mg/kg	<0.01
Benzo(k)fluoranthene	PQA/LIM/004	<0.01	mg/kg	<0.01
Benzo(a)pyrene	PQA/LIM/004	<0.01	mg/kg	<0.01

5.2.7 Climate and Meteorology

The project area has a relatively hot and dry climate throughout the year. The average temperature is greater than 27°C throughout the majority of the county. There is a strong south to north gradient of decreasing precipitation some southern parts of the county receiving greater than 1000 mm of precipitation per year, the central part of the county receiving around 500 mm, and the north/western parts of the country consistently receiving less than 250-500 mm. A small pocket of the north western part of the county receives less than 250 mm precipitation per year. As such, heat stress, dry spells, and drought are hazards that strongly contribute to agricultural risk in the county, especially in the more northern parts of the county. The Tana River runs along south-western boarder of the county where flooding along riparian areas are also a risk, especially due to periods of rain upstream in the Tana River. The project area is a dry land area with harsh climatic conditions, erratic rainfall and poor soils that limits variety and the type of vegetation and animals found in the area

5.3 SOCIO-ECONOMIC ENVIRONMENT

5.3.1 Socio-economic status of Study Area

5.3.1.1 Demographic Profile

The demographic profile in terms of total population, number of households, household size and sex -ratio of the surveyed Liboi Ward in study area has been discussed in section below and details are presented below

The project site is located in Daadab Subcounty, Liboi ward. The project site is approximately 301m from the Kulan shopping centre. The project area`s population is consisted of nomadic ethnic Somali pastoralists, who are mainly camel and goat herders. The project area has an estimated population of 9000 people and 1500 households with an estimate of 4 persons per household. The average gender ration for the population within the project area is estimated to be 60% female and 40% male. Table 9 below presents a summary of demographic profile of Kulan.

Table 11: Summary of demographic profile

Attribute	Magnitude/Number
Approx. population	9000
Households	1500
Gender.	Male – 28% Female – 72%
Ave. No. per household	6 per household
Indigenous	Indigenous- 100% Settlers – 0%
Vulnerable classes	• Poor female headed households (Approximately 300 households) • Orphans (Approximately 200) • Persons Living with Disabilities (Approximately 250) • The elderly (Approximately 150)
Dominant ethnic group	Somali
Primary religion	Islam
Other groups	Meru and Kamba
Employment (formal/Informal)	Formal – 11% Informal – 89%

5.3.1.2 Educational Infrastructure

As per the observation and information sought from the project area and from the public consultations, the area has only one school; Kulan Secondary and Kulan primary school located at about 808.38m from the project site.

5.3.1.3 Occupation and Livelihood Profile

The main livelihood activities undertaken by people in Kulan village are pastoralism, business and farming only during rainy seasons. Business activities is undertaken at Kulan shopping centre which serves Liboi ward and communities within Dadaab sub-county.

The main formal jobs at the area accumulates to 11%. The other 89% of the population is involved in informal employment.

5.3.1.4 Social and Physical Infrastructure

The project area had public institutions; Kulan Primary school, Kulan Secondary School and Kulan health centre. The area had no functional health facility. There was an incomplete dispensary at the area. Kulan Boarding Primary was started in 1985 and has a current enrolment of 381 pupils, 281 boys and 100 girls.

It was also reported that the schools lack enough teachers and infrastructure to accommodate all the pupils.

The main source water is borehole. During the rainy seasons the people rely on Seasonal rivers and streams.

Roads connectivity within the area is poor and not regularly maintained and the main access road to the project site is a dirt road which branches off Garissa-Dadaab Road. The main forms of transport within the area are matatus, Motor bikes and taxis.

Plate 2: Kulan health centre

Plate 3: Kulan primary school

5.3.1.5 Vulnerable groups

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

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

- Poor female headed households (Approximately 300 households)
- Orphans (Approximately 200)
- Persons Living with Disabilities (Approximately 250)
- The elderly (Approximately 150)

The vulnerable households can hardly access the basic needs and most of them really 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.

5.3.1.6 Gender based vulnerability

The society in the project area is characterized by a patriarchal family structure. During the Female Focus Group Discussion and in-depth interviews it was reported that the men are the main controllers of resources that include land and assets.
The main challenges that women and girls face in the community include inequality in education, early marriages, FGM and job discrimination.

The 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. Female literacy was reported to be low.

5.3.1.7 Gender Based Violence

Gender based violence is one of the issues the women highlighted at the FGD. Family disputes are the main sources of GBV in the area.

5.3.1.8 Culture and heritage

No cultural site of significance was reported/observed within the project area. The area elders stated that there were cultural sites however the sites are more than 20km from the project area. Kulan is predominantly made up of the Somali community whose main economic activity is pastoralism. The Somali community in the project area are a patriarchal society; men typically speak for women and make decisions in the family.

5.3.1.9 Religion in the project area

The community members are predominantly Islams with mosques and Madrasas within the locality.

5.3.1.10 HIV/AIDs prevalence

Garissa County has a population of 423,931 comprising of 51% males and 49% females. HIV prevalence in Garissa is (0.9%) lower than the national prevalence of 5.9% (Kenya HIV Estimates 2015). The county contributed 0.5% and 0.1% of the total new HIV infections in Kenya among children and adults respectively.

6 STAKEHOLDER ENGAGEMENT

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

i. Stakeholder identification and analysis
ii. Planning for the stakeholder engagement;
iii. Disclosure of information;
iv. Consultation with stakeholders
v. Addressing and responding to grievances; and
vi. Reporting to stakeholders

6.1 STAKEHOLDER CONSULTATION AND DISCLOSURE REQUIREMENT FOR THE PROJECT

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

A documented record of stakeholder engagement, including a description of the stakeholders consulted, a summary of the feedback received, and a brief explanation of how the feedback was been explained in this chapter.

6.2 STAKEHOLDER CHARACTERISATION AND IDENTIFICATION

Stakeholders are classified in the following two categories;

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

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

6.3 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 Kulan, the stakeholders have been identified and listed in the table given below;

Table 12: Identified Stakeholders

Stakeholder Groups	Primary Stakeholders	Secondary Stakeholders
Community	Local Labourers Land sellers	VMG's Local Community

	Project beneficiaries
Institutions	Faith Based Organisations Education institutions Community Based organisations
Government Bodies	County Government District and local administration

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

Table 13: Stakeholder Significance and Engagement Requirement

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

6.4 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 14:Summary of Stakeholder Influence

Stakeholder Category	Relevant Stakeholders	Magnitude of Influence/Impact	Urgency/Likelihood of Influence	Overall rating of stakeholder rating
Primary Stakeholders	Community land owners	Medium	Low	Minor
	Local Labourer's and subcontractors	Small	Medium	Minor
	County Government of Garissa, District and local administration	Medium	Low	Minor
	FBOs, CBOs and Educational Institutions	Medium	Low	Minor
Secondary Stakeholders	VMGs	Small	Medium	Minor
	Local Community	Medium	Low	Minor

6.5 KEY FEEDBACK RECEIVED DURING COMMUNITY CONSULTATIVE MEETING LEADINS TO LAN IDENTIFICATION AND GRC CONSTITUTION – SCREENING LEVEL

Project: Proposed Kulan Solar Mini-grid
Venue of meeting; Kulan Shopping Centre

Date: 24/06/2021

The Chief; Kulan location called the meeting to order at 9:00 AM. The meeting began with a word of prayer from one community member. The language used to communicate was Kiswahili with a translator explaining to the community in the local Somali dialect. The chief welcomed all to the meeting and said the community is ready for the stakeholder engagement and asked them to participate actively so that the meeting would be fruitful.

The Chief welcomed the chief officer Environment Garissa County Dr. Adan Mohamed to make his remarks and welcome the KOSAP project team to the ward. The Ward Administrator welcomed and thanked all for attending the meeting and asked the community to listen and participate in the consultation. He noted that the County government is in support of the projects that come to make the lives of the people better. He then invited Mr. Amin KPLC County business manager Garissa County to welcome the project team to talk to the community. Mr. Amin asked the community to feel free and participate in the engagement forums because they are part of the key stakeholders of the project.

Mr Amin invited the project's team leader Engineer Benson Mwakina from the Ministry of Energy (national government) to introduce the project team and proceed with the consultations. Engineer Mwakina asked the team to make brief introductions before they engage the community in different issues of the proposed project. Below is a list of KOSAP team members and Garissa County officials present.

6.5.1.1 Positive Impacts/Benefits of the Project

Mr. Mwagangi explained that, every project has both positive impacts and negative impacts. Our assignment is to explain to you the impacts of the project so that you understand how the project will benefit you and the community at large. The project benefit both direct and indirect are as follows:

1. Better source of lighting- replacement of Kerosene lamp and small de-lite lamps with electricity lighting which is clean and has better lighting
2. Benefits to education- provide source of lighting which enables pupils and students to take advantage of longer hours of preps/study in homes. Electricity will be useful in availing power needed to enable use of radio and television sets. Once parents are able to buy these gadgets pupils can access electronic educational materials
3. Business opportunities-Power provides energy needed to power some gadgets that are difficult and expensive to power with generators. Access to electricity will therefore allow the community to take advantage of new business opportunities and enhance the existing ones e.g. Barber shops, salons, posho/maize mills, welding, photo copying, printing, fuel stations, milk coolers and fridges to preserve meat among others
4. Employment and wealth creation- community members will get opportunities to provide non-skilled and skilled labor during construction and operation phases
5. Local Material Supplies and other requirements- the proposed project provides opportunities to supply some materials available locally
6. Up Scaling Electricity Access to the off-grid areas- this area is far away from the grid and so the proposed project helps to reach such areas faster and in a cost effective manner as opposed to grid connections.
7. Impact on HIV/AIDS-due to availability of power, communities can purchase communication equipment like radios and televisions which in turn provides access to information on various issues such as health topics on HIV/AIDs, nutrition and the current Covid-19 pandemic among other information
8. Health benefits of the project- health benefits of the project includes replacement/elimination of use of kerosene lamps and candles, reduced or no use of fuel generators in the trading centers which emits smoke causing respiratory diseases, the health Centre under construction will also benefit from power that can be used to preserve drugs and vaccines alongside powering other medical equipment.
9. Improved standard of living- Living standards of the community is bound to improve as they take advantage of small house hold appliances like e.g. TV, Fridges, radios, blenders, iron boxes e.t.c.
10. Security- Enhanced security due to improvement in lighting up of the area through the street lights. Improved security also means more hours of business
11. Communications- improve communication due to availability of electricity to charge phones, opportunities to set up information communication and technology related business like cyber cafes, access to e-government services among others.
12. Presence of electricity will also attract other business investors to invest in the area

6.5.1.2 Negative impacts of the project

Having discussed the benefits of the project, Mwangangi explained that projects also have negative impacts. He noted that the most important thing is to be able to mitigate the negative impacts so that they do not affect the community. He said ‘’the proposed solar Mini-grid will have the following negative impacts and I will present them alongside their mitigation measures.

	Negative impact	Mitigation measures by contractor
1	Vegetation clearance of the site identified.	• Clear only the areas that are needed to put up the mini-grid • After construction, do landscaping with grass to areas that have no electrical installation as opposed to living areas bare • Planting of trees
2	Air pollution dust from construction activities	• Fence off construction site to reduce dust going to the public • Use of masks for workers
3	Air pollution dust from construction vehicles	• Limit vehicle speed to minimum possible when passing residential areas
4	Air pollution from vehicle emissions	• Maintain vehicles/service vehicles • No idling of vehicles
5	Solid waste	• Clear all solid waste and dispose appropriately
6	Land acquisition/take As you had been briefed before the site identified should; -must not result in displacement of community members - We must avoid land that is currently settled or which has squatters. -There will be an impact of forgoing the current land uses if any or future land uses for the sake of the project.	• The community should be willing and ready to live with this impact
7	Occupation safety and health hazards e.g. accidents, fall from heights, pricks by sharp objects	• Use of proper personal protective equipment like gloves, overalls, helmet, safety shoes • Allocating work according to skills • Toolbox talks to workers to identify hazards and risky activities
8	Labor influx. The nature of the project will require technical skills that may not be available in this community. This will require movement of construction workers (labour influx) into this community. Some risks that are involved with labor influx include social ills, cultural conflict, insecurity among others.	• All workers will be sensitized to respect the locals culture, and conduct themselves according to the contractors code of ethics. The project shall have an established and operational Grievance Redress Mechanism accessible to community members • Reduction of labor influx by tapping into the local workforce
9	Risk of social conflict due to competition for resources and opportunities	• Awareness-raising among local community and workers on the need to have a good /cordial working relation • Consultations with and involvement of local communities in project planning • Provision of cultural sensitization awareness for workers regarding engagement with local

		community. • Recruitment of local workforce to the extent possible especially unskilled and semi-skilled jobs • Contactor shall make provision to provide resources needed by the workers if the need for such resources may result to competition e.g. water • Working closely between contractor and the project grievance redress committee to address complains on time.
10	Increased or illicit behavior and crime (including prostitution, theft and substance abuse)	• Sensitization campaigns both for workers and local communities against such social evils • Enforcement of sanctions (e.g., dismissal) for workers involved in criminal activities
11	Communicable diseases (including STDs and HIV/AIDS)	• Education/awareness about transmission of diseases • Information campaigns on STDs among the workers and local community on ethics, morals, general good behavior and the need for the project to co-exist with the neighbors during the community and worker engagement forums. • Provide condoms to employees
12	Gender-based violence including sexual harassment and exploitation	• Information and awareness raising campaigns to you community members and specifically women and girls. • Mandatory awareness creation for workers on required lawful conduct in the community and legal consequences for failure to comply with laws • Report all complaints on gender-based violence or harassment through the GRM and also directly through CREO • Working closely and Instruction of local law enforcement to act on community complaints on time • Inclusion of GBV specific mitigation measures in the environmental and social management plan of contractor • Requirement of contractor to have code of conduct for the workers and to implement them
13	Child labor	• Ensuring that children and minors are not employed directly or indirectly on the project. • Enforcement of Employment Act that requires contractor to adhere to minimum age • Allowing your children to be employed is illegal and punishable by law because it interferes with the children's right to education • Report any case to the chief's office
14	Demand for Material/resources e.g water	Contractor to consult with elders before using the water resources in the community to avoid conflicts.

15	*Oil Spill Hazards*	• Contractor not to repair vehicles or equipment on site • Maintain vehicles and equipment in good state
16	*Storm water and erosion*	• Contractor to put measures to harvest rainwater and control erosion during construction
17	*Wastewater/ effluent*	Contractor will provide sanitation facilities for workers
18	*Noise resulting from excavation machinery, vehicles and workers*	• Contractor to comply with NEMA Noise and Excessive vibrations rules and regulations 2009. • Contractor to use machinery and equipment with noise attenuation systems. • Contractor to work only during the day • In case of blasting contractor to give notice to community through the village elders and chiefs office
19	Visual and Aesthetic Landscape Impacts	• The visual negative impacts can be mitigated through putting up a wall round the facility to keep off/screen the project stacks, poles, cables, panels and transformers by the contractor. • Proper siting decisions can help to avoid aesthetic impacts to the landscape.
20	Hazardous materials from damaged Panels- Photovoltaic panels may contain hazardous materials, and although they are sealed under normal operating conditions, there is the potential for environmental contamination if they were damaged or improperly disposed upon decommissioning.	• Proper planning and good maintenance practices can be used to minimize impacts from hazardous materials. • Proper disposal of used or Damage solar batteries and panels using NEMA registered disposers for such wastes
21	Fuel storage on site	Contractor will undertake proper installation of the fuel storage tanks and dispensing system like having a budded wall 1.5 times the fuel storage tank. During operation implementing agency will ensure proper maintenance of the solar plank
22	Public safety –potential risk of shocks and electrocution	Proper wiring at houses and premises by a qualified technician

6.5.1.3 Public safety in regards to electricity

Mwangangi educated the community by highlighting the importance of using electricity safely. He said electricity is good but failure to take the precautions while interacting with it can result in electric shocks, fires and even electrocution/death. He emphasized the following precaution/preventive measures to observe in order to prevent risk of electric shocks, fires and electrocutions.

- Engage a certified technician to do wiring in your premises
- Use quality materials while wiring
- Do not engage in individual illegal extensions of power lines to other houses
- Don't touch sockets and switches with wet hands or wipe with wet cloths
- Do not tie your livestock on electric poles

- Do not cut earth wires that run along some electric poles
- Do not touch any electric wire if you find it fallen on the ground
- Report any incident regarding electricity at the local office –staff in charge of operating the Mini-grid
- Vet all new people coming to the village by checking whether they registered their presence with the office of the chief.
- In case of a black out do not open sockets or switches

6.5.1.4 Land requirements for the project

Mr. Mwangangi told the community that one of the agendas of the project team's visit was to progress land Identification process for the proposed Mini-grid. He explained to the public forum that the proposed project will require about 1.55 hectares of land. He explained that the piece of land identified will be screened for its Suitability for the purposes of the Community Mini-grid.

6.5.1.5 Grievance Redress Mechanism

Mr. Mwangangi explained that in a project, grievances may arise and it important to have a grievance redress mechanism that is known to all the community members and accessible with no costs to the community members.

Mr. Mwangangi explained to the community that it is important to put in place a project grievance redress mechanism (GRM). He noted that the GRM to be set should borrow heavily from the existing conflict resolution structures in the community. He explained that the need for a GRM is to provide the community and other stakeholder's opportunity to share project information and raise questions and grievances about the project. He told the community that they are free to raise any complain or request information about the project. He explained further that members of the project/ grievance redress committee will be chosen by the community members themselves. The committee chosen will be in charge of giving project information to the community and be a focal point for reporting project related issues of concern or grievances. He added that the composition of the committee should have representatives from all groups in the community including men, women, youth and persons with disability.

GRM team selected

No.	Names	Represents	Id. No	Phone No.
1.	Kaha Siyat Ibrahim	Women	22956820	0773364904
2.	Haret Abdi Barre	Men	0029012	0725089939
3.	Abdi Sheikh Abdifatah	men	12913786	0705008759
4.	Adow Abdilahi Yusuf	Youth	23493429	-
5.	Bishar Ahmed Mohammed	Men	23062348	-
6.	Kassim Kahim	Men	-	-

6.5.1.6 Plenary session

Mr Mwangangi made a brief summary of what had been discussed and invited the community members to ask questions or seek clarifications on the information shared. The questions raised and responses provided are presented in the table below.

	Name	Questions/suggestions	Response	Response by agency on how feedback will be used or acted upon
1.	Muktar Ibrahim	-Greetings -Will the power to be generated in the area enough to pump water from a borehole	**Engineer Mwakina** - The power generated from the mini-grid will be grid level power that can be used for all purposes including welding and powering borehole water pumps	-
2	Hassan Gurow	What will be the cost of connection per individual household	**Engineer Mwakina** Connection fee for the KOSAP project will be Kshs 1000 which is payable to Kenya power. Money shoud not be paid to any other party apart from Kenya Power	-

6.5.1.7 Focus Group Discussion

a) FGD Youths

This FGDs were led Samuel Mbugua

He welcomed the youths present for the focus group discussion. He further explained to them the proposed project the government wants to implement in their neighborhood will be supplying electricity to the community. This electricity will be generated through solar panels and standby generator. This project is being funded by the World Bank and being implemented by Ministry of Energy through Kenya Power and Lighting Company and County Government of Garissa.

The youths noted were engaged on how the proposed project will be implement in the area and they identified the following positive impact the project will come along with as follows;

- Creation of direct and indirect employment for the community people
- Reduction of travel expenses since health services will be near them
- Clean source of energy (electricity) in their neighborhood
- Improvement of education standards
- Increase of the land value
- Improvement of the economy of the area
- Access to information and news since the community members will invest in the purchasing of the radios, Tvs, and internet services

Further the youths identified the negative impacts that the proposed Mini-grid will come up with in their neighborhood;

- Introduction of visual impacts due to the proposed mini grid and low voltage lines
- Clearing of vegetation on the proposed project site to create room for the construction of the Mini-grid
- Increase of population in the neighborhood especially during the construction phase
- Increase of crimes and other evil vices i.e. unwanted children, early pregnancies,

spread of sexual transmitted diseases, petty theft.

- Mixing of various cultures of different people who will be working during the construction and operational phases of the proposed Mini-grid project.
- More intake of water during the construction and operational phases of the proposed Mini-grid
- Instance of air pollution will be witnessed during the operation phase of the proposed mini-grid.

When youths were asked if they support the proposed project? All of the youths present were in full support of the proposed mini grid project and agreed that they will lobby other youths to support the project.

GRM Representative for Kulan Mini-grid-No Questions

Serial No.	Name	ID NO.	Cell No.
1	Adow Abdilahi Yusuf	23493429	-

b) Women Focus Group Discussion

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 Kulan

GRM Representative for Kulan Mini-grid-No Questions

Serial No.	Name	ID NO.	Cell No.
1	Kaha Siyat Ibrahim	22956820	0773364904

c) FOCUS GROUP DISCUSSION FOR MEN

Simon Mwangangi called the Focus group discussion for Men into order and thanked the Men present for turning up for the meeting in good numbers and for their contribution in the Public Baraza.

A focus group discussion was held with men above 35 years of age. This categorization was based on the assumption that these men; as the heads of families and with a deeper understanding of the community set up, roles, entitlements and were also a foundation of knowledge helpful to the project team in understanding the community better. The main objective of this discussion was to assess whether men had understood the proposed project and its requirements and to provide an opportunity for them to air their issues/give their opinions on the project.

Simon Mwangangi from KPLC explained the importance of holding a separate discussion with them so that they would have an opportunity to freely express themselves and inform the Project team how they would wish to be involved in the project. Simon reminded the men that as the heads of families, they played a crucial role in ensuring the project was a success. He explained to the men that the essence of the environmental and social screening of the project site was to assess its 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. The third objective was to explain the land requirements for the project and the need for a project Grievance Redress Mechanism (GRM) for the project. This would be achieved through the formation of a Grievance Redress Committee (GRC) in which men required to select their representative. Simon went further and summarized the project by explaining its positive and negative impacts and their mitigation measures and the requirements for identifying land for the project. He also explained the need for the men to elect a representative to the GRC which also doubled as the project committee. The representative would present their views/issues to the committee for redress and further action to ensure that the interests and needs of men were factored through-out all the phases of the project.

The men were further explained of their role and responsibility in terms of protecting and ensuring security for the project and the need for community ownership of the project. Simon further told men in the meeting that the identified site would be fenced and would hence forth be referred to as land put aside by the community for energy development project.

Simon went ahead and asked the Men to give their views on how they wished to be involved in the project, to ask questions, give suggestions and or seek clarifications. Their responses and concerns were as follows.

The men confirmed they were in agreement to have the project brought to the community. In unison the men said they would like to be involved in the following:

1. Peace and Security
2. Employment especially as watchmen, security jobs, masonry, fencing among other jobs that skills could be available within the community.
3. To be at the forefront in land identification
4. Anything that may go wrong, men would participate in dispute resolution

There were no questions.

The following were elected to be representatives for men in the GRM/ Project committee.

1. Haret Abdi Barre of ID No. 0029012 and phone number 0725089939
2. Abdi Sheikh Abdifatah of ID No. 12913786 and phone number 0705008759

6.6 KEY FEEDBACK RECEIVED DURING STAKEHOLDER CONSULTATION PROCESS

The general stakeholder consultation was done in a public meeting(Baraza) organized at the Kulan Chiefs office compound where there were a total of 99 in attendance. The meeting was chaired by the area chief assisted by the assistant chief and the "Nyumba Kumi" leaders.
The ESIA team spearheading the process included the following;

NAME	ORGANISATION
Abdi Dekhow	Senior Chief Kulan
Fatuma Abdulahi	Assistant Chief
Simon Mwangangi	ESS KPLC
Hottensia Kabuki	Norken International Limited
Allan Owino	Centric Africa Limited
Umulkheir Abdi	Norken International Limited
Martin Gitonga	Norken International Limited
Iftin Hussein	Senior teacher
Ali Adam	Deputy headteacher

The feeback received during the stakeholder consultation process have been summarized below:

No	NAME	Organization/ Designation	Issues/comments discussed
1.	Haret Abdi	Community member	She commented and appreciated and thoughtfully encouraged the community to accept the project.
2.	Mr. Abdihakim Dekow	Community member	He was concerned whether the basic trainings/ jobs will be given to the locals.
3.	Mr. Noor Abdi	Community member	She was concerned on the distance coverage of the project.
4.	Mr. Khalif Daqancy	Community member	He was concerned whether the kulan community members would be the first people to receive the project.
5.	Mr. Dekho Abdi	Community member	He was concerned whether the project would provide electricity to the salons. He as also concerned whether the members would also pay for the electricity.

Benefits of the Project

- The community was in support of the project. They noted that the project will beneficial to the community as it will:
    - The electricity will assist in water reticulation to the community members at least to reduce the distance covered.
    - Lighting will improve the security situation
    - Employment opportunities will increase for both the youth, men and the women due to increase in business opportunities and during the project construction phase.

- Medical services will improve
- Business improvement
- Education will improve.

Community Concerns

- The community raised they following concerns:
  - Gender equality was raised in relation to the project especially on employment opportunities. They suggested that youths and women should be given priority;
  - Increase in HIV Aids due to interactions of the locals with the project's technical staff from outside the project area

Community Requests

- The community requested the following from the project:

  - 1st Priority to be water reticulation from the existing borehole to the community members.
  - 2nd Priority to supply the school and the shopping Centre with electrical power by improving the batteries and the inverters. This will enable the pupils to attend evening classes, boost the business and improve the security of the area through street lighting.
  - Community members requested for a modern dining hall with tables and chairs. The hall would protect pupils from harsh weather conditions, food contamination and also from scavengers and hungry donkeys. The hall would also be used for projecting information, hosting alternative computer classes, promoting CBC Curriculum and co-curricular activities like drama and music festivals. They also reported that the schools had fewer teachers to manage the number of pupils and students

Public participation "Baraza" Session

Plate 4: Stakeholders engagement process

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

6.7 SUMMARY FEEDBACK RECEIVED DURING FOCUSED GROUP DISCUSSION

The Focus Group Discussions were held with Men, Women and the Youth as indicated in Table 13;

Table 15: FGD dates and attendance

Group	Date	Attendance	Venue
Men	20th October 2021	6	Kulan Primary School
Women	20th October 2021	10	Kulan Primary School
Youth	20th October 2021	7	Kulan Primary School

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

6.7.1.1 Female Stakeholders' Consultation and Participation

The females' participants in the FGD were 10 in number with an age range of 18 to 50. The meeting had only one widows. The following were their responses;

The project perception

The women indicated that it was their first time hearing of the project during the Baraza. They were however in support off the project.

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

- ✓ Women and men don't have equal opportunities in the community. They clarified that men have more opportunities in the community and at the workplaces,. However, this is not the case in education since both men and women have equal opportunities

- ✓ Women receive information about local issues and development or news through the local administrators.
- ✓ Women are sometimes left to head families as the men go to search for pasture.

Institutions/community Development

- ✓ The main community development priorities/needs include.
    1. Health- The health facility within the project area has only male nurses and this makes them uncomfortable.
    2. Water-Improve the accessibility and availability through water reticulation.

Education, literacy, and training of Women in Kulan

- ✓ They denoted that about females go to primary school equally as men but the more males attend Secondary school. The schools were at the project area.

Health care for Women in Kulan

- ✓ Access to health care is not difficult since there is a health Centre within the project area. The main problem was that the health Centre had more male nurses at the maternity section thus making the women uncomfortable.
- ✓ Environmental issues affecting health in the community is mainly lack of sanitary conditions-water and sanitary pads.
- ✓ The public health Centre could not help provide some of the medical needs to the community members.

Transport and communication

- ✓ The main forms of transport are matatus and sometimes cars.

Hygiene and waste management by Women

- ✓ Some Women in Kulan do not access sanitary facilities and or products e.g., sanitary towels.
- ✓ The area possess fewer pit latrines so they have to share.
- ✓ The women manage the wastes by burning.

6.7.1.2 Male Stakeholders' Consultation and Participation

- ✓ The male participants were 6 in number. The following were the response during the male FGD.

The project perception

- ✓ The men indicated that they have heard about the project during the time the community gave out the land.
- ✓ The project will create employment.

Role of Men as per the FGD

- ✓ The findings showed that the roles of men is keeping livestock therefore looking for pastures and provide for the family.
- ✓ They also make critical decision for the community and protect it too.
- ✓ Men have control over most of the resources.

Economy /income generation

- ✓ Men generally earn their income through pastoralism; they heard and later sell livestock.
- ✓ Men contribute more income in the household as compared to women.

Land use

- ✓ The main land based activity in the area is grazing.

- ✓ The main animals kept include cows, goats, sheep and camels.

Education, literacy, and training as per the FGD

- ✓ Most men usually get to Secondary school compared to women

Access to Water analysis by the male FGD

- ✓ The women are responsible for searching water for domestic use.

Access to Power

- ✓ Sources of energy in Kulan
  - For lighting – Torch
  - Cooking -firewood
  - Charging mobile-solar
- ✓ There was no reliable power supply in the area

Transport and communication

- ✓ The main forms of transport are matatus
- ✓ They have internet services.

6.7.1.3 Youth Stakeholders' Consultation and Participation

- ✓ The youth participants were 7 in number. The following opinions were provided by the youth participants during the FGD.

The project perception

- ✓ The youth disclosed that they heard about the project back in 2020.
- ✓ They acknowledged that the project will have vast prositive impacts that include; improved security, creation of employment etc.

Education, literacy, and training for youth FGD

- ✓ An estimate of 70% of the youth has completed secondary education while 30% have completed Vocational/College level education.

Recreation

The main recreational games for the youth is football.

7.1 GRIEVANCE REDRESS MECHANISM

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

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.

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 GRIEVANCE REDRESS PRINCIPLES

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

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

7.3 GRIEVANCE REDRESS COMMITTEE CAPACITY BUILDING

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

7.4 GRIEVANCE PROCEDURES

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

7.5 GRIEVANCE LOG

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

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

b) *Sorting and Processing* - This step determines whether a complaint is eligible for the grievance mechanism and its seriousness and complexity. The complaint will be screened however this will not involve judging the substantive merit of the complaint. The following guide will be used to determine whether a complaint is eligible or not:
Eligible complaints may include those where:

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

Ineligible complaints may include those where:

- The complaint is clearly not mini-grid project -related.
- The nature of the issue is outside the mandate of the grievance mechanism.
- The complainant has no standing to file.
- Other project or organizational procedures are more appropriate to address the issue.

- Closing Out and Escalation: Project-related grievances will be addressed and closed out as appropriate. The GRM will provide a channel for escalation e.g., through legal redress.

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

7.5.1 National Grievances Redress Committee (NGRC)

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

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

Functions of the National Grievances Redress Committee

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

7.5.2 County Grievance Redress Committees (CGRC)

CGRC has been established at the county level to ensure participatory and transparent implementation of the project. The CGRC will help the project carry out its mandate efficiently- particularly ensuring effective communication with the communities.
Members to CGRC will include representation from the following agencies and entities
Representative of NLC, to grant legitimacy to the acquisition process and ensure that legal procedures as outlined in Land Act 2012

1. Representative of the implementing agency
2. Representative of NEMA to handle environmental issues
3. The County Administration representative, which will provide the much-needed

community mobilization, and support to the sub-project.
4. County Land Survey Officer will survey all affected land and produce maps.
5. The County Gender and Social Development Officer who will be responsible for ensuring gender programs are adhered to.
6. The County Lands Registrar will verify all affected land and validate the same.
7. Two PAP representatives from Location Grievance Resettlement Committee – act as voice for the PAPs
8. 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.

7.5.3 Locational Grievance Redress Committee (LGRC)

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

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

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

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

The roles of LRCCs will include among others the following:

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

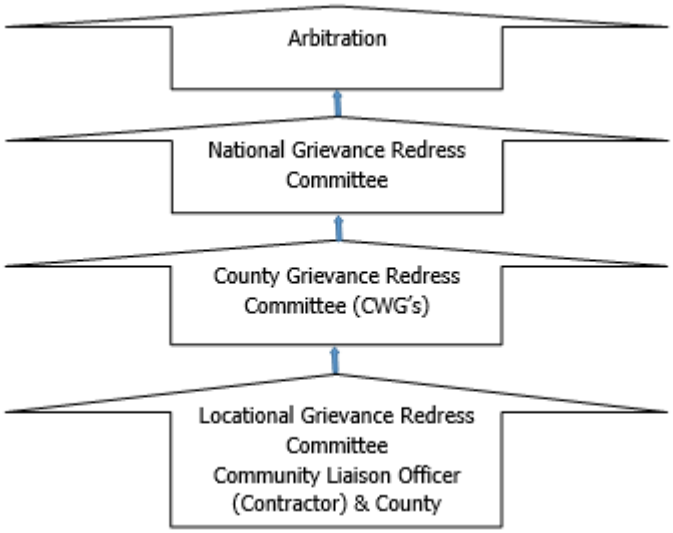


Figure 7-1: KOSAP Grievance Redress Mechanism

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

7.5.3.1 Grievance Mechanism at Kulan.

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

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

The roles of GRC include among others the following:

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

The GRC is yet to hold their first meetings, the community cited project delay as the main reason for not having meetings.

Community grievances are currently resolved at household levels. Households unable to resolve the grievance escalate the grievance to administrative/leadership levels. This is done through the chiefs/Ass. chiefs and community elders. The grievances are discussed with the local leaders("Wazee wa Nyumba Kumi") under the guidance of the chief ultimately providing a solution. Few grievances are escalated the police and a court of law

7.6 WORLD BANK GRIEVANCES REDRESS MECHANISM

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

World Bank Grievances Redress Service

The Grievance Redress Service (GRS) is an avenue for individuals and communities to submit complaints directly to the World Bank if they believe that a World Bank-supported project has or is likely to have adverse effects on them, their community, or their environment. The GRS enhances the World Bank's responsiveness and accountability to project-affected communities by ensuring that grievances are

promptly reviewed and addressed. Complaints must be in writing and addressed to the GRS and sent through the following methods namely:
Those aggrieved or their representatives can report their complaints through the following mediums;
Online by accessing the online form;
Sending an Email to grievance@worldbank.org; or
Submitting a letter to the World Bank Headquarters in Washington D.C., United States or World Bank Kenya County Office.

World Bank Inspection Panel

The Inspection Panel is an independent complaints mechanism for people and communities who believe that they have been, or are likely to be, adversely affected by a World Bank-funded project. The Panel is an impartial fact-finding body, independent from the World Bank management and staff, reporting directly to the Board. The Inspection Panel process aims to promote accountability at the World Bank, give affected people a greater voice in activities supported by the World Bank that affect their rights and interests, and foster redress when warranted. In September 2020, the Board updated the resolution that created the Panel and added to the Panel functions. At the same time, the Board approved a resolution establishing the World Bank Accountability Mechanism (AM). The new AM began operations in early 2021 and houses the Panel to carry out compliance reviews and a new Dispute Resolution Service (DRS), which will give complainants another way to have their concerns addressed. Contacts for registration of complaints to the IPare; (i) Tel: +12024585200: and (ii) Email: ipanel@worldbank.org.

8 IMPACT ASSESSMENT AND MITIGATION MEASURES

8.1 INTRODUCTION

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

8.2 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:

8.3 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.

8.4 ASSESSMENT OF SIGNIFICANCE

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

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

household, community or wider societal group is considered along with their ability to adapt to and manage the effects of the impact; and

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

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

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

Table 16: Categories of Significance

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

For environmental impacts the significance criteria used in this ESIA is shown in Table 17: .

Table 17: 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 license to operate.

8.5 Magnitude of Impact

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

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

For biophysical impacts, the definitions for the spatial and temporal dimension of the magnitude of impacts used in this assessment are provided in Table 17

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

Table 16 below (under Likelihood) provides an account of the key features (definitions) of each of the impact significance classifications (from Not Significant to High); specifically linking them to the need for mitigation measures.

8.6 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.

8.7 Likelihood

Terms used to define likelihood of occurrence of an impact are explained in Table 18

Table 18: Explanation of Terms Used for Likelihood of Occurrence

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

8.8 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.

8.9 Assessing residual impacts

Impact prediction takes into account any mitigation, control and operational management measures that are part of the project design and project plan. A residual impact is the impact that is predicted to remain once mitigation measures have been designed into the intended

activity. The residual impacts are described in terms of their significance in accordance with the categories identified in Table 17 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.

8.10 POSITIVE IMPACTS DURING CONSTRUCTION PHASE

This section enumerates and discusses the positive impacts associated with the proposed project during construction phase of the project.

8.10.1 Creation of Employment Opportunities

Various employment opportunities will be available during construction. The opportunities will be both skilled and unskilled. Majority of the unskilled and semi-skilled jobs will be taken up by the local community. Employment of the locals will increase skill transfer from the contractors. The approximate number of workers to be employed by the proposed project is not yet known, however, this will contribute to easing unemployment level in the area. There will be a trickledown effect to the economy at large resulting from new income revenues as well as services provided through this project.

The impact significance is low as it will employ few people over a short period

Enhancement Measures.

- Contractor should ensure that they prioritise the local community in allocating job opportunities.
- Contractor should ensure that job opportunities are not discriminatory
- Equal opportunities should be given to both men and women

8.18.2 Improving local economy

During this phase, the project will require supply of building materials most of which will be sourced locally at the nearest trading centre and its environs to the extent possible. Therefore, the project will provide ready market for local enterprises with such materials and boosts the local economy.

The businesses that will benefit during this phase are such as hotel, shops, artisan industries and food vending who will be benefit directly from the construction, as people working there will need commodities from them. This will promote the informal sector in securing some temporary revenues and hence improved livelihoods.
One of the responsibilities of the beneficiaries of the proposed Solar Mini-grid is to undertake wiring of their premises before there are connected and payment of a connection fee of Ksh 1000. The MOE through its implementing agency KPLC should consider supporting at least 50 households that are very poor through installation of ready boards to offset the cost of wiring so that they can also access electricity.
The impact significance is low as it will buy few materials over a short period of time

- 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
- Contractor should prioritise local purchases over imports;
- Contractor should give prefence to local labour which increases the local's ability to spend

8.11 POSITIVE IMPACTS DURING OPERATION PHASE

8.11.2 Quality, Reliable Power Supply

There is no electricity in Kulan. 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 (dispensary, primary school) and shopping centre in the area will greatly benefit from the stable power supply.

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

Enhancement Measures

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

8.11.3 Employment Creation

Employment opportunities will also be created during the operation phase of the project. Opportunities that will be created include unskilled, semi-skilled to skilled jobs. These will involve security personnel, and staff to operate and maintain the Mini-grid. Employment will increase skill transfers.

The impact significance is low as it will employ people to manage the substation

Enhancement Measures

- KPLC should ensure that they prioritise the local community in allocating job opportunities.
- KPLC should ensure that job opportunities are not discriminatory
- Equal opportunities should be given to both men and women

8.11.4 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.

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

Enhancement Measures

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

8.11.5 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.

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

Enhancement Measures

- 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

8.11.6 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.'
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

Enhancement Measures

- KPLC should consider having the transmission lines are closer to schools for them to benefit from the power supply;
- 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

8.11.7 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.

8.11.8 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.

8.11.9 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.

8.11.10 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.

8.12 POSITIVE IMPACTS DURING DECOMMISSIONING PHASE

8.12.1 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.

8.12.2 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.

8.13 NEGATIVE IMPACTS DURING PRE-CONSTRUCTION PHASE

8.13.1 Land Take

The identified site for the proposed Mini-grid will take 1.55 hectares of land owned by the Kulan community that they set aside by the community for construction of public facilities. The proposed site falls next to Kulan primary school. The assessment found that;

- No residential houses or businesses premises were on the piece of land
- No socio-economic activity was taking place on the land
- No physical relocation will take place.

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 8.69 km of LV circuit will be constructed mainly along the road reserve and along the boundaries to supply power.

The impact significance for this impact is assessed minor considering the community willfully allocated the land for project construction.

Mitigation Measures

- Land for mini-grids will be acquired by NLC compulsorily and affected communities compensated in-kind.
- The contractor will sign and adhere to the agreement for use of community land for contractor facilities and worker's camps, and restoration of the site after use.
- 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 during construction of the low voltage lines

8.13.2 Impact on Topography

The topography of the project site is an open area with gentle slope of about 1% and mild undulations. The elevation difference of about 10m is observed within the project site. 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.

8.13.1.1 Embedded/In built Control

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

8.13.1.2 Significance of Impact

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

8.13.1.3 Additional Mitigation Measures

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

8.13.3 Impact on Soil Environment

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.

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.

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

8.13.4 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.

Embedded/in-built control

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

Significance of Impact

There are few Receptors (settlements) within 300 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.

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.

8.13.5 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.

The main receptor will be the Kulan Market which is within 635.25m from the site. There are some residents within the 300m 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 and proximity to Kulan centre.

8.13.6 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.

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.

Significance of Impact

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

Additional Mitigation Measures

Only well-maintained equipment should be operated on-site;
If it is noticed that any particular equipment is generating too much noise then lubricating moving parts, tightening loose parts and replacing worn out components should be carried out to bring down the noise and placing such machinery far away from the households as possible;

- Machinery and construction equipment that may be in intermittent use should be shut down or throttled down during non-work periods; and
- Minimal use of vehicle horns and heavy engine breaking in the area needs to be encouraged.
- Construction machineries should be maintained regularly to reduce noise resulting from friction;
- Normal working hours of the contractor to be defined (preferable 8 am to 5pm). If work needs to be undertaken outside these hours, it should be limited to activities which do not generate noise;

- Sensitize construction truck drivers to switch off vehicle engines while offloading materials.

8.13.7 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, Transformers and associated components would be manufactured off site and the construction phase would be relatively short-term in duration (less than one year), it would still require large number of equipment or infrastructure when being erected such as dumpers and transportation vehicles on site. Additionally, the presence of bare soil along the access roads would increase the potential visual impact. The significance of the visual impacts will reduce at increasing distance from the development.
The construction of the mini-grid sites may involve the site clearance of vegetation (minimal vegetation at the site) and other natural attributes. The erection of the solar PV panels and the resulting glare from the sun will make it a standout feature from the natural surroundings and this would the lower the visual appeal of the area.
Even though the Mini grid facilities will be small, their geometric and sometimes highly reflective surfaces may have visual impacts. However, being visible is not necessarily the same as being intrusive. Aesthetic issues are by their nature highly subjective.

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 a little bit of settlement approximately 635.25m from the shopping centre.

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

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.

8.13.8 Impacts on Waste Generation and Soil Contamination

General construction waste generated onsite will comprise of concrete, steel cuttings/filings, packaging paper or plastic etc. solid wastes consisting of food waste, plastic, glass and waste paper will also be generated by the construction workforce. A small proportion of the waste

generated during construction phase will be hazardous and will include waste fuel, grease and waste oil containing rags. Used transformer oil which is also categorized as hazardous waste will be generated from the plant. If improperly managed, solid waste could create impacts on soil quality. Therefore, the receptor sensitivity has been assessed as medium.

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

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.

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.

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.

8.14 KEY ENVIRONMENTAL IMPACTS – CONSTRUCTION PHASE

8.14.1 Vegetation Clearance

The construction process of the proposed Mini-grid and other associated facilities and structures will involve clearing of the existing limited vegetation cover (mainly grass) and trees. The project site is located in open area with minimal settlement around the Kulan Market and the primary school. Both the magnitude and sensitivity of this impact will be low. The impact will be direct, permanent and minor.

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 Kulan will be used for access to the project site.

Significance of Impact
The overall impact significance on vegetation clearance will be low. This is the case due to the fact that the receptor sensitivity is medium and the impact magnitude is low.

Additional Mitigation Measures
Clear only the necessary areas
Ensure proper demarcation and delineation of the project area to be affected by construction works.

1. Specify locations for vehicles and equipment, and areas of the site which should be kept free of traffic, equipment, and storage.
2. Designate access routes and parking areas
3. Re-vegetation including planting of trees around the plant/facility

8.14.2 Soil Erosion Impact

During clearing of the area to pave way for groundbreaking soil erosion may take place. This will be due to surface run off or blowing away by the wind if not properly managed. This is bound to happen because the soil will be loose. The area is gently slopy on the lower side and surface run off can also result to soil erosion. The impact significance will be minor due to the nature of the works and the fact that construction activities will be confined in the small project area.

Embedded/in-built control
The contractor shall avoid groundbreaking during the seasons of high rainfall to avoid erosion.

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.

Additional mitigative measures
Monitoring of areas of exposed soil during rainy seasons to ensure that any incidents of erosion are quickly controlled.

- The contractor should ensure that construction related impacts like erosion and cut slope destabilizing should be addressed through landscaping and grassing, carting away and proper disposal of construction materials
- Use silt traps where necessary
- Cover soil stockpiles.
- Landscaping with grass on areas without electrical installation (lower areas)
- The contractor should ensure recovery of exposed soils with grass and other ground cover as soon as possible.
- The contractor should put up proper drainage to avoid unnecessary erosion and do compaction of spoil areas to avoid land instability in form of soil subsidence, slip and mass movement.
- Areas compacted by vehicles during site preparation and construction should be scarified (ripped) by the contractor in order to allow penetration of plant roots and the re growth of the natural vegetation

8.14.3 Pollution from Solid Waste Generation

It is expected that solid waste will be generated during construction phase of the project. Solid waste is anticipated to be produced during site preparation, civil works, spoil from excavations

and will include; mortar, wood, paper, waste paper wrappings, conductor off cuts, masonry chips and left-over food stuffs. Effects of mismanaged waste include:

- ❖ Public nuisance due to littering or smell in case of rotting

Contamination of soils and water courses
Creation of breeding grounds for vermin like rodents and cockroaches

Embedded/in-built control
Segregate waste and dispose of appropriately using a licensed waste handler.

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

Additional Mitigative measures
Ensure spoil from excavations is arranged according to the various soil layers. This soil can then be returned during landscaping and then rehabilitation, in the correct order which they were removed that is top soil last;
Provide litter collection facilities such as bins and create awareness campaigns to segregate as early as possible, using the appropriate bins

- Contractor to put in place and comply with a site waste management plan
- The contractor should comply with the requirement of OSHA ACT 2007 and Building rules on storage of construction materials
- Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of waste generated over time
- Recovery of materials remains and return to stores
- Re-use of materials where possible
- Proper budgeting to avoid waste generation

8.14.4 Noise and vibration

During construction activities noise pollution will occur and is bound to be a nuisance and a disturbance to neighboring communities. This noise is from construction equipment, excavation works, concrete mixing and vehicles coming to site but will be temporary. From the prediction of the specialist study on ambient noise quality measurements, the traffic noise that will be emitted by traffic accessing the proposed project site during construction is expected to have an adverse impact on ambient noise. The level of traffic noise will increase depending on the traffic volume. General guideline indicates that an increase of 20% in traffic volume approximates to a noise level increase of around 1 dB, while a doubling of traffic volume results in a noise level increase of about 3 dB. It is however, worth noting that the level of noise is attenuated with increase in distance from the source and thus the sites/objects in close proximity to the source will receive more noise in comparison to those at remote location. The impact significance has therefore been assessed minor.

Embedded/in-built control
Limit vehicles to minimum idling time and observe a common-sense approach to vehicle use, and encourage drivers to switch off vehicle engines whenever possible.

Significance of Impacts
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 Kulan primary and the nearby market center with some residential houses.

Additional Mitigative measures

These proposed mitigation measures aim to ensure that noise generated during construction is kept to minimum and adheres to relevant noise standards. They include:

Fencing off the construction site with iron sheet during construction

- Install portable barriers to shield compactors thereby reducing noise levels.
- Use of noise-suppression techniques to minimize the impact of construction noise at the project site.
- Use equipment designed with noise control elements.
- Co-ordinate with relevant agencies regarding all construction activities.
- Set and observe speed limits and avoid raving of engines
- The Contractor shall ensure that construction activities are limited to working hours (i.e., between 8am and 5pm daily) from Monday to Saturday, or as required in terms of legislation.
- Compliance with Noise and Vibration Regulations of 2009 is expected

8.14.5 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. 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.

Embedded/in-built control

Material handling to be done by trained and qualified staff.

Significance of Impacts

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 Kulan primary and the nearby market center with some residential houses.

Additional Mitigative 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

- The contractor site should have designated area (concrete bunded) for storing hazards materials

8.14.6 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.

Embedded/in-built control

Provision of firefighting equipment (extinguishers) on site during construction.

Significance of Impacts

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.

Additional Mitigative measures
The following measures should be put in place to prevent fire hazards:
Create awareness to the construction workers on potential fire hazards
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.

8.14.7 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.

Embedded/in-built control
Reuse of construction materials where possible

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

Additional Mitigative 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.

8.14.8 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. 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.

Embedded/in-built control
Prudent use of available water

Significance of Impacts
The overall significance of impacts is assessed to be negligible due to negligible magnitude of the impact.

Additional Mitigative measures
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.

8.14.9 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.

Embedded/in-built control
Regular maintenance of vehicles to ensure efficient consumption of fuels
Significance of Impacts
This impact will be negligible owing to the size of the project that will require very few trucks during the construction phase
Additional Mitigative 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.

8.14.10 Occupational Health and Safety Impacts

There are several activities involved during construction. These activities can pose potential health and safety risks to the workers. The activities include excavation, backfilling, civil works, pole erection, stringing of conductors. Risk of accidents and incidents are likely during construction activities. As already noted during construction, the safety and health of employees may be exposed to risk as a result of the use of tools and other machinery to construct the Mini-grid. Occupation safety and health risks includes accidents, fall from heights, pricks by sharp objects etc. 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.

Embedded/in-built control
The contractor will use skilled personnel for activities
Significance of Impacts
The impact significance has therefore been assessed moderate. This due to the fact that the impact magnitude is low and the receptor sensitivity is medium. The project will have employees working on site hence the sensitivity.

Additional Mitigative measures
The Contractor should hire a competent Environment, health and Safety Personnel to manage all the active sites.
Awareness creation/Tool box talks on safety to workers while at construction site and documentation kept

- Workers coming to the site should be knowledgeable on safety precautions to take
- Appropriate PPE (helmet, safety harness, gloves, safety shoes, masks, climbing irons among others)
- Proper housekeeping and maintain good hygiene
- Close supervision of workers
- Engagement of trained first aider on site
- Provide safe drinking water for workers
- Availability of equipped first aid box on site

- Risk assessment by contractor of the construction activities and implement mitigation measures appropriately
- Adherence to occupational Safety and Health Act 2007
- Establish Safety committees
- The contractor must acquire insurance for the workers-WIBA cover

8.14.11 Impact on Topography

The topography of the project site is an open area with gentle slope of about 1% and mild undulations. The elevation difference of about 10m is observed within the project site. 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.

Embedded/In built Control

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

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.

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.

8.14.12 Impact on Soil Environment

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.

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.

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

8.14.13 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.

Embedded/in-built control

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

Significance of Impact

- There are few Receptors (settlements) within 300 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.
- 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.

8.14.14 Impact on Ambient Noise

As most of the noise generating activities will be performed within the site area, construction activities will likely have a small to insignificant incremental impact on the existing noise levels. The sources of noise in the construction phase include construction activities, operation of generator sets and movement of vehicles. There will also be increased noise levels because of increased anthropogenic movement in the area.

The main receptor will be the Kulan Market which is within 635.25m from the site. There are some residents within the 300m 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 and proximity to Kulan centre.

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.

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.

Significance of Impact

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

Additional Mitigation Measures

Only well-maintained equipment should be operated on-site;

If it is noticed that any particular equipment is generating too much noise then lubricating moving parts, tightening loose parts and replacing worn out components should be carried out to bring down the noise and placing such machinery far away from the households as possible;

- Machinery and construction equipment that may be in intermittent use should be shut down or throttled down during non-work periods; and
- Minimal use of vehicle horns and heavy engine breaking in the area needs to be encouraged.
- Construction machineries should be maintained regularly to reduce noise resulting from friction;
- Normal working hours of the contractor to be defined (preferable 8 am to 5pm). If work needs to be undertaken outside these hours, it should be limited to activities which do not generate noise;

- Sensitize construction truck drivers to switch off vehicle engines while offloading materials.

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

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

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

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 a little bit of settlement approximately 635.25m from the shopping centre.

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

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.

8.14.1.1 Impacts on Waste Generation and Soil Contamination

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

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

8.14.1.1.1 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.

8.14.1.1.2 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.

8.14.1.1.3 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.

8.14.17 Accidental Oil Spills or Leaks

There is possibility of oil leaks from construction vehicles. The construction machines on the proposed site have moving parts which will require continuous oiling to minimize the usual corrosion or wear and tear. These processes may lead to oil spill to the ground. The impact significance will be minor due to the nature of the works and the fact that construction activities will be confined in the small project area.

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.

Significance of Impact

The impact significance for accidental oil spill or leaks 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.
Additional Mitigation Measures

In the event of accidental leaks, contaminated top soil should be scooped and disposed of appropriately.

- It is proposed that the refuelling and maintenance of vehicles will not take place at the construction site.
- Contractor to create awareness for the employees on site on procedures of dealing with spills and leaks from oil for the construction machinery
- Vehicles and equipment must be serviced regularly and kept in good state to avoid leaks.
- 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.
- Proper training for the handling and use of fuels and hazardous material for construction workers.
- All chemicals should be stored within the bunded areas and clearly labeled detailing the nature and quantity of chemicals within individual containers.

8.15 KEY SOCIAL IMPACTS – CONSTRUCTION PHASE

8.15.1 Land Uptake-Communal land

The proposed project will entail the acquisition of a 1.55 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 beneficiaries and clients in whose property they will undertake electricity connection to the power grid.
During the consultation, it was also reported that the community is not entirely dependent on the land for income. The land has is has minimal vegetation cover with chief's administrative office besides it. During rainy seasons the community utilizes the land for grazing their livestock.
After implementing the embedded controls, the impact magnitude is assessed to be minor.

Source of Impact and Overview of Baseline Conditions

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

Embedded/In-built Controls

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

Significance of Impact

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

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 identified water project for improvement.
- Undertake a ARAP (ARAP appended in this report)

8.15.2 Impact on Occupational Health and Safety

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

- Safety risks such as: tripping; falling due to working at heights; potential fire due to hot work, smoking, failure in electrical installations; electric shocks.
- Health risks: Injuries such as: lifting, lowering, pushing, pulling and carrying; temporary or hearing loss which usually comes from noise generated from machinery used for excavation or piling work and from compressors and concrete mixers etc.; heat stress and working during high temperatures
- Occupational hazards due to dust and noise pollution from operating of heavy machinery and vehicular movement in the project sites.
- Safety risk due to working at heights during installation of power lines
- Risks of road accidents during the transportation of material and equipment to the project sites owing to the poor road network leading to Kulan village.

The mini-grid sites are located in ecological zones associated with flash flooding events. This poses a risk of washing away the mini-grid infrastructure including the power storage units i.e. the batteries making it necessary factor in site design considerations to mitigate against extreme flooding events.

Embedded/in-built control

All construction activities will be carried out during daytime hours and vigilance should be maintained for any potential accidents;

Personal Protective Equipment (PPEs) including safety shoes, helmet, goggles, ear muffs and face masks;

Cranes and other lifting equipment are operated by trained and authorised persons;

Training of the workers on climbing techniques, and rescue of fall-arrested workers;

Excavated areas should be temporarily fenced to avoid access to outsiders and wildlife

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.

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.
- Hire a component Environment, Health and Safety personnel to manage all the active site.
- Hire community Liason officer (CLO)

8.15.3 Impact on local economy and employment

The construction, operation and maintenance of the mini-grids will provide employment opportunities for skilled and unskilled labour. Receptors in the Social area of Interest that may be able to make the most of the direct and indirect employment opportunities in the project are those who have some level of experience in formal employment, as well as those who have gained a basic education. This will be a source of income for the labourers. Where possible, construction materials will be sourced locally in order to promote local businesses.
Thus, anticipated benefits of the Project include Direct employment opportunities mainly during construction of the mini-grids; indirect employment generated by the procurement of goods and services for the Project; induced employment related to jobs ensuing from the expenditure of incomes associated with direct and indirect. The local community is likely to benefit from the economic opportunities to be created from the following:

- Civil works during construction phase including, construction of solar PV module mounting area, transformer yard, inverter room, internal roads, laydown areas, labour camp, distribution line,
- Self- employment options for individuals possessing vocational or technical training skills like electricians, welders, fitters etc;
- Contracting opportunities for local's residents including men, women and youths. During the public meeting the community insisted that all the unskilled labour force must 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 be arise if the community feels left out in employment opportunities.

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

8.15.4 Community Health and Safety

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

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

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).

Significance of Impact

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

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.

8.15.5 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).

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.

Additional Mitigation measures

In contract documents for the Contractor, MOE/KPLC 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/KPLC 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/KPLC 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

8.15.6 Child labour

Implementation of the Kulan 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.

Significance of Impact

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

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.

8.15.7 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.

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.

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.

8.15.8 Gender Based Violence, SEA & SH

Gender Based Violence (GBV), Sexual Exploitation and Abuse (SEA) may be committed against the communities by the construction workers and by staff during the operation and maintenance of the mini-grids. Incidences of Sexual Harassment (SH) may occur among the staff during construction, operation and decommissioning phases of the project. During the FGD with the women, they raised concerns stating that project implementation may lead to sexual harassment. This may be experienced while the women are searching for jobs and those giving the jobs may ask for sexual favours.

Significance of Impact

There are minimal incidences of gender based violence in Kulan as identified during FGD with Men, women and youths. However, it cannot be ruled out during project implementation. Thus, the significance of this impact is considered to be Minor considering low sensitivity of the receptor and low magnitude of the impact.

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 GRM.
- 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 GRM process for capturing disclosure of GBV;
        - A referral pathway to refer survivors to appropriate support services.

8.15.9 Exclusion of VMGs, Vulnerable Individuals and Households

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

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

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

- Poor female headed households (Approximately 300 households)
- Orphans (Approximately 200)

Persons Living with Disabilities (Approximately 250)
The elderly (Approximately 150)

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 into account the project site inhabitants are predominantly the Somali community.

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

8.15.10 Risk of Communicable Diseases; HIV/AIDS

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

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.

Mitigation measures

The Contractor should develop and implement pre-employment screening measures for workers, which should include applicable diseases. Individuals found to be suffering from these diseases will need to be sensitized on prevention of transmission to others and management of the disease prior to mobilisation to site.

The Contractor should develop and implement a HIV/AIDS and other STIs policy and an information document for all workers directly related to the Project. The information document should address factual health issues as well as behaviour change issues around the transmission and infection of HIV/AIDS and other STIs.

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

8.15.11 Risks related to Inadequate Stakeholder Engagement

Lack of timely and adequate stakeholder engagement during construction is a recipe for dissatisfaction among stakeholders affected and can result to grievances which may turn to conflicts and delays in project construction. With the implementation of the mitigation measures the impact significance is minor.

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.

Mitigation measures;

The contractor will design and implement a stakeholder engagement schedule to ensure various stakeholders are engaged at and informed about the project on a timely basis and respond to issues that the stakeholders may require.

- The contractor will also prepare and implement a grievance redress mechanism to deal with grievances. The grievance redress mechanism committee of this GRM should also include representatives from the community.

8.15.12 Community Safety -Access to Site by General Public

If access to the Mini-grid site is not controlled then it can lead to people entering the site including animals. This can result to accidents. Impact significate is rated as moderate considering the high impact magnitude and low receptor sensitivity.

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.

Mitigation Measures

Proper barricading

- Awareness creation to community
- Hazard communication.
- Controlled access to the site by designated personnel
- Maintain records of any person who comes to site

8.15.13 Increase in competition for scarce resources and strain on public utilities

The influx of workers in the area is expected to lead to increase in demand for public amenities such as hospitals, transport, schools water resources etc. This could lead to a loss of access to these services by locals especially those who could be among the vulnerable categories. Due an increase in demand, cost of housing near the sites will disadvantage the locals.
The nature of the project will require technical skills that might not be available in the community. This might require movement of construction workers into the community.. It is expected that technically skilled personnel might be sourced from outside the community while the unskilled labour is expected to be sourced locally. It is therefore a possibility that the neigbouring communities might go out looking for opportunities in project area thus creating competition.

Significance of Impact
The significance of this impact is considered to be minor because the receptor sensitivity will be medium, and the impact magnitude is low.
Mitigation Measures
Reduction of labor influx by tapping into the local workforce to the extent possible
Recruitment of local workforce to the extent possible especially unskilled and semi-skilled jobs

- Consultations with and involvement of local community in project planning and other phases of the project
- Awareness-raising among local community and workers on the need to have a good /cordial working relation
- Sensitization/awareness to workers regarding engagement with local community.
- Contactor shall make provision to provide resources needed by the workers if the need for such resources may result to competition e.g., water
- Establishment and operationalization of an effective Grievance Redress Mechanism accessible to community members
- The contractor and the project/community grievance redress committee to work closely address complains raised on time.
- Gender considerations in employment opportunities
- Appropriate compensation for work done
- Respect for community values/culture
- Prompt payments as per the contractual agreements/terms

8.15.14 COVID-19 amongst workers and the community

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

According to the Ministry of Health, Garissa County is one of the few counties with a few number of reported COVID 19 cases and infections.

Significance of Impact
The receptor sensitivity medium and low magnitude, hence Moderate significance.
Mitigation Measures

Install handwashing facilities with adequate running water and soap, or sanitizing facilities at entrance to main site;
Ensure routine sanitization of shared social facilities and other communal places routinely including wiping of workstations, doorknobs etc.;
All workers and visitors accessing the site every day shall be subjected to rapid Covid-19 screening which may include temperature check and other vital signs;
The project shall put in place means to support rapid testing of suspected workers for covid-19;

- Avoid concentrating of more than 5 workers at one location. Where two or more people are gathered, maintain social distancing of at least 2 meters;
- Sensitize all community segments and project workers on Covid 19 and precautionary measures that need to be observed;
- Avoid concentrating of more than 15 community members at one location. Where two or more people are gathered, maintain social distancing of at least 2 meters;
- The team carrying out engagements within the communities on one-on-one basis will be provided with appropriate PPE for the number of people they intend to meet;
- Restrict site access to only Authorized persons; and
- Continuously adhere to the MoH, WHO and World Bank guidelines on Covid-19 management.

8.16 KEY ENVIRONMENTAL IMPACTS – OPERATION PHASE

8.16.1 Waste Generation and management

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

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

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.

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

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 .
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.

8.16.2 Impact on Water Environment

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 Kulan confirmed that water is a major concern in the area. As noted earlier, the local community rely on surface water sources; Therefore the receptor (water resource) sensitive is assessed as high. From the public participation, it was noted that drought was a major concern within the project area.

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 as there will be no perceptible or readily measurable change from baseline conditions.
Embedded/in-built control
Planning of toilets and waste collection areas should be away from natural drainage channels;
Significance of Impact
Although the sensitivity of the receptor (surface water) in the project area is high owing to unavailability of feasible alternative source of water for the local community, the overall significance of impacts is assessed to be negligible due to neglible magnitude of the impact.
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

8.16.3 Landscape and Visual Impacts

The solar panels will be spread over a horizontal forms 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.

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.

Suggested mitigation measures
The following mitigation measures are proposed to reduce the visual impacts on the surroundings during operational phase:
Signage related to the minigrid must be discrete and confined to entrance gates.
The footprint of the operations and maintenance facilities, as well as parking and vehicular circulation, should be clearly defined, and not be allowed to spill over into other areas of the site;

- Construction of fencing or compound wall around the project boundary;
- Landscaping area around the solar farm site within the project with the participation of the local community. Some trees can be planted around the buffer zone to Camouflage or Facade or smokescreen the solar panels.

8.17 KEY ECOLOGICAL IMPACT- OPERATION PHASE

8.17.1 Collision and Electrical hazards from Distribution Infrastructure

A number of birds' species were identified during the impact assessment. The distribution lines and poles can potentially constitute an electrocution and collision hazard to birds.

Embedded/ in-built Control
There are no embedded controls to prevent birds from roosting/nesting on distribution poles and colliding with distribution wires.
Significance of Impacts?

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

Additional Mitigation Measures

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

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

8.18 KEY SOCIAL IMPACTS – OPERATIONS PHASE

8.18.1 Impact on Economy and Employment

Community consultations and observations made during the site visit suggest that the existing scenario of the Pastoralism 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 to 5 and 15 respectively. The locally procured services will include maintenance work of the facility, 24-hour security, bush and undergrowth cleaning and housekeeping activities. In addition to this, the community will improve their livelihood and businesses by using the electricity from the project.

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.

Additional Mitigation Measures

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

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

8.18.2 Occupational, Health and public safety Impacts

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

- Safety risks such as: tripping; falling due to working at heights during maintenance of the power lines

Electric shocks in case of poor handling of electricity such as using wet hands, poor wiring and overloading of sockets.

Embedded/in-built control

Community sensitization on health and safety issues

Training of the workers on climbing techniques, and rescue of fall-arrested workers during maintenance;

Proper electrical safety signages on the distribution poles

Significance of Impacts

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

Additional mitigation measures

All workers (regular and contracted) should be provided with training on EHS policies and procedures during the operation stage;

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

8.19 KEY ENVIRONMENTAL IMPACTS – DECOMMISSIONING PHASE

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

8.20 KEY SOCIAL IMPACTS – DECOMMISSIONING PHASE

8.20.1 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 and PV panel cleaners) who will be affected.

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

Significance of Impact

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

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 Garissa County.
- Develop and implement a fair and transparent employment and procurement policy.
- Advertise all jobs and tenders. (the jobs can be advised through local administrative offices, GRC meetings)
- Ensure gender mainstreaming during employment
- The contractor shall inform the workers and local community about the duration of work; and
- Reduction of worker will be done phase wise and corresponding to completion of each activity.
- Proper disposal of waste including debris, panels and other accessories

- Rehabilitation of the project site will be carried out to restore the site to its original status or to a better state than it was originally. This will include replacement of topsoil and re-vegetation which will lead to restoration of the visual quality of the area.

8.21 CUMULATIVE IMPACTS

8.21.1 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.

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

9.1 INTRODUCTION

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

The key objectives of the ESMMP are:

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

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

9.2 MONITORING

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

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

During construction phase, the Implementing agency (KPLC) shall monitor the contractor's activities in order to verify that the management measures/procedures/specifications are implemented as contained in the ESMMP. Compliance will mean that the contractor is fulfilling their contractual obligation.
During operation phase, KPLC will monitor facility's operations to ensure compliance with management measures in the ESMMP and operation procedures. As part of this monitoring, the KPLC will undertake or statutory initial environmental audit as required by the ESIA/EA Regulations, 2003 and subsequent annual environmental audits.

9.3 PLAN MONITORING

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

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

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

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

The Environmental and Social Management and Monitoring Plan (*ESMMP*) will provide the basis for monitoring of potential Environmental, social and health Impacts associated with the project. The ESMMP provides effective observation and documentation of monitorable parameters that will help in analyzing the effectiveness of the proposed mitigation measures with the advantages of improving operational efficiency, promoting competitive advantage, improving risk management, reducing liabilities and improving business performance. The ESMMP has been provide in **Error! Reference source not found.** below.

9.4 ENVIRONMENTAL AND SOCIAL MONITORING BY CONTRACTORS

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

1. *Safety*: hours worked, recordable incidents and corresponding root cause analysis (lost time incidents, medical treatment cases), first aid cases, high potential near misses, and remedial and preventive activities required (for example, revised job safety analysis, new or different equipment, skills training, and so forth).
2. *Environmental incidents and near misses*: environmental incidents and high potential near misses and how they have been addressed, what is outstanding, and lessons learned.
3. *Major works*: those undertaken and completed, progress against project schedule, and key work fronts (work areas).
4. *E&S requirements*: noncompliance incidents with permits and national law (legal noncompliance), project commitments, or other E&S requirements.
5. *E&S inspections and audits*: to include date, inspector or auditor name, and records reviewed, major findings, and actions recommended and implemented.
6. *Workers*: number of workers, indication of origin (expatriate, local, nonlocal nationals), gender, age and skill level (unskilled, skilled, supervisory, professional, management).
7. *Training on E&S issues*: including dates, number of trainees, and topics.

8. *Footprint management*: details of any work outside boundaries or major off-site impacts caused by ongoing construction—to include date, location, impacts, and actions taken.
9. *External stakeholder engagement*: highlights, including number of formal and informal meetings, and information disclosure and dissemination—to include a breakdown of women and men consulted and themes coming from various stakeholder groups, including vulnerable groups (e.g., disabled, elderly, children, etc.).
10. *Details of any security risks*: details of risks the contractor may be exposed to while performing its work—the threats may come from third parties external to the project.
11. *Worker grievances*: details including occurrence date, grievance, and date submitted; actions taken and dates; resolution (if any) and date; and follow-up yet to be taken—grievances listed should include those received since the preceding report and those that were unresolved at the time of that report.
12. *External stakeholder e.g., community grievances*: grievance and date submitted, action(s) taken and date(s), resolution (if any) and date, and follow-up yet to be taken—grievances listed should include those received since the preceding report and those that were unresolved at the time of that report. Grievance data should be age and gender-disaggregated.
13. Major changes to contractor's environmental and social practices.
14. *Deficiency and performance management*: actions taken in response to previous notices of deficiency or observations regarding E&S performance and/or plans for actions to be taken—these should continue to be reported until KPLC determines the issue is resolved satisfactorily.

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

Table 19 Environmental Social Management and Monitoring Plan.

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

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
				and quantities of materials etc.		
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 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	Pre- Construction	Contractor- *(contractors' facilities, workers camps)* KPLC- *(project land for generation assets)*	-Land Acquisition and consultation report (consultation (minutes and lists of participants). -Type and amount of compensation paid to affected persons. - Priority community project implemented and handed over to affected communities. -Signed agreements with communities on the use and restoration of their land.	Quarterly	Value of compensation in kind project will be equivalent to the value of land acquired as per NLC

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	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.					
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	Construction Decommissioning	KPLC construction, O&M Contractor	-Records of employees/updated employee register. -Number of local community employees and external employees/ updated employee register.	Quarterly	**50,000.00**

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	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 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 labour	-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	Construction Decommissioning	KPLC construction, O&M Contractor	-Updated employment register indicating locals employed, their ages, national identification numbers etc.	Quarterly	**20,000.00**

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	management practices. -Put visible signage on site "**No Jobs for children**" -Do not allow children at the project site.			-Grievances raised, aggrieved persons and status on resolution etc.		
GBV- SEA and SH	-Prepare an SEA/SH Prevention and Response Action Plan, to manage the SEA/SH risks. -The Action Plan to be proportionate to potential SEA/SH risks, and to include measures such as awareness creation for communities and workers; identification of referral services for survivors and a GRM that ensures confidential reporting of GBV cases. -Implement a code of conduct signed by all those with physical presence on site.	Construction Operations Decommissioning	KPLC construction, O&M Contractor	-Minutes of awareness creation sessions for the community and workers on GBV-SEA/SH. -Code of conduct signed by all those with physical presence on site. -GRM that ensures confidentiality of GBV cases in place. Documented referral services for survivors. -Grievances raised, aggrieved persons and status on resolution etc	Quarterly	**50,000.00**
Forced Labor	-Adhere to the Employment Act which outlaws any form of forced labour. -Report any form of forced labour at the site.	Construction Decommissioning	KPLC construction, O&M Contractor	-Number of reported cases of forced labour.	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 mechanism to deal with grievances. -The grievance redress committee to include	Construction Operations Decommissioning	KPLC construction, O&M Contractor	-Availability of and implementation of the Stakeholder Engagement Plan. -# of stakeholder consultations held -Record of stakeholder consultations held (minutes of meetings and list of participants). -Information disclosed, to whom it was disclosed (men women, PWD, youth, vulnerable individuals and households etc., methods and languages used in the disclosure (culturally appropriate and accessible), grievances raised and status on resolution etc.	Quarterly	**30,000.00**

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	representatives from the community. -Sensitize stakeholders on SEP and GRM.			-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. • 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.	Pre-construction Construction Operations Decommissioning	KPLC construction, O&M Contractor	Minutes of consultative meetings with all community segments including VMGs and vulnerable individuals and households, grievances raised and status on resolution etc.	Quarterly	**No additional cost**

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

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

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

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

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

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

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	5. The stack chimney of the generators will be increased from its normal height of 3 meters to 6 meters					
Solid waste generation	1. Ensure spoil from excavations is arranged according to the various soil layers. This soil can then be returned during landscaping and then rehabilitation, in the correct order which they were removed that is top soil last; 2. Segregate waste 3. Provide litter collection facilities such as bins 4. Contractor to put in place and comply with a site waste management plan 5. The contractor should comply with the requirement of OSHA ACT 2007 and Building rules on storage of construction materials 6. Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing	Construction	KPLC construction, O&M Contractor	Presence of well-maintained receptacles and centralized collection points	Quarterly	**100,000.00**

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	the amount of waste generated over time 7. Recovery of materials remains and return to stores 8. Re-use of materials where possible 9. Proper budgeting to avoid waste generation 10. Proper disposal of waste in line with solid waste regulation 6. Construction wastes to be managed in accordance with construction standards in Kenya					
Impacts on Water Resources and Water Quality	1. Clear the necessary areas only. 2. Appropriate remedial measures shall be implemented by the contractor in the event of erosion. 3. Infrastructure shall be designed to ensure that 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	Construction	KPLC construction, O&M Contractor	-Oil spill containment plan. -Provision of fuel/oil drip and spill trays	Quarterly	**150,000**

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	response plan. In the event of an oil spill the procedures contained in the emergency response plan of the contractor will come into effect. 5. No vehicle maintenance and service shall be done at project site 7. Ensure that potential sources of petro-chemical pollution are handled in such a way to reduce chances of spills and leaks.					

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

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

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

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	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	KPLC construction, O&M Contractor	Sources of raw materials (from local community)	Quarterly	**Part of contractor's cost**
Increased water demand	1. Prudent use of available water 2. Consultations with the project local committee on use of water in the community to avoid conflicts with the community 3. Source and utilize a sustainable and reliable water supply for both construction and operation phase.	Construction	KPLC construction, O&M Contractor	Water usage records	Quarterly	**Part of contractor's cost**
Energy Consumption	1. Ensure responsible electricity use at the construction site through	Construction	KPLC construction, O&M Contractor	Energy consumption records	Quarterly	**No additional cost**

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	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, 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	Construction	KPLC construction, O&M Contractor	Records of any near misses, incident, and accidents. Records of corrective actions implemented if there was an accident.	Quarterly	**1,000,000.00**

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	4. Appropriate PPE (helmet, safety harness, boots, masks, climbing irons) 5. Proper general house keeping 6. Close supervision of workers 7. Risk assessment by contractor of the construction activities and implement mitigation measures appropriately 8. Adherence to occupational Safety and Health Act 2007 9. Availability of equipped first aid box on site 10. Provide safe drinking water for workers 11. Engagement of trained first aider on site 12. Ensure the WIBA cover is taken for the staff 13. Establish safety committees					

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
Community safety –access	1. Proper barricading 2. Hazard communication. 3. Controlled access to the site by designated personnel 4. Maintain records of any person who comes to site	Construction	KPLC construction, O&M Contractor	Presence of a controlled access and records of every person accessing the site	Daily	**20,000.00**
Public Health Impacts	1. Sensitize workers and the community on prevention and mitigation of HIV/AIDS and other sexually transmitted diseases, through staff training, awareness campaigns and community *Barazas.* 2. Awareness creation and consultations with local communities prior and during construction on the dangers of these diseases 3. Informing workers on local cultural values and health matters. 4. Provision of condoms to workers 5. Allowing migrant workers time to be with their families	Construction	KPLC construction, O&M Contractor	Number of awareness creation sessions conducted. -Availability of and distribution of condoms	Quarterly	**20,000.00**

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	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 campaign to maintain individual measures at the workplace.					
Sanitary waste	**1.** Construct/ install pit latrines for both genders clearly labelled	Construction	KPLC construction, O&M Contractor	Presence of separate and clean washrooms for both the gents and ladies	Quarterly	**300,000.00**
Solid Waste Generation	1. Provide waste handling facilities such as labelled waste bins 2. Emphasis on prudent waste generation and give priority to reduction at source 3. Solid waste management awareness to operators	Operation	KPLC construction, O&M Contractor	Presence of well-maintained receptacles and centralized collection points	Quarterly	**50,000.00**

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

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

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	and should include procedures to take when a fire is reported. 4. Workers especially operators of the plant must be trained on fire management 5. 'No smoking' signs shall be posted within the Mini-grid area 6. A fire Assembly point should be identified and marked					
Visual Impacts	1. Fence round the solar Mini-grid to keep off/screen the solar panels.	Operation	KPLC construction, O&M Contractor	Presence of a perimeter fence	Quarterly inspections	**No additional cost**
Water demand	1. Ensure prudent use of water. 2. Install water-conserving automatic taps. 3. Any water leaks through damaged pipes and faulty taps should be fixed promptly.	Operation	KPLC construction, O&M Contractor	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	KPLC construction, O&M Contractor	Presence of separate and clean washrooms for both the gents and ladies	Quarterly	**No additional cost**

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
Flooding	1. Ensure drainage channels are free of any obstruction at all times i.e., not blocked 2. Construct more channels and or expand existing ones 3. Raise foundations of the solar panels and ensure a proper and from concrete base 4. Create flooding diversions and or spill ways to divert water from getting into the solar power facility	Operation	KPLC construction, O&M Contractor	-Provision of drainage system -Raised foundations for the structures	Quarterly	**100,000.00**
Occupation health and Safety	1. Ensure only qualified staff are employed to work in the facility 2. All workers operating the Mini-grid must be equipped with appropriate and adequate person protective equipment (PPE) such as; safety footwear, helmet among others. 3. Operators must be skilled on firefighting management 4. Annual environmental audits should be done	Operation	KPLC construction, O&M Contractor	-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)
	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	KPLC construction, O&M Contractor	Presence of well-maintained receptacles and centralized collection	Quarterly	**200,000.00**
Noise and Vibration	1. Generator room should be sound proof to ensure no noise of a nuisance level will be produced. 2. Monitor noise levels	Operation	KPLC construction, O&M Contractor	Noise levels- Records of noise measurements done by contractor within the project area and at distances of 30m from the Solar mini-grid	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 electricity infrastructure e.g., not tying livestock on electric poles, no cutting earth wires that run along some electric poles, not interfering with sockets	Operation	KPLC construction, O&M Contractor, Consumer	-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)
	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 3. Maintain records of any person who comes to site	Operation	KPLC construction, O&M Contractor	Presence of a controlled access and records of every person accessing the site	Daily	**Part of contractor's cost**

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

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	HIV/AIDS and other sexually transmitted diseases, through staff awareness and awareness campaigns for the community 2. Provision of condoms to workers 3. Allowing migrant workers time to be with their families			-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 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	Operation	KPLC construction, O&M Contractor	Availability of hand washing facilities Utilization of hand washing facilities Number of Covid-19 cases reported	Quarterly	**30,000.00**

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	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	KPLC construction, O&M Contractor	Visual inspection	Quarterly	**50,000.00**
Vehicle Exhaust Emissions	1. Drivers of the vehicles must be sensitized so that they do not leave vehicles idling so that exhaust emissions are lowered. 2. Company vehicles should be well maintained	Operation	KPLC construction, O&M Contractor	Engine maintenance records	Quarterly	**No additional cost**

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
Noise and Vibration	1. Install portable barriers to shield compressors and other small stationary equipment where necessary. 2. Use quiet equipment (i.e., equipment designed with noise control elements). 3. Co-ordinate with relevant agencies in case the noise produced will require a license. 4. Limit pickup trucks and other small equipment to a minimum idling time and observe a common-sense approach to vehicle use and encourage workers to shut off vehicle engines whenever possible. 5. Demolish mainly during the day when most of the neighbours are out working.	Decommissioning	KPLC construction, O&M Contractor	Noise levels- Records of noise measurements done by contractor within the project area and at distances of 30m from the Solar mini-grid	Once off	**20,000.00**
Solid Waste Generation	1. Demolition contractor to adhere to the various manufacturer's guidelines and requirements regarding demolition and disposal	Decommissioning	KPLC construction, O&M Contractor	Presence of well-maintained receptacles and centralized collection points	Daily	**700,000.00**

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	2. Segregation of waste in order to separate hazardous waste from non-hazardous 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	KPLC construction, O&M Contractor	Visual inspection	Daily	**20,000.00**
Public Health-HIV/AIDS	The project will sensitize workers and the surrounding communities on prevention and mitigation of HIV/AIDS and other sexually transmitted diseases, through staff	Decommissioning	KPLC construction, O&M Contractor	Records of awareness creation sessions conducted. -Availability of and distribution of condoms	Once off	**20,000.00**

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	training and awareness campaigns/ to the community.					
	Total					**4,380,000.00**

10 IMPACT SUMMARY AND CONCLUSION

10.1 INTRODUCTION

This chapter gives a summary of impacts conclusion and recommendations

10.2 SUMMARY OF IMPACTS IDENTIFIED AND ASSESSED

10.2.1 Construction Phase Impacts

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

The significance of the identified negative impacts associated with the construction phase is moderate prior to the application of appropriate mitigation measures. The significance of two of the identified negative impacts associated with the construction phase, specifically: impacts related to labour 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.

10.2.2 Operational Phase Impacts

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

With the application of appropriate mitigation measures, the significance of all the identified negative impacts associated with the operational phase will be reduced to MINOR or NEGLIGIBLE

10.3 SA AND VMGP CONCLUSION

The Kulan project has triggered the World Bank Operational Policy (OP 4.10) for Indigenous Peoples due to the known presence of indigenous peoples (IPs)/vulnerable and marginalized groups (VMGs) at the project area. Kulan area is overwhelmingly IP/VMG area and is inhabited predominantly by the Somali community. This is addition to The Kenya Constitution requirement to protect and promote the interests and rights of minorities and marginalized communities and the relevant laws and regulations of the Government of Kenya concerning VMG (Vulnerable and Marginalized Groups). The OP 4.10 Indigenous Peoples contributes to the Bank's mission of poverty reduction and sustainable development by guaranteeing that the development process fully takes due regard to the dignity, human rights and cultures of indigenous people. The Bank requires that the Borrower engage the IPs/VMGs in a process of Free, Prior and Informed Consultations. This was the basis of the public participation in Kulan with the Somali community which resulted in broad community support for the project by the affected IPs/VMGs.

10.4 CONCLUSION AND RECOMMENDATIONS

Before implementation of the project, environmental and social impact assessment has been undertaken to fulfil the legal requirements, obtain background biophysical information of the site, assess and predict the potential environmental and social impacts and associated mitigation measures during the project cycle, suggestions of possible alterations to the proposed design based on the assessment findings were made, public and stakeholder consultation and participation was undertaken, an environmental and social management plan (ESMP) and monitoring plan were developed. The project has been guided by World Bank safeguards regulations and EMCA 1999 *(amended 2015).* During the ESIA various stakeholders including VMGs were consulted, and their views incorporated in the report.

The proponent/contractor to consult all relevant service providers and authorities (i.e., County Administrators, NEMA, amongst others) to harmonize the projects infrastructural and socio-economic developments with existing facilities.

It is recommended that during the project cycle the proponent and contractor shall adhere to ESMP to minimize risks and delays that may occur. This shall also reduce the cost of the project in the long run. It is also suggested that the positive impacts that emanate from such activities shall be enhanced as much as possible.
Lastly, this CPR to be cleared and approved by WB while the National Environment Management Authority (NEMA) to issue ESIA license subject to annual environmental audits after operating for one year. It is recommended that an Environmental Audit (EA) be undertaken annually

11 APPENDICES

	No	Appendix
1	Appendix 1	List of attendance
2	Appendix 2	Minutes of EIA consultation meeting
3	Appendix 3	Minutes of Land acquisition meeting
4	Appendix 4	Land identification meeting list
6	Appendix 5	A-RAP Document
7	Appendix 6	Firm and Lead expert EIA practising licences

APPENDIX 1 – PUBLIC MEETING PARTICIPANTS' REGISTER

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES.

Ministry of Energy

Venue: KULAN BARAZA

Date: 26/10/2021

Time: 11:30 am

List of Participants

#	Name	Position/Institution/Location	Phone No.	Signature
1.	Sophia Hassan	Kulan	0704021032	
2.	Maka Guhad	Kulan	0712977816	
3.	Ella Ahmed	Kulan	07 92 45 33 41	
4.	Sokia Dekow	KULAN	07 9885 2210	
5.	Soluba. Amin Ali	KULAN	0701 10 03 03.	
6.	Fatuma Aden Dahir	KULAN	0724 26 16 27	
7.	SIYATHO Abdullah Abdi	KULAN	07 23 34 64 56	
8.	Halima Abdi Fallah	KULAN	0714 32 85 98	
9.	MARYAN ALi Abdi	KULAN	0702 679525	M. A. A
10.	ZAINABU Hussein	KULAN	0714488446	

REREC Kenya Power Ministry of Energy

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES.

Venue..... KULAN BARAZA .....

Date..... 20/10/2021 .....

Time..... 11:30 am .....

List of Participants

#	Name	Position/Institution/Location	Phone No.	Signature
1.	IBRAHIM KARIUKI	KENYA POLICE I/C	0723760948	
2.	MATHEWS MOHAMED	"	0798333090	
3.	JEFF KARIUKI	"	0798854204	
4.	JARED WANJALA	"	0725720321	
5.	MOHAMUD MOHAMED	"	0728230880	
6.	ADEN MOHAMED	"	0718952046	
7.				
8.				
9.				
10.				

Norken International Ltd

CENTRIC AFRICA

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES.

Venue: KULAN BARAZA

Date: 20/10/2021

Time: 11:30 am

List of Participants

#	Name	Position/Institution/Location	Phone No.	Signature
1.	FARAH SALAN	Kulan	0728996878	
2.	SADIK ABDI DIRIE	Kulan	0729778034	
3.	SALHAL SHEIKH Hassan	Kulan	0711293976	
4.	MOHAMED D. BORLE	Kulan	0791954339	
5.	OMAR IBRAHIM SHARIF	Kulan	0702557254	
6.	ABDIRIZAK Ali ABDI	Kulan	0741202124 / 0726619961	
7.	Khalif Dagane	Kulan	072355 0415	
8.	Suleiman Mohd	Kulan	0729621801	
9.	Farhan Gedow Dahir	Kulan	0748439510	
10.	Aden Sheikh.	Kulan	0713609616	

RERec | Kenya Power | Ministry of Energy

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES.

Venue: KULAN BARAZA

Date: 30/10/2021 Time: 11:30 am

List of Participants

#	Name	Position/Institution/Location	Phone No.	Signature
1.	ITHOW DERROW	Kulan	0726934811	
2.	ABDIRIZAK M. ADOWA	Kulan	0794358616	
3.	Harof Abdi Baro	Kulan	0725039939	
4.	Abdi Ali Ibbiye	Kulan	0718607998	
5.	Mohamed Sheikh Farah	Kulan	0724126249	
6.	AbdiKheir Rashid	Kulan	0769009608	
7.	Abdi samad Hassan	Kulan	0792415050	
8.	Noor Ahmed Sharif	Kulan	0714693300	
9.	MOHAMED HARE SALAH	Kulan	0718216736	
10.	HASARA SAFI ALI	KULAN		

Norken International Ltd

CENTRIC AFRICA LTD

RERec | Kenya Power | Ministry of Energy

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES.

Venue: KULAN GARAZA

Date: 20/10/2021 Time: 11:30 am

List of Participants

#	Name	Position/Institution/Location	Phone No.	Signature
1.	ABDINASIR ADEN IDRISS	KULAN	0796201427	
2.	Bishar Abdullahi	Kulan	0727508681	
3.	ABDULLAHI MOHAMED	KULAN	0724787565	
4.	ABDULLAHI SIGAT HARET	KULAN	0723706626	
5.	ABDIHAKIM DEGAH MOHA	KULAN	0729029600	
6.	HASSAN ALI HUSIYE	KULAN	0704410003	
7.	MOHAMEDMUKTAR ELMOGE	Kulan	0798975365	
8.	Rage diriye	Kulan	0701469210	
9.	Abdinasir Ali	Kulan	0792253286	
10.	Abdifatah Aydi	Kulan	0712843412	

Norken International Ltd

CENTRIC AFRICA

RE-REC | Kenya Power | Ministry of Energy

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES.

Venue: KULAN BARAZA

Date: 30/10/2021

Time: 11:30 am

List of Participants

#	Name	Position/Institution/Location	Phone No.	Signature
1.	KHEIRA AMIN	KULAN	0706465573	K.A.
2.	KHEIRA Mohamedosma	KULAN	07[illegible]695716	Khera
3.	ANAB ABDI JELLE	KULAN	0729340824	[illegible]
4.	HALIMA ABDIKADIR ABDI	KULAN	0791374664	[illegible]
5.	SAHARA BUNDID FARAH	KULAN	0720897673	S.B.F
6.	FATUMA IBRAHIM HASSAN	KULAN	07[illegible]4	Fatuma
7.	Nallho Amin	Kulan	07[illegible]506314	N.Amin
8.	Nimo Ali	Kulan	07[illegible]58423	N.A.
9.	waraga daud	kulan	0742595261	[illegible]
10.	Zeinab Mohamed		0740301864	[illegible]

Norken International Ltd | CENTRIC AFRICA LTD

REREC Kenya Power Ministry of Energy

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES.

Venue....KULAN.....
Date.....20/10/2021.....
Time.....11:30 am.....

List of Participants

#	Name	Position/Institution/Location	Phone No.	Signature
1.	Abdiya Abdi	Kulan	-	
2.	Gini Kabo	KULAN	22865070	
3.	FATUMA	KULAN	-	
4.	Sadia Shant Mohem	Kulan	0724675611	
5.	Mohamed Kahil Gab	Kulan	-	M.K.
6.				
7.				
8.				
9.				
10.				

Norken International Ltd

CENTRIC AFRICA

RERec | Kenya Power | Ministry of Energy

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES.

Venue.....KULAN BARAZA.....

Date.....20/10/2021.....

Time.....11:30 am.....

List of Participants

#	Name	Position/Institution/Location	Phone No.	Signature
1.	WARRA Mohamud	KULAN	0742995261	
2.	ABDIRASHID ATTOI HASSAN	KULAN	0799581469	
3.	Khevra MOHAMED OSMAN	KULAN	0757695716	
4.	ATTOI ADEN IDRIS	KULAN	0721972987	
5.	HUSSEIN DOLAL	KULAN	0711418436	
6.	ABDIYA Janaa	KULAN	0716169401	
7.	Bare Mohamed BIK	KULAN	0706503575	
8.	MOHAMED HASSAN KAKEL	KULAN	0726702999	
9.				
10.				

Norken International Ltd

CENTRIC AFRICA

REREC

Ministry of Energy

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES.

Venue: KULAN BARAZA

Date: 20/10/2021

Time: 11:30 am.

List of Participants

#	Name	Position/Institution/Location	Phone No.	Signature
1.	OMAR DIRIYE ALI	KULAN	0704061709	
2.	OMAR MOHAMED ARTE	Kulan	0746953418	
3.	AHMED ABDI IBRAHIM	Kulan		
4.	MOHAMED HAMUD ELMI	Kulan	0727090625	
5.	ISMAEL AMIN ALI	Kulan		
6.	MUHAMUD ABDI MAALIM	Kulan	0725435473	
7.	ADEN ISSACK HARUN	Kulan	0711288664	
8.	BISHAR MOULID	Kullan	0727674385	
9.	Mohamed Ismail	Kullan	0706986226	
10.	ABDI DAHIR ABDI	Kulana	0705008759	

Norken International Ltd

CENTRIC AFRICA

REREC Kenya Power Ministry of Energy

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES.

Venue..... KULAN BARAZA .....

Date..... 22/12/2021 .....

Time..... 11:30 am .....

List of Participants

#	Name	Position/Institution/Location	Phone No.	Signature
1.	MARYAM Arab Hussien	KULAN	0725334365	
2.	MARYAM SHARIF NOOR	KULAN	0729751993	
3.	LULI Dabaw Sharif	KULAN	0707137709	
4.	Mohamed Ahmedosma	KULAN	0703935188	
5.	Khaira ADEN ABDI	KULAN	~~0706465573~~ ~~0723698924~~	
6.	HABSA SHEIKH ALI	KULAN	0723698924	
7.	MARYA KHALIF	KULAN	0741568591	
8.	NASTEHA ALI ABDI	KULAN	0792829851	
9.	KHADRA ADOW	KULAN	0790801104	
10.	MARYAN MOHAMED	KULAN	0741855723	

Norken International Ltd

CENTRIC AFRICA

FOCUS GROUP DISCUSSION PARTICIPANTS REGISTER

REREC | Kenya Power | Ministry of Energy

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES.

Venue: Kulan ~~Baraza~~ FGD WOMEN

Date: 20/Oct 2021

Time: 11:20am

List of Participants

#	Name	Position/Institution/Location	Phone No.	Signature
1.	Ayan Abdullahi	Kulan	0111425621	[signature]
2.	Kaha Bare	Kulan	0708354595	[signature]
3.	Hodhan Bile	Kulan	0729[illegible]551992	[signature]
4.	Rukia Adow Abdi	Kulan	0716045430	R.A.A
5.	Halima Aden	Kulan	0721972145	[signature]
6.	Fatuma Abdi	Kulan	0740314309	[signature]
7.	Amina Abdi Hassan	Kulan	0704965932	[signature]
8.	Xisale Salad	Kulan	0743765744 ~~[illegible]~~	[signature]
9.	Hubiya Abdi	Kulan	0725[illegible]88973	[signature]
10.	Dahabo Arale	Kulan	0790543416	[signature]

Norken International Ltd | CENTRIC AFRICA LTD

REREC | Kenya Power | Ministry of Energy

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES.

Venue.....Kutulo Primary (Ego-Men).....

Date...20/10/2021.....

Time...13:02 - 13:42.....

List of Participants

#	Name	Position/Institution/Location	Phone No.	Signature
1.	Abdi Sheikh	Elder	0725008759	
2.	Noor Mohamed	Elder	0714698300	*PLWD.
3.	Aden Issack	Sole	0711288664	
4.	Mi: Sakal Sh. Hassan	Tribal	0710298976	
5.	Mohamed Farah	Elder	0724128764	
6.	Mohamed Kalicha	Youth	0714633737	
7.				
8.				
9.				
10.				

Norken International Ltd

CENTRIC AFRICA LTD

REREC Kenya Power Ministry of Energy

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES.

Venue: KULAN YOUTH FGD

Date: 25/6/2021 Time:

List of Participants

#	Name	Position/Institution/Location	Phone No.	Signature
1.	ABDULLAHI SIGAT HARET	Kulan	0723706626	
2.	FARHAN GEDOW	Kulan	0748439810	
3.	MOHAMED MUKTAR ELMOGE	Kulan	0798975305	
4.	MOHAMED HASSAN BERDLE	Kulan	0726302949	
5.	MOHAMED D. BORLE	Kulan	0791954339	
6.	ABDIHAKIM DEKOW M	KULAN	0729029600	
7.	BARE MOHAMED BILE	KULAN	0706503575	
8.				
9.				
10.				

Norken International Ltd

CENTRIC AFRICA LTD

KEY INFORMANTS REGISTER

REREC | Kenya Power | Ministry of Energy

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES.

Venue: KULAN BARAZA

Date: 25/6/2021

Time: 11:30 am

List of Participants

#	Name	Position/Institution/Location	Phone No.	Signature
1.	ABDI DEKOW BORLE	SENIOR CHIEF, KULAN	0720-642-453	
2.	Simon Mwangangi	ESS – KPLC	0722 595046	
3.	Martin Gitonga	Norken International Limited	0719319946	
4.	Umulkheir Abdi	CENTRIC AFRICA "	0790823964	
5.	FATUMA ABDULLAHI BURORA	Assistant chief KULAN	0713813035	
6.	IFTIN HUSSEIN MOHAMUD	SENIOR TEACHER	0725775973	
7.	ALI ADAM GHOLLICHA	Deputy headteacher	0717096062	
8.	ALLAN OUMA	CENTRIC AFRICA	0729924873	
9.	Bare Mohamed Bile	KULAN	0746503575	
10.				

Norken International Ltd | CENTRIC AFRICA LTD

APPENDIX 2 – MINUTES OF THE PUBLIC MEETING

Ministry of Energy | Kenya Power | REREC

MINUTES OF EIA CONSULTATION FOR THE PROPOSED KENYA OFF-GRID SOLAR MINI-GRID PROJECT IN GARISSA COUNTY.

Date: 20/10/2021	Site: KULAN
Time: 11:30am	Venue: KULAN PRIMARY SCHOOL

PRESENT

AGENDA

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

Item No	Description	Action by
Min 1/21	**Introduction**	
	The meeting started at 11:30 am at KULAN Primary school. The area chief introduce the council of elders and the administrators. Mr. Salah introduced the entire KOSAP team.	
Min 2/21	**Opening Remarks**	
	Mr. [redacted] from KPLC briefed the members present on the main agenda of the meeting (ESIA) It was also said that the project is funded by the World Bank and implimented by the Ministry of Energy with support of KPLC and REREC	

Norken International Ltd | CENTRIC AFRICA LTD

Ministry of Energy Kenya Power REREC

Min 3/21	Remarks by the Consultant	
	Mr Alan Oairo explained the process involved in ESIA. He also clearly explained the benefits of the project to the members present. The environmental impacts that were discussed includes; operations of standby Generators Impact on Air Quality, Impact on local Biodiversity. The members were informed on the compensation in kind. Madam hotthensia discussed the anticipated social impacts of the project. Some of the impacts discussed include; child labour, job creation, elite capture land Acquisition. Mitigation measures were also discussed.	
Min 4/21	**Concerns / Issues from participants**	
	The participants were concern on when the project will hit the ground. Hared Abdi commented and appreciated and thoughtfully encouraged the community to accept the project. Abdihakim Dekow was concerned whether the basic trainings / jobs will be given to the locals. Khalif Daganey was concerned whether they (Kulan) would be the first one to recieve the project. Dekho Abdi was concerned whether the project would provide electricity for salons & barber shop. He was also concerned whether the members would provide pay for the electricity. Noor Ahmed was concerned on the distance coverage of the project.	
Min 5/21	**Responses given by the consultant**	

Norken International Ltd CENTRIC AFRICA LTD

	(Simon from KPLC responded to the concerns and issues raised by the participants. He informed the members that once the initial processes of the projects are over the poject will begin. He stated that; as far as jobs are concerned the locals will be given the first priorities. He also disclosed that; there is a plan to be followed and kylan site has been planned for. The contractors will follow the plan to the end. It was said that the power from the project would be enough for businesses e.g salon etc. The members were also informed on the cost of connection being (4000 ksh) for every household.	
Min 6/21	**Acceptance/Rejection of the project**	
	All members accepted the project.	
Min 7/21	**Adjournment**	
	The meeting adjourned at 1:41 pm with a word of prayer from a participant	

Ministry of Energy Kenya Power REREC

Minutes Prepared by: Unaalkhair Abdalla Abdi Date. 20/10/2021.

Position ..... Environmentalist.

Signature .....

Minutes Confirmed by: ..... A.D. Boke Date. 25/10/21

Position ..... SNR CHEF

Signature .....

A.D.B

Norken International Ltd CENTRIC AFRICA LTD

APPENDIX 3– LAND ACQUISITION MINUTES

Minutes of community consultative – First meeting in 2021

MINUTES OF COMMUNITY CONSULTATION MEETING LEADING TO LAND IDENTIFICATION AND GRIEVANCE REDRESS COMMITTEE CONSTITUTION FOR PROPOSED KULAN SOLAR MINI-GRID PROJECT

Project: Proposed Kulan Solar Mini-grid

Venue of meeting; Kulan Shopping Centre

Date: 24/06/2021

AGENDAS

1 Preliminaries
2 Project description
3 Positive Impacts of the project –Solar Mini-grid
4 Negative Impacts of the project and mitigations measures
5 Need for land for the project
6 Grievance Redress Mechanism for the project
7 Focus Group discussions
8 Environmental and social screening of the site

Minute 1/KOSAP/2021: Preliminaries

The Chief; Kulan location called the meeting to order at 9:00 AM. The meeting began with a word of prayer from one community member. The language used to communicate was Kiswahili with a translator explaining to the community in the local Somali dialect. The chief welcomed all to the meeting and said the community is ready for the stakeholder engagement and asked them to participate actively so that the meeting would be fruitful.

The Chief welcomed the chief officer Environment Garissa County Dr. Adan Mohamed to make his remarks and welcome the KOSAP project team to the ward. The Ward Administrator welcomed and thanked all for attending the meeting and asked the community to listen and participate in the consultation. He noted that the County government is in support of the projects that come to make the lives of the people better. He then invited Mr. Amin KPLC County business manager Garissa County to welcome the project team to talk to the community. Mr. Amin asked the community to feel free and participate in the engagement forums because they are part of the key stakeholders of the project.

Mr Amin invited the project's team leader Engineer Benson Mwakina from the Ministry of Energy (national government) to introduce the project team and proceed with the consultations. Engineer Mwakina asked the team to make brief introductions before they engage the community in different issues of the proposed project. Below is a list of KOSAP team members and Garissa County officials present.

KOSAP team

S/No	Names	Position
1	Engineer Benson Mwakina	Ministry of Energy -MOE
2	Dorothy Kagweria	Environmental Social safeguards Expert-MOE
3	Muruiki Marangu	Property Officer KPLC
4	George Nyambane	Surveyor Garisaa County
5	Amin Bishar	County Business manager Garissa
6	Dr. Adan Mohamed	Chief Officer Garissa County
7	Urbanus Muthoka	Surveyor-KPLC
8	Simon Mwangangi	Environmental and Social specialist-KPLC
9	Onesmus Maina	Engineer-KPLC
10	Samuel Mbugua	Environmental and Social specialist-KPLC

Minute 2/KOSAP/2021: Project Description

Engineer Mwakina explained that the national government is implementing KOSAP in partnership with County Government in 14 counties in areas are far away from the national grid. He said the proposed project is called KOSAP-Kenya Off-grid Solar Access Project is being implemented jointly by the Ministry of Energy, the Kenya Power and Lighting Company (KPLC) and the Rural Electrification and Renewable Energy Corporation (REREC) in partnership with the World Bank as a development partner, County Government as a partner and the communities in Off-grid areas being the beneficiaries. Off-grid areas are those places where the national electricity grid has not reached, and whose electricity access has been very low. The reason for choosing solar energy was because this area is far away from the national grid and the fact that the area is well endowed with natural sunlight with high temperatures. National Government strategy of having all households connected to electricity by 2023

He explained that the National Government strategy is to have all households connected to electricity by 2023 using various sources and solar energy is one of the identified sources with the added advantage of being clean energy. He further expounded that the proposed Solar Mini-grid being implemented under KOSAP is part of the government's effort towards universal access to power. He said the proposed Kulan solar Mini-grid is one of the seventeen Solar Mini-grids to be funded by the KOSAP project in Garissa County. He told the community that the project was in the preliminary implementation stages which requires public participation of various stakeholders.

He further noted that the agenda of the visit was to undertake an environmental and social screening of the proposed sites to check suitability in terms of environmental, technical, social and health requirements. He said the second objective was to undertake community engagement to sensitize the community on the project. The other objective was to explain the land requirements for the project and the need for a project grievance redress mechanism.
He sensitize the community on the technical aspects of the project.
He called on the environmentalist (Mr. Mwagangi) to explain the benefits and negative impacts of the project.

Minute 3/KOSAP/2021: Positive Impacts/Benefits of the Project

Mr. Mwagangi explained that, every project has both positive impacts and negative impacts. Our assignment is to explain to you the impacts of the project so that you understand how the

project will benefit you and the community at large. The project benefit both direct and indirect are as follows:

13. Better source of lighting- replacement of Kerosene lamp and small de-lite lamps with electricity lighting which is clean and has better lighting
14. Benefits to education- provide source of lighting which enables pupils and students to take advantage of longer hours of preps/study in homes. Electricity will be useful in availing power needed to enable use of radio and television sets. Once parents are able to buy these gadgets pupils can access electronic educational materials
15. Business opportunities-Power provides energy needed to power some gadgets that are difficult and expensive to power with generators. Access to electricity will therefore allow the community to take advantage of new business opportunities and enhance the existing ones e.g. Barber shops, salons, posho/maize mills, welding, photo copying, printing, fuel stations, milk coolers and fridges to preserve meat among others
16. Employment and wealth creation- community members will get opportunities to provide non-skilled and skilled labor during construction and operation phases
17. Local Material Supplies and other requirements- the proposed project provides opportunities to supply some materials available locally
18. Up Scaling Electricity Access to the off-grid areas- this area is far away from the grid and so the proposed project helps to reach such areas faster and in a cost effective manner as opposed to grid connections.
19. Impact on HIV/AIDS-due to availability of power, communities can purchase communication equipment like radios and televisions which in turn provides access to information on various issues such as health topics on HIV/AIDs, nutrition and the current Covid-19 pandemic among other information
20. Health benefits of the project- health benefits of the project includes replacement/elimination of use of kerosene lamps and candles, reduced or no use of fuel generators in the trading centers which emits smoke causing respiratory diseases, the health Centre under construction will also benefit from power that can be used to preserve drugs and vaccines alongside powering other medical equipment.
21. Improved standard of living- Living standards of the community is bound to improve as they take advantage of small house hold appliances like e.g. TV, Fridges, radios, blenders, iron boxes e.t.c.
22. Security- Enhanced security due to improvement in lighting up of the area through the street lights. Improved security also means more hours of business
23. Communications- improve communication due to availability of electricity to charge phones, opportunities to set up information communication and technology related business like cyber cafes, access to e-government services among others.
24. Presence of electricity will also attract other business investors to invest in the area

Minute 4/KOSAP/2021: Negative impacts of the project

Having discussed the benefits of the project, Mwangangi explained that projects also have negative impacts. He noted that the most important thing is to be able to mitigate the negative impacts so that they do not affect the community. He said ‘’the proposed solar Mini-grid will have the following negative impacts and I will present them alongside their mitigation measures.

	Negative impact	**Mitigation measures by contractor**
1	Vegetation clearance of the site identified.	• Clear only the areas that are needed to put up the mini-grid • After construction, do landscaping with grass to

		areas that have no electrical installation as opposed to living areas bare • Planting of trees
2	Air pollution dust from construction activities	• Fence off construction site to reduce dust going to the public • Use of masks for workers
3	Air pollution dust from construction vehicles	• Limit vehicle speed to minimum possible when passing residential areas
4	Air pollution from vehicle emissions	• Maintain vehicles/service vehicles • No idling of vehicles
5	Solid waste	• Clear all solid waste and dispose appropriately
6	Land acquisition/take As you had been briefed before the site identified should; -must not result in displacement of community members - We must avoid land that is currently settled or which has squatters. -There will be an impact of forgoing the current land uses if any or future land uses for the sake of the project.	• The community should be willing and ready to live with this impact
7	Occupation safety and health hazards e.g. accidents, fall from heights, pricks by sharp objects	• Use of proper personal protective equipment like gloves, overalls, helmet, safety shoes • Allocating work according to skills • Toolbox talks to workers to identify hazards and risky activities
8	Labor influx. The nature of the project will require technical skills that may not be available in this community. This will require movement of construction workers (labour influx) into this community. Some risks that are involved with labor influx include social ills, cultural conflict, insecurity among others.	• All workers will be sensitized to respect the locals culture, and conduct themselves according to the contractors code of ethics. The project shall have an established and operational Grievance Redress Mechanism accessible to community members • Reduction of labor influx by tapping into the local workforce
9	Risk of social conflict due to competition for resources and opportunities	• Awareness-raising among local community and workers on the need to have a good /cordial working relation • Consultations with and involvement of local communities in project planning • Provision of cultural sensitization awareness for workers regarding engagement with local community. • Recruitment of local workforce to the extent possible especially unskilled and semi-skilled jobs • Contactor shall make provision to provide resources needed by the workers if the need for

		such resources may result to competition e.g. water • Working closely between contractor and the project grievance redress committee to address complains on time.
10	Increased or illicit behavior and crime (including prostitution, theft and substance abuse)	• Sensitization campaigns both for workers and local communities against such social evils • Enforcement of sanctions (e.g., dismissal) for workers involved in criminal activities
11	Communicable diseases (including STDs and HIV/AIDS)	• Education/awareness about transmission of diseases • Information campaigns on STDs among the workers and local community on ethics, morals, general good behavior and the need for the project to co-exist with the neighbors during the community and worker engagement forums. • Provide condoms to employees
12	Gender-based violence including sexual harassment and exploitation	• Information and awareness raising campaigns to you community members and specifically women and girls. • Mandatory awareness creation for workers on required lawful conduct in the community and legal consequences for failure to comply with laws • Report all complaints on gender-based violence or harassment through the GRM and also directly through CREO • Working closely and Instruction of local law enforcement to act on community complaints on time • Inclusion of GBV specific mitigation measures in the environmental and social management plan of contractor • Requirement of contractor to have code of conduct for the workers and to implement them
13	Child labor	• Ensuring that children and minors are not employed directly or indirectly on the project. • Enforcement of Employment Act that requires contractor to adhere to minimum age • Allowing your children to be employed is illegal and punishable by law because it interferes with the children's right to education • Report any case to the chief's office
14	Demand for Material/resources e.g water	Contractor to consult with elders before using the water resources in the community to avoid conflicts.
15	*Oil Spill Hazards*	• Contractor not to repair vehicles or equipment on site • Maintain vehicles and equipment in good state
16	*Storm water and erosion*	• Contractor to put measures to harvest rainwater and control erosion during construction

17	*Wastewater/ effluent*	Contractor will provide sanitation facilities for workers
18	*Noise resulting from excavation machinery, vehicles and workers*	• Contractor to comply with NEMA Noise and Excessive vibrations rules and regulations 2009. • Contractor to use machinery and equipment with noise attenuation systems. • Contractor to work only during the day • In case of blasting contractor to give notice to community through the village elders and chiefs office
19	Visual and Aesthetic Landscape Impacts	• The visual negative impacts can be mitigated through putting up a wall round the facility to keep off/screen the project stacks, poles, cables, panels and transformers by the contractor. • Proper siting decisions can help to avoid aesthetic impacts to the landscape.
20	Hazardous materials from damaged Panels- Photovoltaic panels may contain hazardous materials, and although they are sealed under normal operating conditions, there is the potential for environmental contamination if they were damaged or improperly disposed upon decommissioning.	• Proper planning and good maintenance practices can be used to minimize impacts from hazardous materials. • Proper disposal of used or Damage solar batteries and panels using NEMA registered disposers for such wastes
21	Fuel storage on site	Contractor will undertake proper installation of the fuel storage tanks and dispensing system like having a budded wall 1.5 times the fuel storage tank. During operation implementing agency will ensure proper maintenance of the solar plank
22	Public safety –potential risk of shocks and electrocution	Proper wiring at houses and premises by a qualified technician

Public safety in regards to electricity

Mwangangi educated the community by highlighting the importance of using electricity safely. He said electricity is good but failure to take the precautions while interacting with it can result in electric shocks, fires and even electrocution/death. He emphasized the following precaution/preventive measures to observe in order to prevent risk of electric shocks, fires and electrocutions.

- Engage a certified technician to do wiring in your premises
- Use quality materials while wiring
- Do not engage in individual illegal extensions of power lines to other houses
- Don't touch sockets and switches with wet hands or wipe with wet cloths
- Do not tie your livestock on electric poles
- Do not cut earth wires that run along some electric poles
- Do not touch any electric wire if you find it fallen on the ground
- Report any incident regarding electricity at the local office –staff in charge of operating the Mini-grid
- Vet all new people coming to the village by checking whether they registered their presence with the office of the chief.

- In case of a black out do not open sockets or switches

Minute 5/KOSAP/2021: Land requirements for the project

Mr. Mwangangi told the community that one of the agendas of the project team's visit was to progress land Identification process for the proposed Mini-grid. He explained to the public forum that the proposed project will require about 1.55 hectares of land. He explained that the piece of land identified will be screened for its Suitability for the purposes of the Community Mini-grid.

Minute 6/KOSAP/2021: Grievance Redress Mechanism

Mr. Mwangangi explained that in a project, grievances may arise and it important to have a grievance redress mechanism that is known to all the community members and accessible with no costs to the community members.

Mr. Mwangangi explained to the community that it is important to put in place a project grievance redress mechanism (GRM). He noted that the GRM to be set should borrow heavily from the existing conflict resolution structures in the community. He explained that the need for a GRM is to provide the community and other stakeholder's opportunity to share project information and raise questions and grievances about the project. He told the community that they are free to raise any complain or request information about the project. He explained further that members of the project/ grievance redress committee will be chosen by the community members themselves. The committee chosen will be in charge of giving project information to the community and be a focal point for reporting project related issues of concern or grievances. He added that the composition of the committee should have representatives from all groups in the community including men, women, youth and persons with disability.

GRM team selected

No.	Names	Represents	Id. No	Phone No.
7.	Kaha Siyat Ibrahim	Women	22956820	0773364904
8.	Haret Abdi Barre	Men	0029012	0725089939
9.	Abdi Sheikh Abdifatah	men	12913786	0705008759
10.	Adow Abdilahi Yusuf	Youth	23493429	-
11.	Bishar Ahmed Mohammed	Men	23062348	-
12.	Kassim Kahim	Men	-	-

Minute 7/KOSAP/2021: Plenary session

Mr Mwangangi made a brief summary of what had been discussed and invited the community members to ask questions or seek clarifications on the information shared. The questions raised and responses provided are presented in the table below.

	Name	Questions/suggestions	Response	Response by agency on how feedback will be used or acted upon
1.	Muktar Ibrahim	-Greetings -Will the power to be generated in the area enough to pump water from a borehole	**Engineer Mwakina** - The power generated from the mini-grid will be grid level power that can be used for all purposes including welding and powering borehole water pumps	-
2	Hassan Gurow	What will be the cost of connection per individual household	**Engineer Mwakina** Connection fee for the KOSAP project will be Kshs 1000 which is payable to Kenya power. Money shoud not be paid to any other party apart from Kenya Power	-

FOCUS GROUP DISCUSSION FOR YOUTHS

This FGDs were led Samuel Mbugua

He welcomed the youths present for the focus group discussion. He further explained to them the proposed project the government wants to implement in their neighborhood will be supplying electricity to the community. This electricity will be generated through solar panels and standby generator. This project is being funded by the World Bank and being implemented by Ministry of Energy through Kenya Power and Lighting Company and County Government of Garissa.

The youths noted were engaged on how the proposed project will be implement in the area and they identified the following positive impact the project will come along with as follows;

- Creation of direct and indirect employment for the community people
- Reduction of travel expenses since health services will be near them
- Clean source of energy (electricity) in their neighborhood
- Improvement of education standards
- Increase of the land value
- Improvement of the economy of the area
- Access to information and news since the community members will invest in the purchasing of the radios, Tvs, and internet services

Further the youths identified the negative impacts that the proposed Mini-grid will come up with in their neighborhood;

- Introduction of visual impacts due to the proposed mini grid and low voltage lines
- Clearing of vegetation on the proposed project site to create room for the construction of the Mini-grid
- Increase of population in the neighborhood especially during the construction phase
- Increase of crimes and other evil vices i.e. unwanted children, early pregnancies, spread of sexual transmitted diseases, petty theft.
- Mixing of various cultures of different people who will be working during the

construction and operational phases of the proposed Mini-grid project.

- More intake of water during the construction and operational phases of the proposed Mini-grid
- Instance of air pollution will be witnessed during the operation phase of the proposed mini-grid.

When youths were asked if they support the proposed project? All of the youths present were in full support of the proposed mini grid project and agreed that they will lobby other youths to support the project.

GRM Representative for Kulan Mini-grid-No Questions

Serial No.	Name	ID NO.	Cell No.
1	Adow Abdilahi Yusuf	23493429	-

Women Focus Group Discussion

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 Kulan

GRM Representative for Kulan Mini-grid-No Questions

Serial No.	Name	ID NO.	Cell No.
1	Kaha Siyat Ibrahim	22956820	0773364904

FOCUS GROUP DISCUSSION FOR MEN

Simon Mwangangi called the Focus group discussion for Men into order and thanked the Men present for turning up for the meeting in good numbers and for their contribution in the Public Baraza.

A focus group discussion was held with men above 35 years of age. This categorization was based on the assumption that these men; as the heads of families and with a deeper understanding of the community set up, roles, entitlements and were also a foundation of knowledge helpful to the project team in understanding the community better. The main objective of this discussion was to assess whether men had understood the proposed project and its requirements and to provide an opportunity for them to air their issues/give their opinions on the project.

Simon Mwangangi from KPLC explained the importance of holding a separate discussion with them so that they would have an opportunity to freely express themselves and inform the Project team how they would wish to be involved in the project. Simon reminded the men that as the heads of families, they played a crucial role in ensuring the project was a success. He explained to the men that the essence of the environmental and social screening of the project site was to assess its 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. The third objective was to explain the land requirements for the project and the need for a project Grievance Redress Mechanism (GRM) for the project. This would be achieved through the formation of a Grievance Redress Committee (GRC) in which men required to select their representative. Simon went further and summarized the project by explaining its positive and negative impacts and their mitigation measures and the requirements for identifying land for the project. He also explained the need for the men to elect a representative to the GRC which also doubled as the project committee. The representative would present their views/issues to the committee for redress and further action to ensure that the interests and needs of men were factored through-out all the phases of the project.

The men were further explained of their role and responsibility in terms of protecting and ensuring security for the project and the need for community ownership of the project. Simon further told men in the meeting that the identified site would be fenced and would hence forth be referred to as land put aside by the community for energy development project.

Simon went ahead and asked the Men to give their views on how they wished to be involved in the project, to ask questions, give suggestions and or seek clarifications. Their responses and concerns were as follows.

The men confirmed they were in agreement to have the project brought to the community. In unison the men said they would like to be involved in the following:

5. Peace and Security
6. Employment especially as watchmen, security jobs, masonry, fencing among other jobs that skills could be available within the community.
7. To be at the forefront in land identification
8. Anything that may go wrong, men would participate in dispute resolution

There were no questions.

The following were elected to be representatives for men in the GRM/ Project committee.

3. Haret Abdi Barre of ID No. 0029012 and phone number 0725089939
4. Abdi Sheikh Abdifatah of ID No. 12913786 and phone number 0705008759

MINUTE 8/KOSAP/2021: A.O.B

Five community members were identified to sign Land Identification Form on behalf of the community.

Minute 9/KOSAP/2021: Closure of Meeting

There being no other business, the Chief thanked all the attendants for turning up and their contributions. Members agreed to keep in touch and clarify on any necessary information as regards the intended projects. The meeting ended with a closing prayer at 12:00 PM

AL

REPUBLIC OF KENYA

MINISTRY OF ENERGY

KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP).

SITE IDENTIFICATION, ENVIRONMENTAL AND SOCIAL SCREENING FOR PROPOSED SOLAR MINI-GRID FOR COMMUNITY FACILITIES, ENTERPRISES AND HOUSEHOLDS.

SITE KULAN MINI-GRID

MEETING VENUE KULAN

DATE 24/06/2021 - ATTENDANCE LIST

LIST OF ATTENDANCE/PARTICIPANTS LIST

No	NAME	Identification number –ID No	Mobile No.	Gender Male-M/Female-F	Village	SIGN.
1.	ABDI DEGOW BORLE	9048308	0720 642 453	M	Kulan	
2.	ADEN SHEIK MUHAMED	0029003		M	"	
3.	BISHAR ABDIKER MUHAMED	23062343	0725729992	M	Kulan	
4.	FARAH SALAN ARIE	8480980	0798776878	M	"	

20	HUSSEIN ABDINOOR BARE			M	Wa own	
21	ABDI DIGALE HUSSEIN	0051610		M	"	
22	HUSSEIN DOLLA IBRAHIM	0047255	0711418136	M	"	
23	DALKANE BURALE ELMOGE	0033676	0729932133	M	"	
24	HARÉ ABDI BARE	0089012	0725089939	M	"	
25	MOHAMED HARÉ SWALEH	23512300	0718216736	M	"	
26	SULEIMAN MOHAMED ABDON	27492626	0729671801	M	"	
27	MOHAMED HASSAN BARGOLE			M	"	
28	BILOW HALIL OSMAN	0047171	0701051683	M	"	
29	ABDI ALI IMBIYE			M	"	
30	NIMCO MOHAMED ABDON			M F	"	
31	NAIMO AMIN ALI			M F	"	
32	HALAN GULHAD OSMAN			M F	"	
33	HABIBA ABDI			M F	"	
34	ABDULLAHI ABDI GARANE			M	"	

35	Ismail Amin Ali			M		
36	Abdihakim D. Borce			M		
37	Farhan Gedow Dahir			M		
38	Mohamed Noor Iman			M		
39	Abdi Ali Abdi	27449182	0726019969	M	Kala	
40	Abdi Hamet Kharif			M		
41	Abdi Rashid Abdi Hassan			M		
42	Bashe Dire Kamer			M		
43	Bille Halil Osman			M		
44	Abdullahi / Sheik Hassan			M		
45	Abdullahi Jalan			M		
46	Simon Mwangangi	14623210	0722553876	M	KPLC	
47	Teddy Murimi	26712020	0721 791114	M.	KPLC	
48	Eng. B.M. Mwaura	9079006	0722247815	M	MOE	
49						

4

50	MAKA Guyo Osman			F	Kulan	
51	HABIBA ABDI DIGORÉ			F	"	
52	BUNTI BIRIYE Mohammed			F	"	
53	NATITO AMIW ALI			F		
54	Rukhsana Bible Roba			F	Kulan	
55	Nima Sagar Ibrahim			F	"	
56	KALTO YARROW Ibrahim			F	"	
57	Zeinab Mohamed Sheikh			F	"	
58	SAFIA NUNOW Mohamed			M		
59	Urbanus Mutua			M	KPLC	
60	Samuel Mbugua			M	KPLC	
61	Ibrahim Hassan			M	C.G.G	
62						
63						

5.	Omar Digiye Ali	7634868	0704061709	M	KULAN	
6.	Eng B.M. Mwakio	9029006	0722247875	M	MoPE	
7.	Amin Burhan	8492258	0722701378	M	KPLC	
8.	Dr. Aden M. Dahiye	[illegible]	[illegible]	M	County Govt	
9.	GEORGE NYAMWANZI	24677874	[illegible]	M	S.O.K M.O.L	
10	DOROTHY KAGWERIA				MOE	
11						
12						
13						
14						
15						
16						
17						
18						
19						

2

KULAN

FGD
MEN

REPUBLIC OF KENYA

MINISTRY OF ENERGY

KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP).

SITE IDENTIFICATION, ENVIRONMENTAL AND SOCIAL SCREENING FOR PROPOSED SOLAR MINI-GRID FOR COMMUNITY FACILITIES, ENTERPRISES AND HOUSEHOLDS.

SITE Kulan

MEETING VENUE centre

DATE 24/6/2021

LIST OF ATTENDANCE/PARTICIPANTS LIST

No	NAME	Identification number –ID No	Mobile No.	Gender Male-M/Female-F	Village	SIGN.
1.	FIRAH SOLAN ADEE	8980980		M	Kulan	
2.	ABDI DIGALE HUSSEIN	0057610		M	"	
3.	Aden Sh. Mukumed	0079003		M	"	
4.	Abdi Sh. Abdi Fatah	12913786		M	"	

5.	Omar Shirye Ali	7634868		M	Kulan	
6.	Rage Shirye Kalim	8504597		M	"	
7.	Hussien Dalal Ibrahim	0047215		M	"	
8.	Dubow Abdi	12913970		M	"	
9.	Hassan Yussuf Roble	2149184		M	"	
10	Haret Abdi Bare	0029012		M	"	
11	Abdi Sh. Muhumed	0046247		M	Kulan	
12	Gillow Khalil Osman	0047191		M	"	
13	Abdullahi Mohamed	37707380		M	"	
14	Khalif Dagane	8480938		M	"	
15	Eng. B.M. Mlacha	9079006	0722247575	M	NWE	
16	Simon Mwangangi	14423210	0722595246	M	KPLC	
17	Amin Bulow	8492258	0722705378	M	KPLC	
18	Wilson Muthui	5707146	0711 633 462	M	KPLC	
19	George Mtanane	24677874	0712449848	M	S.O.K Walda	

2

20	Dr. Aden M. Dahiye	28269762	0720701491	M	County Govt	
21	Mohamed Mustafa	5762746	0721673462	M	KPLC	
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						

REPUBLIC OF KENYA

MINISTRY OF ENERGY

KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP). WOMEN FGD

SITE IDENTIFICATION, ENVIRONMENTAL AND SOCIAL SCREENING FOR PROPOSED SOLAR MINI-GRID FOR COMMUNITY FACILITIES, ENTERPRISES AND HOUSEHOLDS.

SITE ..... KULAN MINIGRID .....

MEETING VENUE..... KULAN BARAZA SITE

DATE..... 24/6/2021

LIST OF ATTENDANCE/PARTICIPANTS LIST

No	NAME	Identification number –ID No	Mobile No.	Gender Male-M/Female-F	Village	SIGN.
1.	Amina Muhaman		0701461968	F	Kulan	
2.	Kalha Yerrow		0773364404	F	"	
3.	Fatma Muhumed		0796149804	F	"	
4.	Maka ~~Hulan~~ GUHAD	8480945	0712977816	F	"	

5.	Rahma Barakhe		0746030876	F	Kulan	
6.	Luli muhamed	13701991	0718643421	F	Kulan	x
7.	Habiba Abdi		0712688360	F	Kulan	X
8.	Dorothy Kaguema					
9.	Asli Mohamed	22874504.	0728898191	F	"	
10	ANAB ABDI JELLE	35402757	0729346	F	"	
11						
12						
13						
14						
15						
16						
17						
18						
19						

YOUTH FGD.

REPUBLIC OF KENYA

MINISTRY OF ENERGY

KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP).

SITE IDENTIFICATION, ENVIRONMENTAL AND SOCIAL SCREENING FOR PROPOSED SOLAR MINI-GRID FOR COMMUNITY FACILITIES, ENTERPRISES AND HOUSEHOLDS.

SITE KULAN MINIGRID

MEETING VENUE KULAN

DATE 24/06/2021

LIST OF ATTENDANCE/PARTICIPANTS LIST

No	NAME	Identification number –ID No	Mobile No.	Gender Male-M/Female-F	Village	SIGN.
1.	BISHAR ATHMAN M.	23062348	0725729992	Male	Kulan	
2.	FEISAL ABDI wardere	34965215	0719529314	male	Kulan	
3.	Suleiman mohamed	27492626	0729671801	male	Kulan	
4.	Farun Muhamed	24909792	07	male	Kulan	

5.	Mohamed Abdi Mohamed	34716242	0715863804	Male	Kulan	
6.	Issa Mohamed	38223903	0722563104	Male	Kulan	
7.	Abdilahi Abdi	3392544	0712843412	Male	Kulan	
8.	Abdirizak Ali	23144/802	0726089967	Male	Kulan	
9.	Mahamed Nur Ima	35625581	0799772207	Male	Kulan	
10	Kilene Ibrahim Xunow	20926154	0706784459	Male	Kulan	
11	Abdirahman Abdi Hassan	34260008	0797318784	Male	Kulan	
12	Hilal Dahir Ahmed	12913745	0713694947	Male	Kulan	
13	Kaleb Hamis Abdi	N/A	0706391376	Male	Kulan	
14	Luqman Warsame Ole	N/A	N/A	Male	Kulan	
15	Abdisamad Mohamed	N/A	N/A	Male	Kulan	
16	Abdirahman Hassan Guhad	9084584	0714082755	Male	Kulan	
17	Abdikadir Gedow Dahir	37152966	0729843715	Male	Kulan	
18	Samuel Mbugua	7228810	0720553310	m	Kolc	
19						

2

APPENDIX 5 – Abbreviated Resettlement Action Plan (A-RAP)

1. Kulan Sub-project Site

The Kulan sub-project site is on unregistered community land and held in trust by the County Government of Garissa 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, and is part of the land owned by the Kulan community and utilized for grazing. Consultations leading to the identification and selection of the sub-project site are captured in the Environmental and Social Screening report for Kulan. *Refer to Chapter 5 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 9000 (approximately 1,500 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 1.55 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 2.2 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 Kulan community proposed the following projects on a priority basis: -

- Water reticulation from the existing water sources to serve the community by installing solar powered pumps, dispensing unit, and other amenities;
- Provision of enough health care needs for example power connection which will help serve the health centre;
- Schools within the project area lack infrastructure and enough teachers that can accommodate all the students.

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.	KPLC
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.	KPLC
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 Crops Structures	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	KPLC

Community facilities e.g., water sources (earth pans, boreholes etc.).	Community members on unregistered community land, community members utilizing public land, and members of registered and unregistered group ranches.	or damage to the above will be compensated/restored at full replacement cost,[1] in line with the provisions of the RPF.	

4. Consultations with PAPs about Acceptable Compensation Options and Alternatives that have been considered

Detailed consultations with PAPs on land acquisition and compensation, including the modalities of acquiring land and compensation options, were undertaken during the Environmental and Social Screening, Environmental and Social Impact Assessment, and the NLC land valuation process. The following sections provide a summary of the consultations.

4.1 Engagement of Project -Affected Persons (PAPs)

Local administration and County Renewable Energy Officers (CREOs) supported the proponent and implementing agency (IA) to mobilize community members and other stakeholders for public consultations and engagement activities. National and county government entities, community segments (men, women, youth, elders, persons with disability, vulnerable and marginalized groups, etc.), NGOs, and local leaders were engaged through key informant interviews, community meetings, and focus-group discussions. The proponent and IA implemented appropriate measures to ensure PAPs effectively participated in the consultations. *Refer to Chapter 6 of the ESIA on 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 Kulan 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 7 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

Figure 1: ——————————

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

Date	Objective	Implementing Entities	Land Acquisition and Compensation Aspects Discussed	Key Issues Raised	Responses Given
24th June, 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).	None	None
October 20th 2021	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.	The Kulan community proposed the following projects according to priority; - 1st Piped water from dam to water village; 2nd construction of classrooms at the school as the current classrooms are insufficient; 3rd Construction of a laboratory and wards at the dispensary.	The proponent has set aside KES 1 million to implement the priority in-kind compensation project. The value of the project will be proportional to or greater than the value of land. NLC will determine the value of land.
May 2023	Compulsory Land Acquisition.	NLC	Site inspection and inquiries. Land valuation. Award of compensation.		

5. Institutional Responsibility for Implementation of the ARAP

Entity	Role
Ministry of Energy	• Coordinate A-RAP implementation and provide budget for in-kind compensation.
National Land Commission	• Implement the statutory process for compulsorily land acquisition, including site gazettement and inspections, inquiries, valuation, and award of compensation.
Kenya Power	• 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 7 of the ESIA for a detailed GRM.*

7. Implementation Timetable and Budget for the ARAP Implementation

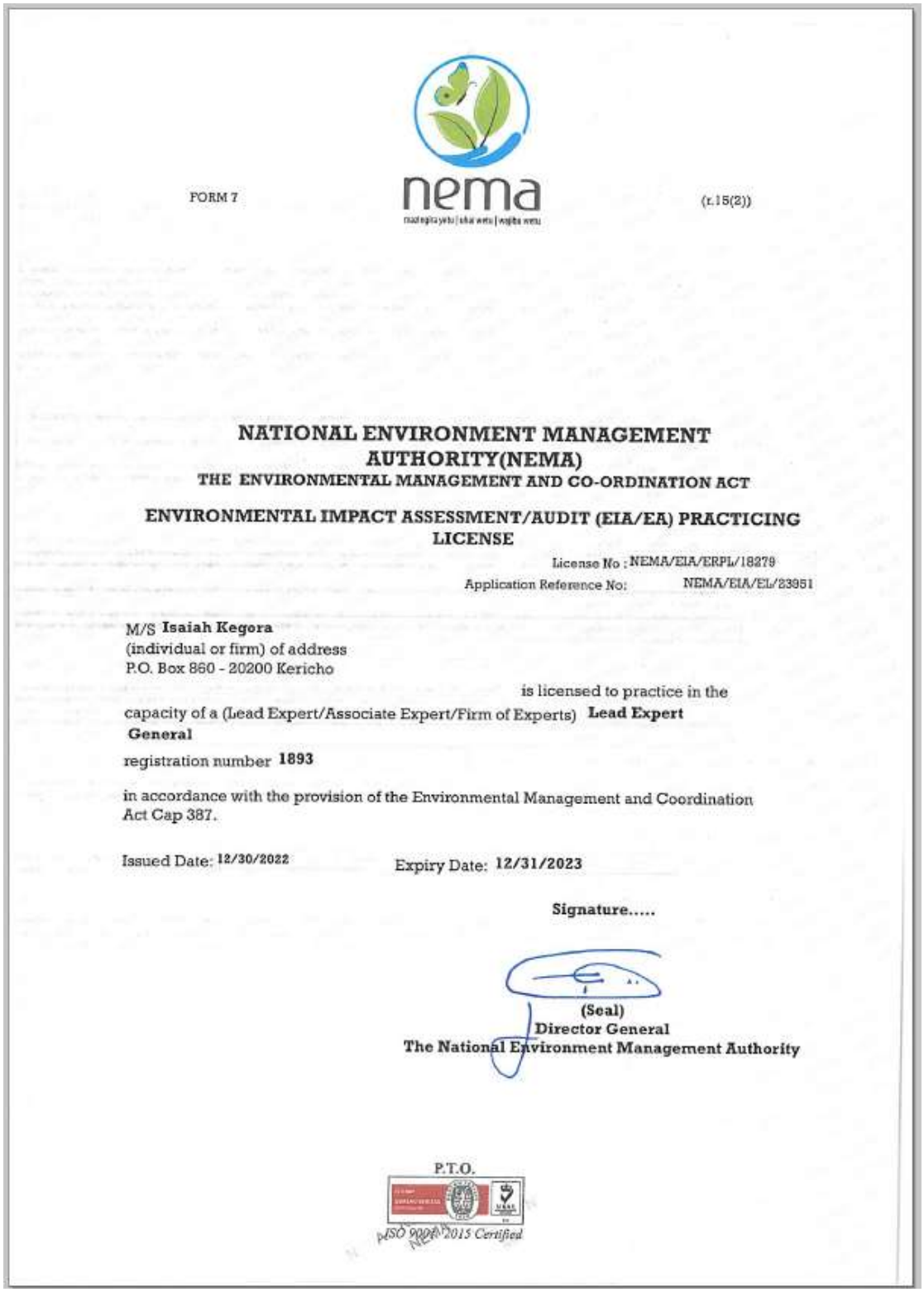
7.1 Timelines

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.

APPENDIX 6– NEMA LICENCE



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

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/18263

Application Reference No: NEMA/EIA/EL/23929

M/S **Norken International Limited**
(individual or firm) of address
P.O. Box 9882 - 00100 NAIROBI

is licensed to practice in the capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Firm of Experts** registration number **0181**

in accordance with the provision of the Environmental Management and Coordination Act Cap 387.

Issued Date: **12/30/2022** Expiry Date: **12/31/2023**

Signature.....

(Seal)
Director General
The National Environment Management Authority

P.T.O.

ISO 9001:2015 Certified