MINISTRY OF ENERGY

REPUBLIC OF KENYA

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

PROJECT: KENYA OFF-GRID SOLAR ACCESS PROJECT

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

LOCATION : KALOKOL DIVISION, TURKANA CENTRAL SUB COUNTY,TURKANA COUNTY

2023

CERTIFICATION

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

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ACKNOWLEDGEMENT:

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Abbreviations

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

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

EXECUTIVE SUMMARY

E-1- Introduction and Project Brief

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

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

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

E-2- Project Categorization and Justification

In the World Bank context, there have been several projects supported by the organization that aim to provide electricity to communities located far from the national grid. These projects utilize off-grid approaches, meaning they are independent of a national or regional grid. The experience gained from these projects provides valuable guidance for designing sustainable off-grid electrification initiatives, particularly those targeting dispersed and economically disadvantaged communities. The Kalokol 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 Kalokol site as a solar power facility, it falls within the medium risk project category as per the Kenyan legislative framework.

E-3 Approach and Methodology

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

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

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

E-4 Legislative Regulatory Framework

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

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

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

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

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

E-5 Environmental Setting

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

E-6 Project Description

The Kalokol Mini Grid project aims to provide electricity to approximately 1837 residential and 14 nonresidential consumers in Kalokol Village at Kalokol Division, Turkana Central Sub County, Turkana County. The project will utilize solar photovoltaic panels, a Battery Energy Storage System, and a Diesel Generator to generate electricity. A Low Voltage Power Distribution Network will be established to distribute the power to customers.

The core of the project, solar panels with a minimum capacity of 450 kWp will capture solar energy. Solar energy is clean, renewable, and abundant in the region, making it a sustainable energy source. A minimum usable battery capacity of 1,125 kWh will store excess solar energy for use during nighttime and periods of low solar irradiation. This ensures a continuous and reliable power supply. The project will include PV inverters with a minimum capacity of 450 kW, as well as a maximum string inverter capacity of 200 kW. These inverters convert DC electricity from the solar panels into AC electricity suitable for consumer use.

A distribution line will be installed to transmit electricity to the consumers, ensuring efficient power distribution throughout the area. The proposed monthly energy demand for the project is 42340 kWh, meeting the needs of the community. The project aims to satisfy a daily energy demand of 1,411 kWh, ensuring a consistent power supply. The system is designed to accommodate a peak demand of 262 kW, addressing high-demand periods effectively. A 48-kilometer LV network will be established to distribute power efficiently to consumers.To provide backup power during periods of low solar generation or high demand, a diesel generator with a prime rating of 320 kVA will be integrated into the system.
The estimated cost of the project is approximately **USD. 1,756,509.39**, 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 Kalokol Mini Grid approximately 1.048 hectares of land will be acquired from the community in line with the national laws and World Bank provisions. In accordance with the World Bank's Operation Policy (OP) 4.12 on Involuntary Resettlement, an abbreviated Resettlement Action Plan (A-RAP) was prepared, outlining the principles and procedures for land acquisition and compensation. This plan is annexed to this ESIA.

E-7 Project Alternatives

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

E-8 Stakeholder Engagement

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

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

During the ESIA stakeholder engagement public meeting, which took place in Kalokol center on 14th January, a total of 83 males and 19 females 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.

E-9 – Impacts and Mitigation Measures

The Environmental and Social Impact Assessment (ESIA) for the proposed Solar Mini-grid project has identified both positive and negative impacts across its different phases: pre-construction, construction, operation, and decommissioning. In the construction phase, positive impacts include local employment opportunities, boosting local businesses, and sourcing materials locally. During the operation phase, positive impacts encompass reliable power supply, economic improvement, education, health benefits, improved living standards, and enhanced security and communication. Similarly, the decommissioning phase offers positive impacts such as local employment and sourcing.

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

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

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

Table 1: Summary of Pre-construction Impacts

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

Table 2: Summary of Construction and Decommissioning Phases Impacts

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

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

E-10 Environmental and Social Management and Monitoring Plan

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

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

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

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

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

E- 11 Conclusion

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

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

1 INTRODUCTION

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

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

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

1.1 CONTEXT

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

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

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

The project components are:

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

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

1.2 PROJECT OVERVIEW

The identified power Mini-grid site is located on Unregistered community Land in Kalokol in the Western shore of Lake Turkana, Kalokol division, Turkana County on GPS Coordinates of latitude **3°31'40.7"N** and longitude **35°51'28.6"E**.
The proposed solar mini grid will be located on a 1.048 Hectares piece of land. The solar mini grid will comprise Solar panels, batteries, invertors, perimeter fence and a distribution line.

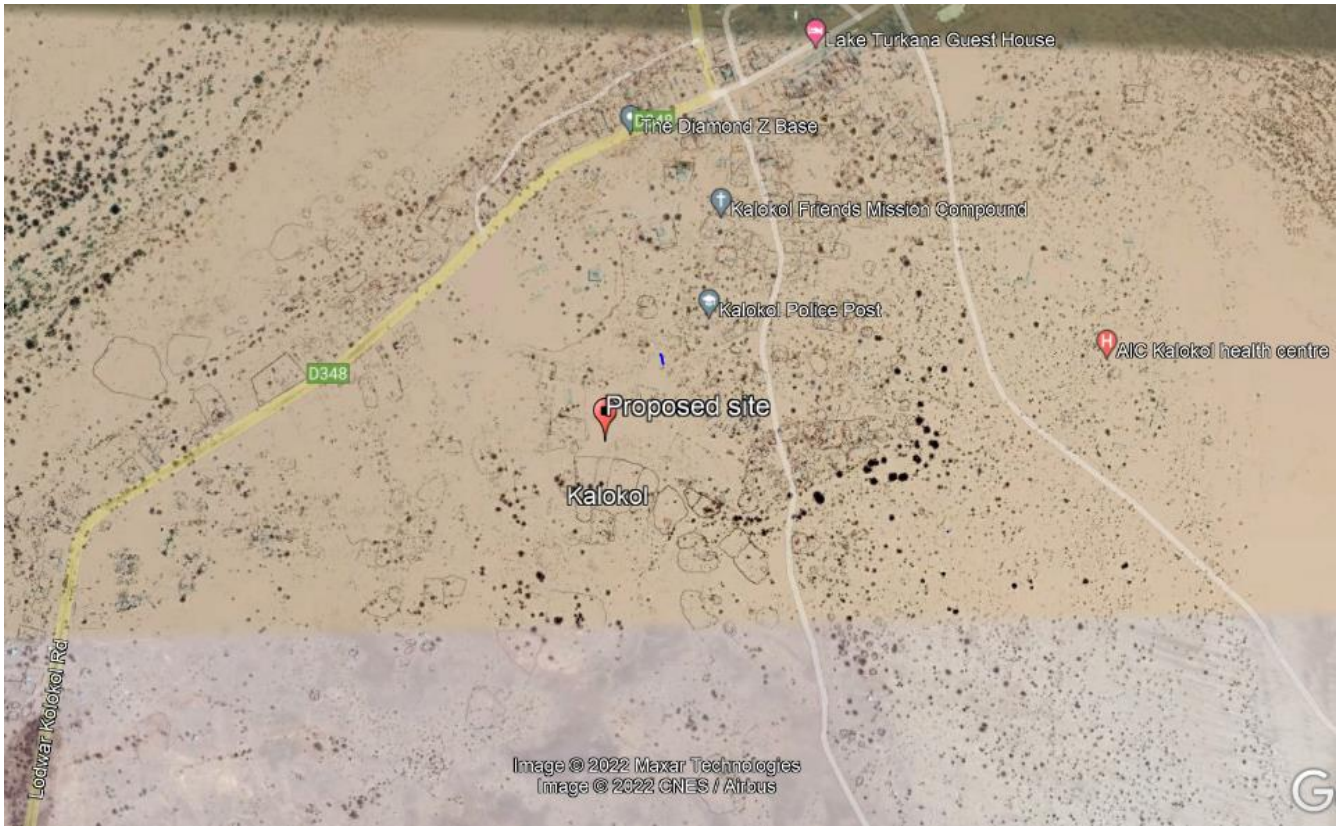

Figure 1: Map showing the exact location of the site

1.3 PURPOSE AND SCOPE OF WORK

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

1.4 ESIA METHODOLOGY

1.4.1 Screening and Scoping

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

1.4.2 Environmental Impact Assessment

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

1.4.2.1.1 Kick-off Meeting

Norken and Centric team had a brief kick-off meeting with the Proponent on 12th July 2021 followed by subsequent online meetings and discussion on various aspects of the project up to

5th August, 2021 and 15th September, 2021. The meetings addressed varied deliverables and thresholds to be achieved and maintained during this assessment in terms of scope of work, deliverables, timeline and the methodology. All communication and meetings were done online. Courtesy call meeting to the county commissioner of Turkana was also done as the team dispersed for field assessment.

Figure 2: Courtesy call to the County Commissioner

1.4.2.1.2 Desk based review and baseline assessment

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

1.4.2.1.3 Project Description

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

1.4.2.1.4 Baseline Condition

This entails description and collection of relevant primary data within the project site's bio-physical, socio-economic and cultural profile with respect to the biodiversity profile, land use types, cultural heritage and practices, social and economic issues likely to be affected, expected project activities to be involved during the design, construction and operation of the proposed facility. The information also includes description of the community social structure, employment and labour market, sources and distribution of income, cultural/religious sites and properties, vulnerable groups and indigenous populations. This also covers description of the sites' physical environment including their topography, land cover, geology, climate and

meteorology, air quality and hydrology. This entailed use of secondary data sources and for some specific environmental parameters the deployment of specialized equipment to measure and record the environmental readings as primary data for analysis and inclusion in the ESIA report. The ecological and biophysical environment will focused on describing the flora and fauna resident in the Turkana county and at the mini-grid site level. This was based on observation of flora and fauna, KPIs on local indigenous knowledge on historical and current status of rare, endemic and endangered plant and animal species known to occur in the project area. Vegetation assessment was done to gain an understanding of the mini-grid sites habitat type. This has provided for an in depth description of existing land use type and their linked socio-economic activities.

1.4.2.1.5 Impact Assessment (IA) Prediction

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

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

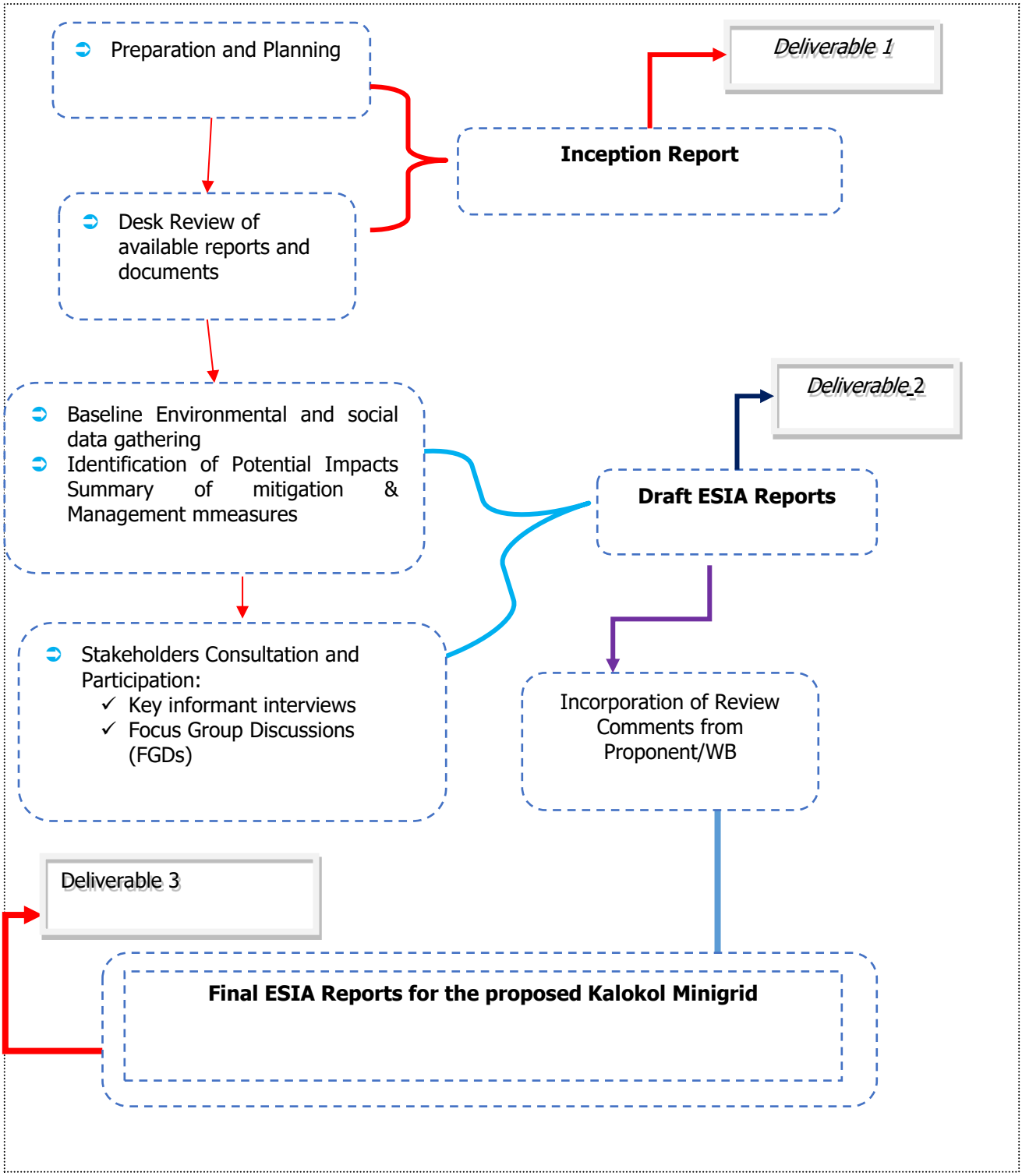

Figure 3: Summary of Environmental and Social Impact Assessment Methodology

1.4.4 Study Team

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

Team 1 – 11/03/2021 -first round of detailed consultations with the community was done during the screening process and it involved disseminating the project information to the community, site identification and screening for the mini-grid and constitution of the GRM and selection of GRM committee.

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

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

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

1.5 LIMITATIONS/UNCERTAINTIES

The limitation experienced during the study are illustrated below.

- ✓ Some data which the consultants sought from the community could not be assertained eg. the number of the VMG's, orphans,rate of HIV infections, number of cases of GBV etc.
- ✓ Limited information on some environmental aspects e.g. acquifers.
- ✓ Due to drought that was being experienced the community member were engaged in looking for water and pasture thus delaying in attending public participation meetings. This was mitigated by starting the meeting early enough
- ✓ The risk of having mechanical failure due to poor roads. This was mitigated by making sure the team uses an off road vehicle adaptive to this terrain.

1.6 LAYOUT OF THE REPORT

Table 4: Structure of the ESIA Report

SECTION	TITLE	DESCRIPTION
Section 1	Introduction	Introduction to the Project and ESIA scope and methodology adopted.
Section 2	Project Description	Technical description of the Project & related infrastructure and activities.
Section 3	Policy,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 Kalokol solar mini grid;

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

S. NO.	PARTICULARS	DESCRIPTION
1.	Project location	The power Mini-grid site is located Kalokol in the Western shore of Lake Turkana, Kalokol division, Turkana Central Sub county, Turkana County. Geographically, the site is located on latitude **3°31'40.7"N** and longitude **35°51'28.6"E**.
2	Land Size/Tenure	The proposed solar mini grid will be located on an approximate 1.048 Ha piece of land. The proposed project site is 300m from Kalokol Police Post, 1.1 km from AIC Kalokol Health Centre and 500m from Lodwar-Kalokol Road The site is on unregistered community Land.
	Approx. population	12000
	Households	1100
	Dominant ethnic group	Turkana
	Other minor ethnic groups	Kalenjin, Somali, Luhya, Luo, Congolese
4.	LV network is proposed at	48 km
6.	MV network	13.82 km
7.	Climatic condition	The site area has a hot, dry climate with temperatures ranging between 20ºC and 41ºC and with a mean of 30.5ºC. Rainfall in the area is bimodal and highly variable. The long rains occur between April and July and the short rains between October and November. Annual rainfall is low, ranging between 52 mm and 480 mm with a mean of 200 mm Rain patterns and distributions are erratic and unreliable. Rain usually comes in brief, violent storms that result in flash floods. The driest periods (akamu) are in January, February and September and the county is highly prone to drought. 80% of the county is categorised as either arid or very arid.
9.	Site Conditions	The density of the vegetation in the site area is scarce and dominated by *Prosopis juliflora.*
10.	Road Accessibility	Murram road- Lodwar-Kalokol Road
11.	Nearest Airport	Kalokol Airstrip 2 KMs from the site
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	South Island National Park

2.2 PROJECT LOCATION

The proposed Mini-grid site will sit on a 1.048 Ha of land. The project site is located in Kalokol in the Western shore of Lake Turkana, Kalokol division, Turkana Central Sub county, Turkana County. Geographically, the site is is located on latitude **3°31'40.7"N** and longitude **35°51'28.6".** The proposed project site is 0.19km from the South Island National Park, 300m from Kalokol Police Post, 1.10 AIC Kalokol Health Centre and 500km Lodwar Katokol Road.
The proposed project site is generally flat; the area is characterised by highly permeable sandy soils.

Figure 4 and Plate 1 below present the location of the proposed project site.

Figure 4: Project Location

Figure 5: Project site picture

2.2.1 Project site setting

The proposed Kalokol mini grid is in Turkana County. It falls under Lot 1 comprised of West Pokot and Turkan Counties. Geographically, Kalokol site falls on coordinates latitude **3°31'40.7"N** and longitude **35°51'28.6".**

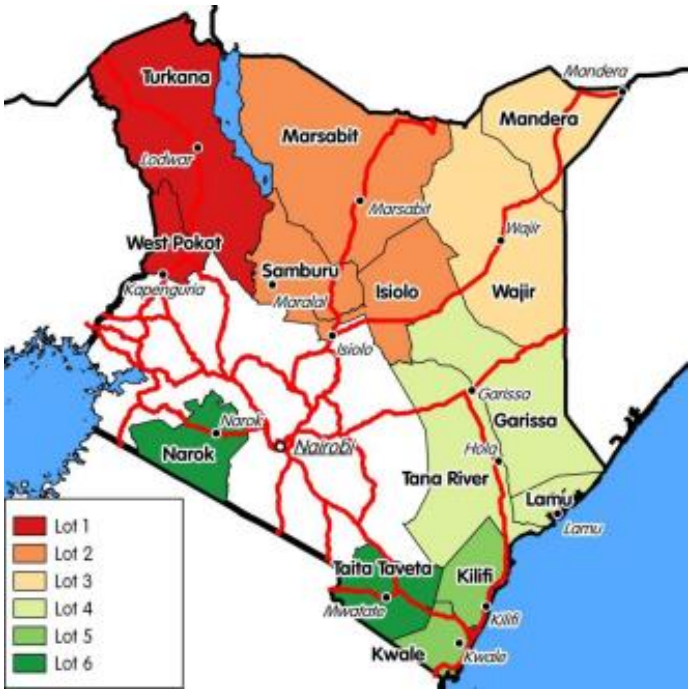

Figure 6: Map Showing the KOSAP Counties Lot 1

2.3 PROJECT DESCRIPTION AND ALTERNARTIVES

2.3.1 Project Components

2.3.1.1 Solar PV modules

The Kalokol Solar Mini Grid Electrification Project is a significant initiative set in the region of Kalokol, on the Western shore of Lake Turkana, within the Kalokol division of Turkana County. This project aims to bring reliable electricity to the local community and facilitate economic development in this off-grid area.

2.3.1.2 Key Components of the Project:

1. **Solar Mini Grid Infrastructure**

Solar Panels: The core of the project, solar panels with a minimum capacity of 450 kWp will capture solar energy. Solar energy is clean, renewable, and abundant in the region, making it a sustainable energy source.

Batteries: A minimum usable battery capacity of 1,125 kWh will store excess solar energy for use during nighttime and periods of low solar irradiation. This ensures a continuous and reliable power supply.

Inverters: The project will include PV inverters with a minimum capacity of 450 kW, as well as a maximum string inverter capacity of 200 kW. These inverters convert DC electricity from the solar panels into AC electricity suitable for consumer use.

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

Distribution Line: A distribution line will be installed to transmit electricity to the consumers, ensuring efficient power distribution throughout the area.

2. **Power Demand and Networks**

Monthly Energy Demand: The proposed monthly energy demand for the project is 42,340 kWh, meeting the needs of the community.

Daily Energy Demand: The project aims to satisfy a daily energy demand of 1,411 kWh, ensuring a consistent power supply.

Peak Demand: The system is designed to accommodate a peak demand of 262 kW, addressing high-demand periods effectively.

Low Voltage (LV) Network: A 48-kilometer LV network will be established to distribute power efficiently to consumers.

Medium Voltage (MV) Network: A 13.82-kilometer MV network will connect the generation sources to the LV network, ensuring reliable and robust power transmission.

Step-Up Transformer: A 325 kVA step-up transformer will be employed to adjust voltage levels as needed to facilitate power transmission.

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

Diesel Gen-Set: To provide backup power during periods of low solar generation or high demand, a diesel generator with a prime rating of 320 kVA will be integrated into the system.

Fuel Tank: A fuel tank with a capacity of 2,000 liters will store diesel fuel for the generator, ensuring uninterrupted power supply during extended cloudy periods or other contingencies.

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

2.3.1.4 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.

2.3.1.5 Distribution lines

Kalokol site will have a distribution line circuit of 48km 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.

2.3.1.6 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.

2.3.1.7 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;

2.3.1.8 Project Cost

Kalokol project cost is estimated at **USD. 1,756,509.39**

2.3.1.9 Land Tenure

Land in Turkana is communally owned; any purchase/lease/rent of land must pass through the local leaders-chiefs, village elders and the community-who must be informed as well authorize the land acquisition process.
The proposed site is on Unregistered Community Land. The project site identified was barren, there wasn't any archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance as well as is not located within the vicinity of recognized cultural heritage sites and the land was communal.

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

2.3.1.10 Compensation Details

Compensation for the land for the proposed project will be in kind. The Land will be acquired compulsorily by NLC.The Proponent will undertake some projects for the community. In Kalokol, the community requested the following projects:

- 1st Priority- Improvement of water supply by drilling more boreholes and doing water reticulation. The second priority request was the improvement of the medical facility.
- 2nd Priority- improvement of the existing medical facility.

2.4 RESOURCE REQUIREMENT

2.4.1 Workforce Requirement

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

2.4.2 Water Requirement and Source

2.4.2.1 Construction Phase

It has been estimated that approximately 50,000 Litres of water will be required per day for civil works during construction stage. Further, water will be required for workers at project site.

However, this quantity of water requirement will vary depending on the mobilisation of construction workers at site. The water for the construction phase will be supplied by local water vendors.

2.4.2.2 Operation Phase

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

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

2.4.3 Raw Material Requirement

2.4.3.1 Construction Phase

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

2.4.3.2 Operation Phase

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

2.4.4 Power Requirement

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

2.4.5 Fire Safety and Security

2.4.5.1 Construction Phase

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

2.4.5.2 Operation Phase

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

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

legislation.

2.4.6 The Implementing Agency (REREC)

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

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

Note: *The Solar Mini-grid will be installed operated and maintained by the contractor for the first seven (7) years and then handed. So, for the seven years REREC will be monitoring the operations of the contractor.*

2.4.7 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.

2.4.8 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.

2.5 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.

2.5.1 Site Selection

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

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

Further details on the other locations identified were not available.

- The project site is 300m from Kalokol Police post
- No settlement present in the project site;
- The project site land is predominantly on Unregistered community land that has been set aside for public facility use.
- The project site has scarce vegetation
- The project site land is on flat terrain and characterized by sandy soils

The proposed project site has the following location advantages:

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

Figure 7: Proposed site and proximity to the consumers

2.5.2 Power Scenario in Kalokol

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

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

The county has a huge potential for renewable energy which can tapped through wind and solar energy and hence be channeled to productive sectors within the county as well as export to other counties. Failure to construct and operate the minigrid in Kalokol 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.

2.5.3 Alternative Sources of Energy

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

The problems in operation of wind power are lack of time series data of wind, trained human resources to intricate design of wind power etc. In addition, providing wind power for Kalokol 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 Kalokol.

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 Kalokol 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.

2.5.4 Zero or No Project Alternative

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

will continue to have no electricity and this will not help in maximizing and utilizing the area facilities. Main facilities that will lose out includes; Kalokol Police Posts, AIC Kalokol Health Centre, Kalokol Mixed primary etc. 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.

2.5.5 Alternate Location for Project Site

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

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

- Load growth - the location of Mini-grid first and foremost is informed by the existing and also load growth of an area. Technical studies show that the area will experience load growth over time and there is need to supply electricity.
- Size – proposed potential sites need to be sufficient for the average size of Solar Mini-grid and associated auxiliary facilities. Therefore, the size acquired must meet the required size. The proposed site is 1.55 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 Kalokol. 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

2.5.6 Analysis of Alternative Construction Materials and Technology

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

2.5.7 Solid waste Management Alternatives

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

regard, a NEMA registered solid waste handler would have to be engaged. This is the most practical and feasible option for solid waste management considering the delineated options.

2.5.8 Conclusion

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

3 BASELINE SETTINGS - ENVIRONMENT, ECOLOGY AND SOCIAL

3.1 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 Kalokol Sub-Location. The socio-economic information presented in this report has drawn from primary socio-economic survey and the Population and housing census 2019, Kenya Bureau of Statistics (KBS).

3.1.1 Project Footprint Area

The site is located at the West shores of Lake Turkana in Kolakol division, Turkana Central sub-county, Turkana County.
The proposed solar mini grid will be located on an approximate 1.048 Ha piece of land. The proposed project site is 300m from Kalokol Police Post, 1.1 km from AIC Kalokol Health Centre and 500m from Lodwar-Kalokol Road.
The proposed project site is generally flat; the area is characterised by highly permeable sandy soils.
The site is on Unregistered community land that was set aside for development projects.

3.2 ENVIRONMENT BASELINE

3.2.1 Land Use

The area is majorly arid with a sparse population within the area. The Land in Kalokol has several uses which are but not limited to construction of houses and economic activities. The major economic activity of the resident community in Kalokol is fishing due to the close proximity to Lake Turkana, Minimal pastoralism few commercial entrepreneurs. The few livestock are usually fed from fields located away from the main Kalokol centre.

The land on project site does not and cannot support growth of pasture hence it is rarely used as feeding ground for cattle. The most common animals that are domesticated include camels, sheep, and goats.

Land in the community is mainly communal and is also used for homesteads and also used for harnessing underground water. The Kalokol Centre near the project site also comprises of residential houses and institutions like schools and clinics.

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

Figure 8: Kalokol centre

3.2.2 Topography

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

The site area is mostly plain lands; the distant mountain ranges lie in the Border areas near River Turkwel. The characteristics of the soil change considerably heading around the Ferguson Gulf, where the ground is mostly sand and doum palms are the most common type of vegetation. The area soils are mainly sandy soils. The area is prone to seasonal flash flooding during the rainy seasons which makes roads impassable especially along seasonal water ways. The terrain at the project site is nearly flat with an approximated slope of 0.001 which would be ideal for the mounting of the solar panels supporting structures.

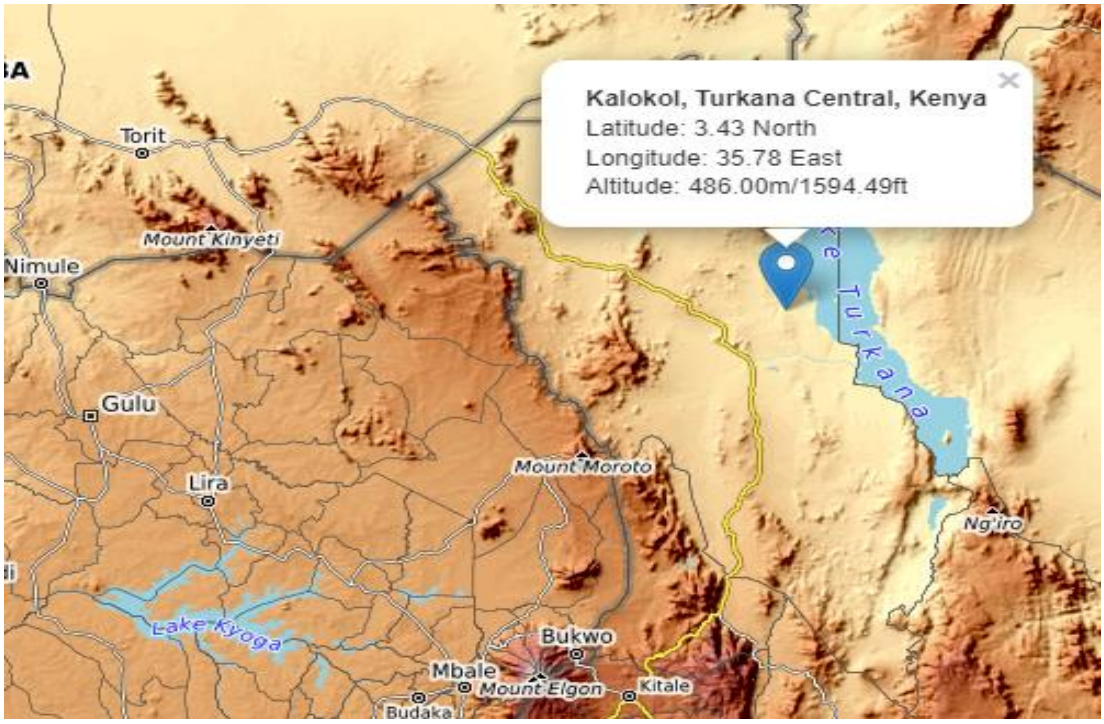

Figure 9: Topography map

3.2.3 Hydrogeology and Drainage

Turkana County is within Africa's Tectonic region in the Great Eastern Rift Valley. It is on altitude of 360 meters while the surrounding basin's elevation varies between 375 and 914 meters. The county has three main inflows: Omo, Turkwel and Kerio rivers. However, there is no outflows with predominant water loss from evaporation. Lake Turkana where the project area lies at the western shores is the only lake with water from two distinct catchment areas of the Nile.
The project area is predominantly arid with most of water resources being underground. In Kolakol there are two sources of water. One of them is surface water from Lake Turkana. This water source is mainly used by the animals while the population depend on the subsurface water from one main drilled borehole.

3.2.4 Ecology

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

The herbaceous tree species include *Aristide adscensionis, Blephanis linafolia, Cenchrus ciliaris, Cyperus rotundus, Cynodon plectostachyus, Echnochloa haploclada, Evolvulus alsinoides, and Launea cornuta.* Main wildlife around the project area include hippos, crocodiles, and tilapia fish in addition to the various fish species in Lake Turkana. There exists various bird species, key among them the flamingos in Lake Turkana and wild birds around the project site.

Figure 10: Floral Representation of the project area

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

With regard to water resources in the project area, the main water sources constitute surface and ground water. There is one major borehole that serves the residents. The water is clean and but not treated, its salty. Kalokol which is located at the western shores of Lake Turkana highly depends on the lake for water.

3.2.6 Ambient Air Quality

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

Table 6: Ambient air quality results

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

Time	

3.2.7 Ambient Noise Quality

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

Table 7: Noise measurement results

Aspect	dB	Time Stamp
Leq		
LS(max)		
LS(min)		
LPeak(max)		

Noise Descriptors used for the survey

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

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

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

dB Decibels

3.2.8 Soil Type

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

3.2.9 Climate and Meteorology

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

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

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

3.3 SOCIO-ECONOMIC ENVIRONMENT

3.3.1 Socio-economic status of Study Area

3.3.1.1 Demographic Profile

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

The area is highly populated at the sea shore areas and the area is characterized by many manyattas. The approximate population in Kalakol is 12000 with an approximate 1100 households present. Kalokol has a gender ration that is currently estimated to be about 40 % male and 60% female.

Figure 11: Housing types near the shore of the lake

Table 8 below presents a summary of demographic profile of Kalokol

Table 8: Summary of the Demographic profile

Attribute	Magnitude/Number
Approx. population	12000
Households	1100
Gender.	Male – 40% Female – 60%
Ave. No. per household	10 per household
Indigenous	Indigenous- 80% Settlers – 20%
Vulnerable classes	• Widows-approximately 70 • Orphans –approximately 300 • Persons Living with Disabilities- Approximately 50 • The elderly (80 years and above)- approximately 150
Dominant ethnic group	Turkana
Primary religion	Christianity
Other groups	Kalenjin, Turkana, Somali, Luhya, Luo, Congolese
Employment (formal/Informal)	Formal – 10% Informal – 85%

3.3.1.2 Educational Infrastructure

Existing schools include Kalokol Mixed Primary school, Kalokol Girls Primary School, Faith Homes, Luchonga Homes(PLWDs) and Nariria Primary School.Kalokol Mixed Primary school has a total of 827 with 14 TSC teachers (6 males and 8 female). Nariria Primary school on the other hand has a total of 585 pupils (301 boys and 284 girls). The school has a total of 7 TSC teachers(1 female and 1 male) The completion rate among the girls in the primary schools is slightly higher than that of the boys(100% to 80%). Kalokol Girls Boarding school has an enrollment of 414 with 8 TSC teachers. It boasts 12 class rooms, 12 boys' toilets and 12 girls' toilets.

The government initiatives that have been in place to support education includes The County Government Feeding Programme and the Mary's Meal where they provide the schools with meals especially for the ECD pupils. The average Teacher to student ratio is 1:59. The average distance pupils and students walk to school is 5Km.

Figure 12: Kalokol Girls Primary School

3.3.1.3 Occupation and Livelihood Profile

Kalokol lies along the western shores of Lake Turkana. Fishing is the main economic activity of the area, despite the populations' pastoral background. As such, the most valuable productive assets are fishing equipment (boats, nets, lines and hooks), whereas the importance of livestock to household income is relatively small. Access to a raft can increase a household's income from the sale of fish two-fold, and access to a boat (by ownership or membership) can double such profits once more.

Fish is sold fresh, dried, salted and smoked depending on the distance to the market. The Kalokol hosts one of the major fishing trading Centers in Turkana Centre. Higher levels of income in the area is derived from the sales of fresh fish, which is transported directly to Nairobi. The area also hosts the Kalokol fish processing factory although it's no longer operational. The Congolese are many in the area specifically for fish business and the fish is also transported to Congo.

Women are less engaged in fishing activities; they collect and sell firewood and charcoal and make baskets and mats from doum palm leaves, which they sell inside and outside the area. The absence of large-scale agriculture and the small herd sizes, mean households must purchase most of their food. The youths are also involved in small businesses and motorbike business

Figure 13: Kalokol Food processing Plant and the Kalokol Fish Market

3.3.1.4 Land Use

Land in Kalokol is mainly communal. The land has several uses which are but not limited to construction of houses, economic activities and subsistence activities. The major economic activity of the resident community in is fishing hence land is minimally utilised for commercial

entrepreneur areas, homesteads and as a source of food for the animals.
The land on project site does not and cannot support growth of pasture hence it is rarely used as feeding ground for cattle. The most common animals that are domesticated include camels, sheep, and goats. Crops in Kalokol are planted in small scale on Kitchen Gardens and the harvest is 100% for persnal household consumption.

3.3.1.5 Social and Physical Infrastructure

Public and private institutions found in the project area include: schools and health facilities. The institutions observed in the area during the field visit include;

- Kalokol Mixed Primary School
- Kalokol Girls Boarding School
- Nariria Primary School

The main health facility in the area is AIC Kalokol Health Centre that operates 24hours and offers MCH, lab and diagnosis, Maternity, outpatient, inpatient and pharmacy. Its located on Coordinates 3.5346426, 35.8687179. The centre currently has 7 clinicians (3males and 4 females) and 20 other staff. The centre is accessible to almost 70% of the population. The rest of the 30% walk to the Diocese of Lodwar St. Marys Dispensary Kalokol and as far Loyangalani dispensary.

The main source of water in the area include a borehole withclean but untreated water and Lake Turkana. Roads connectivity within the area is poor and not regularly maintained and the main access road to the project site is Lodwar-Kolakol road.

Figure 14: Main access road

3.3.1.6 Vulnerable groups

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

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

- Widows-approximately 70
- Orphans –approximately 300
- Persons Living with Disabilities- Approximately 50
- The elderly (80 years and above)- approximately 150

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

3.3.1.7 Gender based vulnerability

During the Female Focus Group Discussion and in-depth interviews, it was reported that the men are the main controllers of resources that include land, assets and equipment's and the women have minimal control of assets. The men have equal opportunities with the women in matters education and the primary school completion rate of girls is higher than boys. The men have to keep livestock and do fishing most of the time together with their boys to support the families. The men have more opportunities in the community and workplaces as compared to women.

The main challenges that women and girls face include; rape cases, GBV and insecurity when fetching firewood. It was noted that the community has rampant male chauvinism and women have minimal opportunities in decision making processes in the area.

In a typical household, the head of the household is the eldest male members, while the decision making authority is the man. In addition to this, men are responsible for ensuring the financial security of the family. Girls have a 100% access to education while its 50% access to women.

3.3.1.8 Gender Based Violence

Gender based violence is one of the issues the women highlighted as being rampant in the area with daily reported cases. The most common types of GBV are intimate and its both physical and sexual. Twedo CBO was the main GBV support centre for GBV victims and it used also to empower women but it stopped working 3 years ago due to lack of funding.

3.3.1.9 Culture and heritage

No cultural site of significance was reported/observed within 10Km project area. The main one is called Naking'ol that is 30 km away and it's a sacred and religious area.

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

3.3.1.10 Religion in the project area

The community members are predominantly Christian with three main churches in the area; Friends Church Kalokol, Diocese of Lodwar Kalokol Catholic Church and Kalokol KAG Church.

Figure 15: Entrance to Kalokol Friends Church

3.3.1.11 HIV/AIDs prevalence

Prevalence rates of sexually transmitted illness especially HIV/AIDS is very high in Kalokol. The Health practitioner at the AIC Kalokol Health Centre confirmed it to be at 40%. This is the case because the area main income generating activity is fishing. High number of unprotected sex is reported in the area especially between fishermen and women that live around the area and do fish selling businesses. In many cases fish is exchanged for sex and the existence of different traders from other regions like the Congolese has led to the high rise.

4 POLICY, LEGAL 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 Kalokol site. Supply of power will be through KPLC and same tariffs will be charged for each category.

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

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

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

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

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

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

4.3 NATIONAL LEGAL FRAMEWORK REVIEW

The applicabe legal framework is illustrated in table 9 below.

Table 9: Policy and Legislative Framework

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

		management and the conservation of natural resources forms an integral part of societal decision-making.	
4.	Environmental and Development Policy (Session Paper No.6 1999)	As a follow-up to the foregoing, the goal of this policy is to harmonize environmental and developmental goals to ensure sustainability. The paper provides comprehensive guidelines and strategies for government action regarding environment and development.	The proponent: • Is undertaking an Environmental Impact Assessment, Social Impact Assessment and Public participation as part of the planning and approval of infrastructural projects. • Will ensure that periodic Environmental Audits are carried out for the project
5.	The Gender and Development Policy (Sessional paper no.2 2019)	The overall goal of this policy is to achieve gender equality by creating a just society where women, men, boys, and girls have equal access to opportunities in the political, economic, cultural, and social spheres of life.	In the absence of appropriate measures, the project can exacerbate gender inequalities and sexual and gender-based violence. In adherence to this policy, measures will be put in place to: • ensure gender inclusivity in decision making, employment opportunity and access to the energy generated from the Mini-Grid • mitigate social risks including sexual and gender-based violence, and any form of discriminations
6.	The HIV/ AIDS Policy 2009	In summary, the policy aims at: i. Establishing and promoting programmes to ensure non-discrimination and non- stigmatization of the infected. 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 rural setting at Kalokol. 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 Legislations			

1.	The Constitution of Kenya, 2010	The Constitution of Kenya promulgated in 2010 is the supreme law of the republic and binds all persons and all State organs at all levels of government. The Constitution provides the broad framework regulating all existence and development aspects of interest to the people of Kenya, and along which all national and sectoral legislative documents are drawn.	The proposed project complies with the Constitution by proposing a structure in its ESIA on how to deal with Social, Health, safety and environmental issues for sustainable development.
2.	Environmental Management and Coordination Act, 1999 (And the Amendments Of 2015)	The EMCA is a framework environmental law in Kenya. This Act (assented to on January 14, 2000) provides a structured approach to environmental management in Kenya. With the EMCA coming into effect, the environmental provisions within the sectoral laws were not superseded; instead, the environmental provisions within those laws were reinforced to better manage Kenya's ailing environment.	The proposed project will be undertaken in accordance with relevant sections of the EMCA, specifically Clauses 58 – 63. These sections of the Act are operationalized by subsidiary legislation promulgated under the Act and specifically Legal Notice (L.N.) 101: Environment (Impact Assessment and Audit) Regulations, 2003.
3.	L.N. 101: EIA/EA Regulations, 2003 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 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	This regulation provides for the sustainable management of water used for various purposes in Kenya. The regulation contains discharge limits for various environmental parameters into public sewers and the environment.	The contractor will be required to properly manage the effluent from construction activities in accordance with the above regulations prior to discharge into the environment.

5.	L.N. 121: Waste Management Regulations, 2006	Generally, it is a requirement under the regulations that a waste generator segregates waste (hazardous and non-hazardous) by type and then disposes them in an environmentally acceptable manner.	Waste to be disposed in accordance with these regulations.
6.	L.N. 61: Noise and Excessive Vibration Control Regulations, 2009	The general prohibition of these regulations states that no person shall make or cause to be made any loud, unreasonable, unnecessary, or unusual noise which annoys, disturbs, injures, or endangers the comfort, repose, health, or safety of others and the environment.	Rules 13 and 14 of the regulations define the permissible noise levels for construction sites. These noise limits will be applicable to the proposed project.
7.	Environmental Management and Coordination, (Conservation of Biological Diversity) (BD) Regulations 2006	These regulations are described in Legal Notice No. 160 of the Kenya Gazette Supplement No. 84, December 2006. These regulations apply to conservation of biodiversity which includes conservation of threatened species, inventory and monitoring of BD and protection of environmentally significant areas, access to genetic resources, benefit sharing and offences and penalties. Additionally, this regulation provides for the local enforcement of the International Convention on Biological Diversity (CBD).	The proposed project will impact biodiversity through clearance of vegetation on the proposed site. This will be done in strict adherence to ESMMP and revegetation of degraded site will be done as spelt out in the ESMMP
8.	Environmental Management and Coordination, (Fossil Fuel Emission Control) Regulations 2006	These regulations are described in Legal Notice No. 131 of the Kenya Gazette Supplement No. 74, October 2006. These regulations include internal combustion engine emission standards, emission inspections, the power of emission inspectors, fuel catalysts, licensing to treat fuel, cost of clearing pollution and partnership to control fossil fuel emissions. The proposed project will generate fuel	This legislation gives caution to proponent on proper handling and management of fuels. The KPLC will adhere to the ESMMP while handling and managing the fuels

		emissions linked to the back-up generator. This will only happen when the sun rays are poor.	
9.	Licenses and Permits Required Under The EMCA	The subsidiary legislations under the EMCA are partially monitored using permits and licenses. Subsequently all licenses and permits required during the construction phase shall be the responsibility of the individual contractors and their agents. During the operational phase, all permits, and licenses required to operate the project will be the responsibility of the proponent.	The following permits to be available for inspection during the construction and operational phases of the project: ✓ EIA License under Environmental Management and Coordination Act, 1999; ✓ Workplace Registration under Occupational Safety and Health Act, 2007; ✓ Construction Permit by the County Government; and ✓ Noise Permit under Legal Notice 61: The Environment Management and Coordination (Noise and Excessive Vibration Control) Regulations, 2009.
10.	Occupational Health and Safety Act, 2007	The Occupational Safety and Health Act (OSHA) was enacted to provide for the health, safety and welfare of persons employed in workplaces, and for matters incidental thereto and connected therewith.	The contractors will be required to fully comply with Legal Notice 40 titled: Building Operations and Works of Engineering Construction Rules, 1984 (BOWEC). Each contractor will develop and implement a formal construction health and safety plan.
11.	L.N. 31: The Safety and Health Committee Rules, 2004	These rules came into effect on April 28, 2004, and require that an Occupier formalize a S&H Committee if there is a minimum of 20 persons employed in the workplace. The size of the S&H Committee will depend on the number of workers employed at the place of work	The contractor will be required to constitute Health and Safety Committee to oversee safety and health at the construction site
12.	L.N. 24: Medical Examination Rules, 2005	These rules provide for Occupiers to mandatorily undertake pre-employment, periodic, and termination medical evaluations of workers whose occupations are stipulated in the Eighth Schedule to the OSHA and the First Schedule to this Rules. Workers that fall under the above two schedules are	The contractor should that the workers exposed to hazards and or accidents undergo requisite medical examinations as required by these rules

		required to undergo medical evaluations by a registered medical health practitioner duly registered by the DOSHS.	
13.	L.N. 25: Noise Prevention and Control Rules, 2005	The rules set the permissible level for occupational noise in any workplace (which includes construction sites) The Proponent is to ensure that • any equipment brought to the site for use shall be designed or have built-in noise reduction devices that do not exceed 90 dB(A). • those employees that may be exposed to continuous noise levels of 85 dB(A) are medically examined as indicated in Regulation 16. If found unfit, the occupational hearing loss to the worker will be compensated as an occupational disease.	The contractor to ensure that equipment is serviced properly and/or use equipment that complies with the threshold noise values provided in the act. Alternatively, each contractor will be required to develop and implement a written hearing conservation programme during the construction phase.
14.	L.N. 59: Fire Risk Reduction Rules, 2007	Several sections of the rules apply to the proposed project as enumerated below. - Regulation 16 requires Proponents to ensure that electrical equipment is installed in accordance with the respective hazardous area classification system. It is also a requirement that all electrical equipment is inspected every six months by a competent person and the Proponent is required to keep records of such inspections. - Regulation 22 provides a description of the functions of a fire-fighting team. - Regulation 23 requires Proponents to mandatorily undertake fire drills at least once a year.	The proponent is expected to comply with the requirements of L.N. 59: Fire Risk Reduction Rules, 2007 by i. Carrying out, and record, a fire risk assessment identifying any possible dangers and risks. ii. Reducing, or where possible remove, the risk of fire and take precautions to deal with the remaining risks. iii. Developing an emergency plan should a fire occur which includes evacuation procedures etc.

		- Regulation 34 requires Proponents to develop and implement a comprehensive written Fire Safety Policy - Regulation 35 requires a Proponent to notify the nearest Occupational S&H area office of a fire incident within 24 hours of its occurrence and a written report sent to the Director of DOSHS within 7 days.	
15.	The Energy Act, 2019	The Energy Act of 2019 deals with all matters relating to all forms of energy including the generation, transmission, distribution, supply and use of electrical energy as well as the legal basis for establishing the systems associated with these purposes. The Act also established the Energy and Petroleum Regulatory Authority (EPRA).	The proponent is in line with the Energy act regulations in the following ways. • The proponent has identified an available site • Alignment of the Mini-Grid Project to County development plans. • The Mini-Grid proponent has the technical and financial capability to conduct the project • The proponent has conducted the necessary engagement with the community.
16.	Water Act, 2016	Part 2 section one of the Act notes that every water resource is vested in and held by the national government in trust for the people of Kenya. Section 143 (1) notes that; A person shall not, without authority conferred under this Act- (a) Willfully obstruct, interfere with, divert or obstruct water from any watercourse or any water resource, or negligently allow any such obstruction, interference, diversion or abstraction; or (b) Throw, convey, cause or permit to be thrown or conveyed, any rubbish, dirt, refuse, effluent, trade waste or other offensive matter or thing into or near	All construction, operation and decommissioning phases will take caution to refrain from polluting any water resource and will endeavour to prevent pollution in line with the ESMMP.

		to any water resource in such manner as to cause, or be likely to cause, pollution of the water resource.	
17.	The Energy (Solar Photovoltaic Systems) Regulations, 2012	These regulations shall apply to a solar PV system manufacturer, importer, vendor, technician, contractor, system owner, a solar PV system installation and consumer devices. The Regulations prohibits any person from designing or installing any solar PV system unless he/she is licensed by EPRA.	The Regulations regulates the design and installation of PV systems. The persons engaged in the designing and installation of the Mini-Grid shall be licensed by EPRA
18.	The Public Health Act (Cap. 242)	The Act prohibits the proponents from engaging in activities that cause environmental nuisance or those that cause danger, discomfort or annoyance to inhabitants or is hazardous to human and environmental health and safety.	✓ The proponent will be in line with the regulations of this act and will ensure suppression of infectious diseases and maintain proper sanitation during all the phases of the project.
19.	The Standards Act Cap 496	The Act is meant to promote the standardization of the specification of commodities, and code of practice; to establish a Kenya Bureau of Standards, to define its functions and provide for its management and control. The KPLC will ensure that commodities and codes of practice utilized in the proposed project adhere to the provisions of this Act.	All materials and spares used to construct the project will comply with the standardized specifications and certification.
20.	Penal Code Act (Cap.63)	Section 191 of the penal code states that if any person or institution that voluntarily corrupts or foils water for public springs or reservoirs, rendering it less fit for its ordinary use is guilty of an offence. Section 192 of the same Act says a person who makes or vitiates the atmosphere in any place to make it noxious to health of persons /institution, dwelling or	The KPLC shall observe the guidelines as set out in the environmental management and monitoring plan laid out in this report as well as the recommendation provided for mitigation/minimization/avoidance of adverse impacts arising from the project activities.

		business premises in the neighbourhood or those passing along public way, commits an offence.	
21.	The Land Act, 2012	An Act of Parliament to give effect to Article 68 of the Constitution, to revise, consolidate and rationalize land laws; to provide for the sustainable administration and management of land and land-based resources, and for connected purposes Forms of Tenure. 5. (1) There shall be the following forms of land tenure- (a) freehold; (b) leasehold; (c) such forms of partial interest as may be defined under this Act and other law, including but not limited to easements; and (d) customary land rights, where consistent with the Constitution. Methods of acquisition of title to land. 7. Title to land may be acquired through— (a) allocation; (b) land adjudication process; (c) compulsory acquisition; (d) prescription; (e) settlement programs; (f) transmissions; (g) transfers; (h) long term leases exceeding twenty-one years created out of private land; or (i) any other manner prescribed in an Act of Parliament. Conversion of land. 9. (1) Any land may be converted from one category to another in accordance with the provisions of this Act or any other written law. (d) Community land may be converted to either private or public land in accordance with the law relating to community land enacted pursuant to Article 63(5) of the Constitution.	Land in Kalokol is community land whose tenure falls under customary land rights. KPLC will observe all the relevant provisions of the Act including conversion from community land to public land as will be deemed appropriate

22.	Community Land Act, 2016	This Act is critical for the proposed project is within community land. Section 6(1) of the Act provides that 'county governments shall hold in trust all unregistered community land on behalf of the communities for which it is held'. Furthermore, Section 6(2) maintains that 'the respective county government shall hold in trust for a community any monies payable as compensation for compulsory acquisition of any unregistered community land'. 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.	The proposed project site falls on unregistered community land. The community has since allocated the land in kind for project use. The establishment of the mini-grid will convert communal land to industrial use for long term. Further, based on community need assessment the proponent will undertake in kind development project to support the community health needs.

		(c) With transparency and accountability; and (d) On the basis of equitable sharing of accruing benefits. The concept of community land has been defined broadly enough to include VMGs. Women, children, old people, and future generations have been thought of as beneficiaries and thus their rights secured in this Act	
23.	Land Registration Act, 2012	Section 27 (2) provides that a transfer without valuable consideration shall have the same effect as a transfer for valuable consideration when registered.	Once the KOSAP PIU finalizes stakeholder engagements in all the identified counties, the transfer process shall be commenced to ensure that the land rights are secured. This gives the project the required land security to allow project implementation, which is in compliance with this legal requirement.
24.	Land value amendment Act 2019	It aims at standardizing the value of land in Kenya for the primary purpose of enhancing efficiency and expediting the compulsory land acquisition process for public projects. It introduces Section 107A into the Land Act, which provides the criteria for the valuation of freehold and community land that is the subject of compulsory acquisition. Community Land, like freehold land, shall be valued based on the criteria outlined in Section 107A and the Land Value Index which will be jointly developed by the national government and county government. Section 5 introduces a list of the forms in which compensation can be made.	Land in Kalokol is community land. The 0.988 Ha allocated by the community for the proposed mini-grid will be acquired for the project. The MOE will pay compensation in kind through implementation of projects in water, education or health sectors. The community prioritized water project (Water reticulation)
25.	The Environment and Land Court Act 2011	This is an Act of Parliament intended to give effect of article 162(2) b of the constitution; to establish a	The project will have a grievance redress mechanism with a committee. The work of the committee will be to receive and

		superior Court to hear and determine disputes relating to the environment and the use and occupation of, and title to, land and to make provision for its Jurisdiction functions and powers, and for connected purposes. The principal objective of this Act is to enable the Court to facilitate the just and expeditious, proportionate and accessible resolution of disputes governed by this Act.	respond to all the grievances raised. As explained in chapter five of this report, an aggrieved party will turn to the legal system after exhausting the GRM levels of resolution set. In the event any disputes on land and environment are not resolved through the project GRM, this court will provide a forum for timely resolution of such grievances.
26.	The Physical and Land Use Planning Act, 2019	This Act of Parliament makes provision for the planning, use, regulation, and development of land and for connected purposes.	The proposed site is not in contravention of any Zoning regulations. The project site is within unregistered community land; necessary county approvals will be sought by the proponent e.g., Project design approval and change of use. The approvals shall be issued by the Physical planner in the department of Lands, Housing and Urban Development – Turkana County.
27.	The Employment Act No 11 of 2007	This Act is important since it provides for employer – employee relationship that is important for the activities that would promote management of the environment within the energy sector.	With the Contractor and the Project Proponent being primary employers during the construction and operational phases of the Project, respectively, they are bound by this law to abide to its stipulations on employee management and relations
28.	The Work Injury Benefit Act, 2007	This is an Act of Parliament to provide for compensation to employees for work related injuries and diseases contracted in the course of their employment	The Proponent and Contractor will maintain an insurance policy cover for its employees, record of accident, carryout proper accident investigations; organize for pre-employment and regular medical examinations for staff.
29.	Air Quality Regulations (2014)	Regulation 3 stipulates that the objective of these Regulations is to provide for the prevention, control, and abatement of air pollution to ensure clean and healthy ambient air.	The Proponent and contractor will implement mitigation during construction to ensure neighbouring properties are not impacted by nuisance dust
30.	The Traffic Act Chapter 295 Laws of Kenya	This Act consolidates the law relating to traffic on all public roads. Key sections include registration and licensing of vehicles; driving licenses; driving and	The project will observe the provisions of the Act including management of traffic of construction vehicles as guided by the ESMMP

		other offences relating to the use of vehicles on roads; regulation of traffic; accidents; offences by drivers other than motor vehicles and other road users. Many types of equipment and materials shall be transported through the roads to the proposed site. Their registration and licensing will be required to follow the stipulated road regulations. The Act also prohibits encroachment on and damage to roads including land reserved for roads.	
31.	National Museums and Heritage Act, 2006	The Act seeks to consolidate the law relating to national museums and heritage; to provide for the establishment, control, management and development of national museums and the identification, protection, conservation and transmission of the cultural and natural heritage of Kenya; to repeal the Antiquities and Monuments Act and the National Museums Act.	During implementation of the project, the Act will be followed in the event of case of chance find of cultural heritage on the proposed site
32.	The Prevention, Protection and Assistance to Internally Displaced Persons and Affected Communities Act, 2012	This an Act of Parliament that provides for the prevention, protection and provision of assistance to internally displaced persons and affected communities and give effect to the Great Lakes Protocol on the Protection and Assistance to Internally Displaced Persons, and the United Nations Guiding Principles on Internal Displacement and for connected purposes.	According to this Act, displacement in projects should be avoided to the extent possible and implementation of KOSAP sub-projects will adhere to this requirement.
33.	County Government Act, 2012	This Act makes provisions for county governments' powers, functions and responsibilities to deliver services and for connected purposes. Part VIII of the	In complying with this requirement, the ESIA team held consultations on the project with the County Government of Turkana namely the Governor, County Executive Committee

		act on Citizen Participation (87) (b) emphasizes on the right of citizens to participate to any development projects prior to their implementation. This Act gives guideline on planning in the County and especially the partnership in development between the National Government and other investors	members for Environment, Energy and Public service and Administration. Additionally, the County government through the CEC Public service administration and the Chiefs office mobilized the communities for the consultation forums
34.	The Sexual Offenses Act 2006	This is a comprehensive law that criminalizes a wide range of behaviours including rape, sexual assault, defilement, compelled or induced indecent acts with child imbeciles or adults, gang rape, child pornography, child trafficking, child sex tourism, child prostitution, exploitation of prostitution, incest by male and female persons, sexual harassment, deliberate transmission of HIV or other life threatening sexually transmitted disease, stupefying with sexual intent, forced sexual acts for cultural or religious reasons among others. The Act also has orders for medical treatment for victims including free HIV prophylaxis, emergency pregnancy pill and counselling. The Act provides stiff penalties in which most of the crimes attract minimum of ten years imprisonment which can be enhanced to life imprisonment.	Implementation of a project creates changes in a community in which it is implemented and is has potential to can cause shifts in power dynamics between community members and within households. For instance, male jealousy is a key driver of Gender Based Violence (GBV) which can be triggered by labour influx on a project when workers are believed to be interacting with community women. Hence, abusive behaviour can occur not only between project-related staff and those living in and around the project site, but also within the homes of those affected by the project.
35.	The Children Act, 2012	Part 2 of the Act denotes the rights of the children and their welfare shall be protected from child labour and armed conflict i.e. Every child shall be protected from economic exploitation and any work that is likely to be hazardous or to interfere with the child's education, or to be harmful to the child's health or	Sensitization to the community on the need to ensure the protection of children has been done and will continue throughout the project cycle. In addition, the contractor will sensitize workers against abuse and exploitation of children.

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

4.3.1 Administrative Framework

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

Table 10. Administrative stakeholders and their roles

Stakeholders	Role
NEC	The **National Environmental Council** is responsible for policy formulation and directions for the purposes of EMCA. The Council also sets national goals and objectives and determines policies and priorities for the protection of the environment. *The proponent should ensure that the project abides by the set goals and objectives of the Council.*

NEMA	The responsibility of NEMA is to exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of Government in the implementation of all policies relating to the environment. *This ESIA has been prepared for submission to NEMA for review and approval prior to the commencement of the Project activities, in compliance to the EMCA.*
PCC	EMCA has also established a Public Complaints Committee, which provides the administrative mechanism for addressing environmental harm. The Committee has the mandate to investigate complaints relating to environmental damage and degradation. The members of the **Public Complaints Committee** include representatives from the Law Society of Kenya, NGOs, and the business community. *The proponent should address all issues arising from the Project in accordance with the above requirements, including a clear policy of stakeholder engagement and feedback.*
WRA	Water Resources Authority is responsible for regulation of water resources issues such as water allocation, source protection and conservation, water quality management and pollution control and international waters. One of its functions among others is to receive water permit applications for water abstraction, water use and recharge and determine issue, vary water permits; and enforce the conditions of those permits as well as formulate and enforce standards, procedures and Regulations for the management and use of water resources and flood mitigation. *The project area experiences serious water scarcity. The proponent will have to purchase water for use during construction.*
The Energy and Petroleum Regulatory Authority (EPRA): established	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 Kalokol site.

4.4 INTERNATIONAL SAFEGUARDS REQUIREMENTS

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

S.No.	Safeguard Policy	Objective	Applicability
1.	Environment Assessment (Operational Policy, OP/BP 4.01)	The objective of this policy is to ensure that Bank-financed projects are environmentally sound and sustainable, and that decision-making is improved through appropriate analysis of actions and of their likely environmental impacts. This policy is considered to be the umbrella policy for the Bank's environmental 'safeguard policies.	The policy is applicable to this project because there are environmental and social concerns associated with the construction and operation of the proposed project. In response, REREC has commissioned and Environmental impact assessment in order to identify and address the potential impacts to a level that is acceptable.
2.	Natural Habitats (Operational Policy, OP/BP 4.04)	This policy recognizes that the conservation of natural habitats is essential to safeguard their unique biodiversity and to maintain environmental services and products for human society and for long-term sustainable development. The Bank therefore supports the protection, management, and restoration of natural habitats in its project financing, as well as policy dialogue and economic and sector work. The Bank supports, and expects borrowers to apply, a precautionary approach to natural resource management to ensure opportunities for environmentally sustainable development. Natural habitats are land and water areas where most of the original native plant and animal species are still present. Natural habitats comprise many types of terrestrial, 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 Kalokol that may not negatively affect diverse flora, fauna, and avifauna. The main flora in the project area is *prosopis juliflora*. 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 adverse effects during the development process are avoided, or if not feasible, ensure that these are minimized, mitigated or compensated; and (iii) ensure that indigenous peoples receive culturally appropriate, gender and inter-generationally inclusive social and economic benefits.	The policy is applicable because the main inhabitants of Kalokol area Turkana. Other minority tribes include; Kalenjin, Turkana, Somali, Luhya, Luo and Congolese. Turkana, Turkana and Somali are classified as a marginalized group in Kenya. The proponent will continue to engage the beneficiaries in a culturally appropriate way and allow for decision making in a free, prior and informed consent manner throughout the phases of the project.

4.	Involuntary Resettlement (Operational Policy, OP/BP 4.12)	The objective of this policy is to (i) avoid or minimize involuntary resettlement where feasible, exploring all viable alternative project designs; (ii) assist displaced persons in improving their former living standards, income earning capacity, and production levels, or at least in restoring them; (iii) encourage community participation in planning and implementing resettlement; and (iv) provide assistance to affected people regardless of the legality of land tenure.	The policy is triggered for the entire project because there is land acquisition for the Mini-grid, Wayleaves, contractor facilities and worker's camps.

5 STAKEHOLDER ENGAGEMENT

This section profiles the key stakeholders of the Kalokol 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

5.1 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. The final ESIA report will be shared with the stakeholders by way of making it available to the target beneficiaries and other interested parties. The ESIA report will be shared through the county headquarters (a copy will be availed) or will be accessible through the CREO office and KPLC website. In addition, a copy of the ESIA should be availed by CREO to the chief's office for access by the local community and other stakeholders. The findings of the ESIA will be shared or disseminated to the target community in a culturally appropriate format such as using local language and through public meetings and focus group discussions. The disclosure will also consider any mobility, disability, and literacy challenges that the affected persons may have.

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

5.2 STAKEHOLDER CHARACTERISATION AND IDENTIFICATION

Stakeholders are classified in the following two categories;

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

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

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

Table 11: Identified stakeholders

Stakeholder Groups	Project-Affected Persons	Interested parties
Community	Local Labourer Project beneficiaries VMG's Local Community	Fishermen Pastoralists
Institutions	Faith Based Organisations Education institutions Community Based organisations	
Government Bodies	County Government District and local administration NEMA	

5.2.1 Stakeholder Mapping

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

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

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 12: Stakeholder Significance and Engagement Requirement

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

5.3 STAKEHOLDER ANALYSIS

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

- **High Influence**: This implies a high degree of influence of the stakeholder on the project in terms of participation and decision making or high priority to engage with the stakeholder;
- **Medium Influence**: Which implies a moderate level of influence and participation of the stakeholder in the project as well as a priority level to engage the stakeholder which is neither highly critical nor are insignificant in terms of influence; and
- **Low Influence**: This implies a low degree of influence of the stakeholder on the project in terms of participation and decision making or low priority to engage that stakeholder.

The intermediary categories of low to medium or medium to high primarily imply that their influence and importance could vary in that particular range subject to context specific conditions or also based on the responses of the project towards the community.

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

Table 13:Summary of Stakeholder Influence

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

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

Project: 11/03/2021
Venue of meeting; at Kalokol market

5.5 MINUTES OF COMMUNITY CONSULTATION MEETING

Minutes of the community consultation meeting held on 11/03/2021 at Kalokol market centre, from 13.27 pm.

AGENDA

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

In attendance (refer to annexed list of participants)

MIN 1.0 WELCOMING AND OPENING

The meeting started at 13.27pm and was opened with a word of prayer by David Emase. In his remarks the Assistant Chief Jamada Stephen Panyako termed the visit by KOSAP team as God's grace to the residents. He told the community to keenly listen to what the visitors had to tell them.

The area Chief Daniel Emuron Namojong said REREC, KPLC and MoE had come to sensitize the community on a proposed electrification propject in the area. He thanked residents particularly Boda Boda operators, business people, youth, women and elders for turning up for the meeting. He said Kalokol was is a very strategic town which serves a big neighbouring population. There were about 10 primary schools, 3 secondary schools, polytechnic, and tens of businesses that could benefit from power connection. Power will also boost food/fish storage and also encourage the establishment of light industries.

The area ward administrator said KOSAP intends to construct a power project in collaboration with the World Bank and one of the requirements was project land.

The MCA proposed that the project be centrally located so that it can capture all public facilities, households and businesses. He proposed that it should be located in vacant land next to the Ward administrator's office.

He then invited the visitors to address the Baraza. The visiting team introduced themselves as follows;

7. Kioko Maithya - Social Safeguards Officer - REREC
8. Irene Kawira - Senior Environmentalist - REREC
9. Caleb Ewoi - CREO - CREO
10. Agnes Gachoki - Senior Surveyor - REREC
11. Lawrence Lorika - Technician - KPLC (lodwar)
12. Myra Mukulu - Technical Advisor Cook Stoves - MOE

2.0 KOSAP AND KALOKOL MINI GRID

Ms Myra Mukulu informed the participants that the proposed project is part the Kenya off Grid Solar Access Project (KOSAP) which is funded by the World Bank and is being implemented by the Ministry of Energy, the Kenya Power and Lighting Company (KPLC) and the Rural Electrification and Renewable Energy Corporation (REREC). MoE will provide overall coordination of the Project including responsibility for safeguards due diligence, and compliance monitoring. REREC will implement the mini grid and will be

responsible for the implementation of Resettlement Framework Plan, Environmental Social Management Framework and Social Assessment. She said the Government is committed to providing electricity to communities that have not been served by the national grid such as Kalokol because it recognises energy as key to advancing development.

She said KOSAP entails the following components;

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

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

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

3.0 PROJECT LAND REQUIREMENTS: RIGHTS AND ENTITLEMENTS OPTIONS AND IMPLICATIONS

The Surveyor, Ms. Agnes Gachoki told the Baraza that the main purpose of the Baraza was to seek community consent for land donation for the project. Land required for the construction of the Mini grid is 2-5 acres. Land in Kalokol, falls under the Community land category. It is yet to be registered, has no title but is jointly owned by the community. Its use and management is governed by the Community Land Act 2016.

She explained the various forms of acquiring interest in land including; allocation, land adjudication process, compulsory acquisition, settlement programs, transfers, donation and long-term leases. The Surveyor informed the meeting that if they opted to consent to donation of the project land following VLD criteria has to be met;

VLD criteria

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

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

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

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

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

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

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

4.0 PROJECT TECHNICAL DESCRIPTION, WIRING, CONNECTION AND PAYMENTS

Mr. Lawrence Lorika from KPLC told the meeting the proposed mini grid will comprise a solar system and a thermal unit (generator). The Mini-grid will have a capacity of 31KVA and PV 104kwp). He said based on an aerial survey done on 2019, Kalokol has a potential customers base of approximately 448 households and 12non-residential users. These customers are mapped for connection. Energy meters will be installed by KPLC staff and the locals living within the required 3 km radius would be connected to power. He said to be connected one will be required to pay a one-off connection fee of kshs.1000 as opposed to other places like Lodwar, Kitale and other big towns whereby they pay kshs.15000 or more.

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

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

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

MIN 5.0 SOCIAL AND ENVIRONMENTAL ISSUES

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

Potential positive impacts:

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

Potential negative impacts:

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

She affirmed that the project beneficiaries were the Yapakunur Clan, a major sub-tribe of the Turkana language group who are Indigenous people and are the only VMG residing near the sub-project area thus the sole project beneficiary. Construction of the mini grid could restrict the access of VMGs to grazing land thus affecting availability of pasture, and consequently their main source of livelihoods, and forcing families to relocate grazing activities elsewhere. Consequently, a VMGP may not be required. The project can include

specific interventions in the final ESMP to ensure the community has access to culturally appropriate benefits. The project will strive to minimize adverse impacts on the indigenous people and ensure that they fully and continuously participate in the consultation process and receive culturally appropriate benefits from construction of the mini grid. The ESIA study would be conducted before the onset of the project and an ESMP developed outlining viable mitigation measures.

Screening would be undertaken to ensure that the project is designed and implemented in an environmentally and socially sustainable manner, taking into account Kenya's relevant sector legislation as well as World Bank Safeguard Policies. This would be undertaken using screening checklists in reference to requirements of the Environmental Management and Coordination Act, 1999 (amended 2019) and KOSAP-Environmental and Social Management Framework (ESMF). The screening process would consider potential impacts of the project and propose viable mitigation measures. She assured the community that temporary or minor impacts which are foreseen during project implementation will be sufficiently mitigated.

6.0 GRIEVANCE RESOLUTION COMMITTEE (GRC)

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

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

Existing indigenous grievance redress mechanism

Conflicts occasionally arise within individuals and families. The Kaaling community like in all other parts of the Turkana society is endowed with elaborate and systematic traditional mechanisms of conflict management. When disputes occur, they are referred elders (*Ng'akasukou*). The elders then summon involved parties and witnesses to the meeting point (*Ekitoe Ng'akasukou*).The elders will listen to the conflicting parties/individuals, weigh adduced evidence and pronounce the verdict accordingly.

Any matter that is not resolved or when the parties are not satisfied they can report to the chief or seek discourse in a court of law.

The summary of the comments/remarks from the community in the meeting held at Kalokol on 11/03/2021
QUESTION/COMMENTS ANSWER/REMARKS

QUESTION/COMMENTS	ANSWER/REMARKS
Michael Lokwakol This is a great project. Some of us will be able to increase our income for working for long hours	Noted
John Esekon **Tumekua tukiuliza stima itafika uku lini. Sasa hii stima wenye wako bali awatafutiwa? We have given you land freely, so what are you giving to the society?**	**Those beyong 3kms radius can use KOSAP home solar systems**
Paul Koriang Don't bring foreign labour, use locals.	Only technical labour will be sourced outside. Locals to do unskilled jobs.
Charles Erot MoE walieka solar kwa shule lakini haifanyi kazi. How long will project take to construct?	REREC is currently undertaking a mantaince programme on solar for schools and other institutions. Completion of minigrid to take less than one year.
Reuben Esibitar Is 1000 registration fee?	No it is connection fee. Its payable once.

5.6 7.0 FOCUS GROUP DISCUSSIONS

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

FGD-MEN

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

Kioko them the FGD was a good avenue for the elders to express their opinions and freely ask any questions they might not have been unable to ask in front of the youth and women, He said that at the end of the FGD discussion the group should come into consensus on issues discussed in the earlier meeting, select a representatives to the GRC. Matters agreed on and selected representatives would then be presented to the main meeting for adoption.

During the meeting the elders agreed to voluntary land donation and selected the following as their representatives in the GRC;

Michael N. Lokwakol	**10986387**	**0790604608**
Joseph E. Ekunoit	13647323	0792977119
David M. Emase	11512716	0710232300

FGD - questions/Answers (MEN)

John Ngatia **Hii stima je, wakati inapoletwa karibu na nyumba, inaweza kubaliana na miti green? Watoto wakishika io miti si watachomeka?**	**KPLC will pass cables away from trees. Trees near cables/poles are regularly pruned.**
Charles Leto Payment of 1000 is for what? If it burns fridge or house what happens? Will grass thatched houses be supplied**?**	It is connection fee You can report and request for compensation. However ensure whoever carries out wiring for you is qualified All houses are eligible for connection
Michael Ekune Does it use normal poles? Some connection cables are loose and children may touch by mistake	No it uses treated poles. Wire is insulated and earthed. Safety education shall also be carried out by contractor
Lukas Ekale Who does wiring? Self or contractor How is token amount determined?	 Self Amount less statutory deductions
Abraham Ekiru If iam connected can I sambazia power to jirani mwenye hana?	Yes so long the two of you have an agreement
Joseph Ekuloit How much do I spent on tokens per month?	Depends on usage. If it is just for lights it will be less than 300 bob

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Question, Suggestions, feedback and responses for Focus group discussion with men

FGD-WOMEN

The women seemed not to have understood the issue. Therefore Myra repeated the introduction of the project and the benefits as well as the need to have voluntary land donation so as to construct KOSAP minigrids. Thereafter the women asked questions.

Name of Person making the contribution (e.g. comment or question)	**Question, Comment, Suggestion**	**Feedback/Responses by project team**
Jacinta Asimit	Will we need to pay for labour for wiring of the house?	Myra responded that yes households will need to pay for wiring of the house. Nevertheless the project will ensure that poles transmitting electricity are brought to the proximity of the house
Mary Eliwan	I am far from the road. Will I still get power?	Myra responded that the power is provided within a 3km radius from the power plant. There is also the option of KOSAP component 2 which provides solar home systems for those who will not be reached by the minigrid.
Malvin Akai	I live in a far village – Nakria. Will I benefit from the power	Myra responded that the power is provided within a 3km radius from the power plant. There is also the option of KOSAP component 2 which provides solar home systems for those who will not be reached by the minigrid.

After the discussions in the FGD for women, Myra requested that they elect 2 women who will be in charge of communicating any grievances to the Ministry of Energy and implementing agencies.
The following were nominated:

Name	ID number	Telephone number
Catherine Loreng'	30777499	0793951779
Jacinta Asimit	3999839	0727903293

FGD - YOUTH

The youth said they had understood the issue of the minigrid, had no more questions and proceeded to nominate the following representatives as a member of the GRC

Name	ID number	Telephone number
Lobwin Haron	36331935	0708037547

8.0 REVIEW OF FEEDBACK FROM FGDS BY ALL COMMUNITY MEMBERS

After the FGDs the participants convened back to the main meeting to review the respective resolutions from the FGDs. During the meeting they expressed their support towards the project saying the benefits to the area shall be enormous. They mentioned the opportunity to light their homes, establish income generating business ventures and employment as some of the major benefits.
They resolved to freely donate land for the project, validated the nominees to the GRC and elected officials to lead the identification of project land and sign the land donation form on their behalf.

The community nominated the following as members of the GRC:

No	Name	Design.	1D No.	Mobile No.
1	Michael N. Lokwakol	Men	10986387	0790604608
2	Joseph E. Ekunoit	Men	13647323	0792977119
3	David M. Emase	Men	11512716	0710232300
4	Catherine Loreng'	Women	30777499	0793951779
5	Jacinta Asimit	Women	3999839	0727903293
6				

5.7 KEY FEEDBACK RECEIVED DURING STAKEHOLDER CONSULTATION PROCESS

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

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

The meeting had 83 males and 19 females. The ESIA team spearheading the process included the following;

NAME	ORGANISATION
Kennedy Shisoka	Ministry of Energy Engineer

Ldyia Komen	EIA Expert-Norken International
Japheth Kipsang Bor	EIA Expert Norken International
Umulkheir Abdi	EIA Expert-Centric Africa Limited

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

No	Concerns/Issues	comments discussed
1.	Project timelines	The consultants informed the community that as soon as the ESIA, project approval will be given and it will give way for project implementation. The contractor will be identified once the project is approved.
2.	Distance to be covered by the project	He was concerned on the distance to be covered by the project. The consultant clarified that power from the site will cover a 3 Km radius hence many residents will be able to benefit.
3.	Grievance redress committee	The community was concerned whether there is a grievance redress committee for the area to represent them during the project implementation The consultants addressed this by stating clearly that they had given the community the opportunity to choose a few individuals to represent the rest and form a grievance redress Committee. One of their main roles was to ensure that the local concerns raised by the community members in regards to the project are promptly addressed by the proponent and contractor.
4.	Mode of payment	Concern on the mode of payment of the solar power and the consumption bills The consultants informed the community that the power will be supplied in prepaid(tokens) and every household will pay according to their consumption rates. The connection fee will be 1000 for each household.
5.	Safety	He was concerned if the community will be taught on all the safety measures to have in place when using electricity The consultants clarified that KPLC will offer training to the community members on how to safely use the electricity. They were urged to take part so as to avoid accidents in future.
6.	Waste disposal Method	She was concerned on the waste disposal methods to be used by the contractor. The consultants clarified that all the vehicles used by the contractor will be well serviced to prevent air and noise pollution. All the workers will be given training towards proactive use of waste bins for waste disposal and the toilets. Any soil potentially contaminated by chemicals, oils, fuels will be collected and disposed of by a NEMA authorized waste handler.

5.7.1 Project benefits

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

1. The electricity that will improve education, business and healthcare
2. Lighting will improve the security scenario at Kalokol
3. The power will aid in water piping and pumping
4. Employment opportunities will increase for both the youth, men and the women due to increase in business opportunities and during the project construction phase.
5. Fishing will improve due to availability of better preservation methods

5.7.2 Community main concerns

Some of the main concerns raised by the community include;

- Safety measures and awareness once the project is implemented.
- The connection fees and the mode of bill payments if it will be affordable
- Poor waste disposal methods by the contractor that will eventually have a negative environmental impact to the community.

5.7.3 Community Requests

- The community requested the following from the project in terms of projects that will impact them if implemented:
  - ✓ 1st Priority- Improvement of water supply by drilling more boreholes and doing water reticulation. The second priority request was the improvement of the medical facility.
  - ✓ 2nd Priority- improvement of the existing medical facility.
  - ✓ 3rd Priority-Provision of electricity power to the local institutions

All the unskilled opportunities should be from Kalokol during the project implementation

Public participation "Baraza" Session

Community members making their comments

5.8 SUMMARY FEEDBACK RECEIVED DURING FOCUSED GROUP DISCUSSION

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

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

The Focus Group Discussions were held with Men, Women and the Youth as indicated in Table 14;

Table 14: FGD dates and attendance

Group	Date	Attendance	Venue
Men	14th January 2022	13	Kalokol Centre
Women	14th January 2022	10	Kalokol Centre
Youth	14th January 2022	12	Kalokol Centre

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

5.8.1.1 Female Stakeholders' Consultation and Participation

The females' participants in the FGD were 10 in number with an age range of 20-67. There were 4 widows in attendance. The following were their responses;

The project perception

The women indicated that they had heard of the project and understand what it entails trough the chiefs baraza. They stated that the project will bring a positive impact to the community through provision of electricity and also enhancement of the local security. The are gladly welcoming the project but request for water piping as a CSR.

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

- ✓ The women undertake fishing, businesses, home chores and selling firewood's.
- ✓ Women and men have equal opportunities in the community.
- ✓ They stated that they have some control on some assets.
- ✓ Women experience the following challenges in the community; rape cases, male chauvinism, GBV and insecurity when fetching Firewood.
- ✓ They receive information mainly from the chief and the village elders.

5.8.1.2 Male Stakeholders' Consultation and Participation

- ✓ The male participants were 13 in number. The male participants are household heads and the ages ranged from 39 to 83 years. The following were the response during the male FGD.

The project perception

- ✓ The men are fully aware of the project since the proponent has undertaken several meetings.
- ✓ The project is long overdue and should be implemented immediately to supply electricity that will aid business, education and health.
- ✓ The GRC Formulated should be engaged continuously
- ✓ All the non-skilled jobs should be given to the locals
- ✓ It should support the locals on a water project. The community does fishing and the project will greatly aid in fish preservation.

Role of Men as per the FGD

- ✓ The men are fishermen and pastoralists
- ✓ They are key in decision making process in the community.
- ✓ Men and women have equal opportunities in education, however the women are more advantaged since men spend most of their time fishing and grazing.
- ✓ In the workplace, men have more opportunities than women.
- ✓ The men have control on land, livestock and other resources. However, they highly consult women.
- ✓ The men feel safe in the area. The youth however engage in cattle theft to pay for motorcycle loans.

- ✓ Main challenges men face include the water problem, high HIV/AIDS due to high fishermen unprotected sex, getting killed by the crocodiles and lack of toilets for fishermen.

Male FGD Session

5.8.1.3 Youth Stakeholders' Consultation and Participation

- ✓ The youth participants were 12 in number. The following opinions were provided by the youth participants during the FGD.

The project perception

- ✓ The youth disclosed that they had heard about the project.
- ✓ They were optimistic that the project will create employment to the local youths, bring electricity, improve business and security in the area.
- ✓ The youths felt that the project should employ a specialist and create more awareness.
- ✓ They wanted to know the cost of connectivity, the project coverage and the hazards associated with the project
- ✓ The youths have 100 groups in the area that' specialize in business, sports, social work and health sensitization

Priorities

- ✓ The main youth's priorities include Health, employment, grants for their business and access to technology.
- ✓ The youths are nearly involved in decision making.
- ✓ Sports programmes are in place to help the youths and they aid in socialization and sensitization on matters education.

6 IMPACT ASSESSMENT AND MITIGATION MEASURES

6.1 INTRODUCTION

This section provides an assessment of potential environmental and social impacts from the proposed Projects as well as the proposed mitigation measures to avoid, reduce, remediate or compensate for potential negative impacts and to enhance positive impacts. A description of the assessment methodology used to assess the significance of potential impacts, taking into account impact magnitude and sensitivity of receptors and resources affected, is provided below. To facilitate the reading of the ESIA, the same heading structure in terms of environmental indicators, receptors or resources affected by the project activities were considered as the ones used in the baseline. All the mitigation measures identified in this chapter have been collated into the Environmental and Social Management and Monitoring Plan ('ESMMP') matrix, including Occupational Health and Safety.

6.2 IMPACT ASSESSMENT METHODOLOGY

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

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

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

6.3 DEFINING IMPACT

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

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

6.4 Assessment of Significance

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

- Status of compliance with relevant Kenyan legislation, policies and plans and any relevant Kenyan or industry policies, standards or guidelines, as well as international best practice standards and guidelines;
- The magnitude (including nature, scale and duration) of the change to the natural or socioeconomic environment (e.g. an increase in coastal erosion, or an increase in employment opportunities),

expressed, wherever practicable, in quantitative terms. The magnitude of all impacts is viewed from the perspective of those affected by considering the likely perceived importance as understood through stakeholder engagement;

- The nature and sensitivity of the impact receptor (physical, biological, or human). Where the receptor is physical, the assessment considers the quality, sensitivity to change and importance of the receptor. For a human receptor, the sensitivity of the household, community or wider societal group is considered along with their ability to adapt to and manage the effects of the impact; and
- The likelihood (probability) that the identified impact will occur. This is estimated based upon experience or evidence that such an outcome has previously occurred.

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

For this assessment, significance has been defined in **Error! Reference source not found.** below based on five levels;

Table 15: ***Categories of Significance***

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

For environmental impacts the significance criteria used in this ESIA is shown in **Error! Reference source not found.**.

Table 16: Overall Significance Criteria for Environmental Impacts

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

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

6.5 MAGNITUDE OF IMPACT

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

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

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

6.6 SENSITIVITY OF RESOURCES AND RECEPTORS

Sensitivities are defined as aspects of the natural or social environment which support and sustain people and nature. Once affected, their disruption could lead to a disturbance of the stability or the integrity of that environment. For ecological impacts, sensitivity can be assigned as low, medium or high based on the conservation importance of habitats and species. For habitats, these are based on naturalness, extent, rarity, fragility, diversity and importance as a community resource.
For socio-economic impacts, the degree of sensitivity of a receptor is defined as 'a stakeholder's (or groups of stakeholders') resilience or capacity to cope with sudden changes or economic shocks. The sensitivity of

a resource is based on its quality and value/importance, for example, by its local, regional, national or international designation, its importance to the local or wider community, or its economic value.

6.7 LIKELIHOOD

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

Table 17: 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)

6.8 DEFINITION OF MITIGATION MEASURES

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

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

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

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

6.9 ASSESSING RESIDUAL IMPACTS

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

in terms of their significance in accordance with the categories identified in **Error! Reference source not found.** and **Error! Reference source not found.** above.
Social, economic and biophysical impacts are inherently and inextricably interconnected. Change in any of these domains will lead to changes in the other domains.

6.10 NEGATIVE IMPACTS – PRE-CONSTRUCTION PHASE

6.10.1 Land Acquisition

The proposed project will entail the acquisition of a 1.048 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 minimal vegetation cover. After implementing the embedded controls, the impact magnitude is assessed to be minor.

6.10.1.1 Source of Impact and Overview of Baseline Conditions

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

6.10.1.2 Embedded/In-built Controls

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

6.10.1.2.1 Significance of Impact

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

6.10.1.3 Additional Mitigation Measures

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

- Providing skills-based training interventions, especially for self-employment to the young and unemployed. This will enhance their employability and create potential for income generation through self-employment;
- Procuring resources from the local sources so as to induce more employment in the supply chain.
- Community compensation in kind. The community identifying projects admissible in Water, Health and Education sector within a radius of 10 km. The community requested for Improvement of water supply by drilling more boreholes and doing water reticulation.
- A-RAPs will be prepared and implemented in sub-project sites on the community land

6.10.2 Acquisition of Way leaves

The project proponent will use existing access roads to set up the power distribution lines and will seek access from beneficiaries and clients in whose property they will undertake electricity connection to the power grid. Supply of electricity will involve passing of low voltage (LV) lines to connect the customers to power.

6.10.2.1 Embedded/In-built Controls

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

6.10.2.1.1 Significance of Impact

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

6.10.2.2 Mitigation measures

- Consultations with the community during construction of the low voltage lines to agree on the mode of compensation of the affected areas
- A-RAPs will be prepared and implemented in sub-project sites on the community land

6.10.3 Impact Related to Stakeholder identification and consultations

This impacts are associated with these risks:

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

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

3. *Risks related to inadequate consultations with all segments of the community and exclusion of VMGs and vulnerable individuals and households in subproject activities and implementation structures*
   Mitigation measures
   - Ensure adequate consultations prior to construction, and throughout the project cycle with all segments of the community and other relevant stakeholders. This should be based on the SEP, using appropriate consultation techniques
   - Ensure all concerns or grievances raised are responded to in a timely manner.

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

   Mitigation measures

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

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

   Mitigation measures

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

6.10.3.1 Embedded/In-built Controls

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

6.10.3.1.1 Significance of Impact

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

6.11 POSITIVE IMPACTS- CONSTRUCTION PHASE

6.11.1 Impact on Employment

The construction of the mini-grid 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.

Thus, anticipated benefits of the Project include Direct employment opportunities mainly during construction of the mini-grids The local community is likely to benefit from the 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; and
- Skill transfer from the contractors to the locals that will be given opportunities during the implementation of the project.

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.

6.11.1.1 Impact Significance

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

6.11.1.2 Enhancement Measures

A significant segment of labour requirement during the construction phase will be sourced locally. While, the significance of the impact on 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; and
- Preference should be provided to the vulnerable population in the Study Area.

6.11.2 Impact on Local Trade

Where possible, construction materials will be sourced locally in order to promote local businesses.
Thus, anticipated benefits of the Project include indirect employment generated by the procurement of goods and services for the Project; induced employment related to jobs ensuing from the expenditure of incomes. The local community is likely to benefit from the economic opportunities to be created from the following:

- 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; and
- 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.

6.11.2.1 Impact Significance

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

6.11.2.2 Enhancement Measures

- Preference should be provided to local sub-contractors or suppliers to pass on maximum economic benefit locally; and
- The project proponent will establish a mechanism to audit sub-contractors and suppliers with respect to compliance of utilizing local labour and resources.

6.12 NEGATIVE IMPACTS – CONSTRUCTION PHASE

6.12.1 Change in Land Use

The study area consists of communal land with patches of open scrubland. The internal distributions lines will be laid by Kenya Power. The land procured for the project site was uncultivated, and undeveloped. During consultation, it was established that the land belongs to the community in Kalokol Location. The community has since allocated the land in kind for project use. The establishment of the mini-grid will convert communal land to industrial use for long term.

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

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

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

6.12.1.1 Embedded/In-built Control

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

6.12.1.2 Significance of Impact

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

6.12.1.3 Additional Mitigation Measures

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

6.12.2 Impact on Topography

The topography of the project site is an open area with gentle slope of about 1.7% and mild undulations. There are no water bodies that pass though directly the proposed project site. Typically, solar power projects do not undertake levelling of topography and since the proposed project, along with the access road, is mostly on a flat terrain the receptor sensitivity has been assessed to be low.

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

6.12.2.1 Embedded/In built Control

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

6.12.2.2 Significance of Impact

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

6.12.2.3 Additional Mitigation Measures

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

6.12.3 Impact on Soil

6.12.3.1 Project Phases and Associated Activities

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

Construction Phase

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

Operation and Maintenance Phase

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

Decommissioning Phase

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

6.12.3.2 Significance of Impacts

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

6.12.3.3 Additional Mitigations

- Vehicles will utilize the existing roads to access the site;
- No unauthorized dumping of used oil and other hazardous waste should be undertaken at site;
- All waste should be stored in a shed that is protected from the elements (wind, rain, storms, etc.) and away from natural drainage channels;
- Solid waste should be Segregated in color coded waste receptacles.
- In case of accidental/unintended spillage on small area, the contaminated soil should be immediately collected and stored as hazardous waste;
- Compacting of loose soil in excavated areas.
- Enclose the construction site and protect the soil to prevent the waste soils and other debris from being washed away by surface runoff and wind.

- All dug up soil that is not needed on-site to be removed promptly and disposed of to appropriate areas.
- Re-use the dug-up soil in backfilling and landscaping.
- Any soil potentially contaminated by chemicals, oils, fuels to be collected and disposed of by a NEMA authorized waste

6.12.4 Impact on Air Quality

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

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

6.12.4.1 Embedded/in-built control

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

6.12.4.2 Significance of Impact

There are few Receptors (settlements) within 500 m of the project site, that include the community borehole and some residential homes, and the impact magnitude will be moderate and sensitivity medium hence the impact significance will be moderate.

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

6.12.4.3 Additional Mitigation Measures

- Spraying water on soil before excavation and periodic access road wetting to reduce nuisance dust levels.
- Visual inspection of dust pollution from roads and the construction site and appropriate intervention if dust levels are high.
- Speed restriction of construction vehicles to a speed of 10-15km/h or less on the site and on the access roads to the site.
- Maintenance and servicing of machines and engines off-site.
- Grievance procedure for dust complaints.
- The use of appropriate Personal Protective Equipment (PPE) such as dust masks, in particular, for construction workers.
- All construction materials will be transported in designated trucks which will be covered.

6.12.5 Impact on Ambient Noise

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

There are some residents within the 500m from the site and will most likely be affected by increasing noise

levels. The receptor sensitivity is therefore considered as medium. Impact magnitude is considered to be minor to medium considering the construction period of the project that will last for not more than 12 months.

6.12.5.1 Assessment Criteria for Impact on Ambient Noise

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

- Construction activities including site preparation, piling work, construction of ancillary facilities;
- Transportation of construction materials, machinery and personnel; and
- Operation of generator sets.

The ambient noise levels have been assessed with respect to Noise Pollution (Regulation and Control) Rules, 2000 and WHO Guidelines.

6.12.5.2 Embedded/in-built control

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

6.12.5.3 Significance of Impact

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

6.12.5.4 Additional Mitigation Measures

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

6.12.6 Visual Intrusions and Changes in Landscape Impact

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

The project area is primarily a rural area and with agriculture 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, the solar panels may have minimal visual impact. However, being visible is not necessarily the same as being intrusive. Aesthetic issues are by their nature highly subjective.

6.12.6.1 Embedded/In-built Control

Proper siting decisions can help to avoid aesthetic impacts to the landscape. The project site is located in open area with minimal settlement around besides the dispensary and residential homes.

6.12.6.2 Significance of Impact

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

6.12.6.3 Additional Mitigation Measures

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

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

6.12.7 Impacts on Waste Generation and Soil Contamination

General construction waste generated onsite will comprise of concrete, steel cuttings/filings, packaging paper or plastic etc. solid wastes consisting of food waste, plastic, glass and waste paper will also be generated by the construction workforce. A small proportion of the waste generated during construction phase will be hazardous and will include waste fuel, grease and waste oil containing rags. Used 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.

6.12.7.1.1 Embedded/in-built control

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

6.12.7.1.2 Significance of Impact

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

6.12.7.1.3 Additional Mitigation Measures

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

6.12.8 Impacts on Water Quality

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

6.12.8.1.1 Significance of Impact

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

6.12.8.1.2 Mitigation Measures

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

- ❖ Clear the necessary areas only.
- ❖ Appropriate remedial measures shall be implemented by the contractor in the event of erosion.
- ❖ Infrastructure shall be designed to ensure that contaminated run-off does not reach watercourses.
- ❖ In the event of an oil spill the procedures contained in the emergency response plan of the contractor will come into effect.
- ❖ No vehicle maintenance and service shall be done at project site but in approved garages or service stations to avoid any possible oil and fuel spills that could contaminate soils and possibly ground water quality.
- ❖ Ensure that potential sources of petro-chemical pollution are handled in such a way to reduce chances of spills and leaks.
- ❖ Construction activities to avoid any unchanneled flow of water at the site
- ❖ Storage areas that contain hazardous substances should be bundled with an approved impermeable liner and provision for a pit to be made in case of oil spill.
- ❖ The excavation and use of rubbish pits during construction should be strictly prohibited.
- ❖ A waste disposal area should be designated within the active construction area and this should be equipped with suitable containers i.e., skips or bins of sufficient capacity and designed to contain and prevent refuse from being blown by wind,

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

6.12.9 Impacts from Hazardous Materials

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

6.12.9.1.1 Significance of Impact

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

6.12.9.1.2 Mitigation Measures

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

6.12.10 Fire Hazards

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

6.12.10.1.1 Significance of Impact

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

6.12.10.1.2 Mitigation Measures

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

- Create awareness to the construction workers on potential fire hazards
- Provision of firefighting equipment (extinguishers) on site during construction.
- No smoking shall be done on construction site
- 'No smoking' signs shall be posted at the construction site
- A fire evacuation plan must be posted in various points of the construction site including procedures to take when a fire is reported.

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

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

6.12.11.1.1 Significance of Impact

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

6.12.11.1.2 Mitigation Measures

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

6.12.12 Energy Consumption

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

6.12.12.1.1 Significance of Impact

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

6.12.12.1.2 Mitigation Measures

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

6.12.13 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 Kalokol village.

6.12.13.1 Embedded/in-built control

- All construction activities will be carried out during daytime hours and vigilance should be maintained for any potential accidents;
- Personal Protective Equipment (PPEs) including safety shoes, helmet, goggles, ear muffs and face

masks;
- Cranes and other lifting equipment are operated by trained and authorised persons;
- Training of the workers on climbing techniques, and rescue of fall-arrested workers; and
- Excavated areas should be temporarily fenced to avoid access to outsiders and animals.

6.12.13.2 Significance of Impacts

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

6.12.13.3 Additional mitigation measures

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

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

6.12.14.1 Embedded/in-built control

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

- The excavated areas will be properly fenced for safety and sign boards in local languages will be put up;
- No hazardous waste or any waste be stored within the site for long periods of time and be in contact with the soil in order to prevent against ground water contamination
- The truck drivers carrying construction machinery and materials will be instructed to drive within speed limits with careful consideration for village traffic;
- Movement of heavy equipment and construction materials will be regulated during peak hours (0900hrs to 0500hrs).

6.12.14.2 Significance of Impact

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

6.12.14.3 Additional Mitigation Measures

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

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

6.12.15 Child labour

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

6.12.15.1 Significance of Impact

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

6.12.15.2 Mitigation measures

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

6.12.16 Impacts on Cultural Heritage

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

6.12.16.1 Significance of Impact

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

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

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

- ✓ A chance find can be reported by any member of the Project. Accordingly, if a chance find is

encountered, the first course of action is to stop work in the vicinity of the find. Then the following steps will be undertaken:

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

6.12.17 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 phases of the project. This may be experienced while the women are searching for jobs and those giving the jobs may ask for sexual favours.

6.12.17.1 Significance of Impact

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

6.12.17.2 Mitigation measures

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

6.12.18 Exclusion of VMGs, Vulnerable Individuals and Households

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

The activities of component 1 envisages upon completion of the MG, that the relevant Implementing Agencies will connect customers from community facilities, enterprises and households to the electricity grid on a commercial basis under a market driven approach. There is a high likelihood that the targeted 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 the people and households considered vulnerable in the community as:

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

6.12.18.1 Significance of Impact

Considering the high sensitivity of the VMGs and the vulnerable individuals and households identified in the project and high magnitude, the impact significance is considered to be major. However, it is important to put into account the project site inhabitants are predominantly the Somali community.

6.12.18.2 Mitigation measures

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

6.12.19 Risk of Communicable Diseases

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

6.12.19.1 Significance of Impact

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

6.12.19.2 Mitigation measures

- The Contractor should develop and implement pre-employment screening measures for workers, which should include communicable diseases. Individuals found to be suffering from these diseases will need to be sensitized on prevention of transmission to others and management of the disease prior to mobilisation to site.
- The Contractor should develop and implement a Communicable Diseases Policy and an information document for all workers directly related to the Project. The document should address factual health issues as well as behaviour change issues around the transmission and infection of diseases.
- The Contractor will make condoms available to employees and communities neighbouring the site office during construction.
- All project personnel should be inducted on a Code of Conduct that gives guidelines on worker-worker interactions, worker-community interactions and development of personal relationships with members of the local communities.
- If workers are found to be in contravention of the Code of Conduct, which they will be required to sign at the commencement of their contract, they will face disciplinary action including dismissal from duty.

- Sensitize all community segments and project workers on Covid 19 and precautionary measures that need to be observed;
- Restrict site access to only Authorised persons; and
- Continuously adhere to the MoH, WHO and World Bank guidelines on Covid-19 management.

6.12.20 Increased Water Demand

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

6.12.20.1 Significance of Impact

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

6.12.20.2 Mitigation Measures

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

6.12.21 Forced Labor

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

6.12.21.1 Significance of Impact

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

6.12.21.2 Mitigation Measures

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

6.13 POSITIVE IMPACTS- OPERATION PHASE

6.13.1 Impact on Economy and Employment

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

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

6.13.1.1 Significance of Impact

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

6.13.1.2 Additional Mitigation Measures

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

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

6.13.2 Quality, Reliable Power Supply

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

6.13.2.1 Significance of Impact

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

6.13.2.2 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

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

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

6.13.3.1 Significance of Impact

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

6.13.3.2 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

6.13.4 Improvement of Local and National Economy

The mini-grid project will ensure supply of a stable power that will reduce damage to the electronics and this will result in promotion of businesses both in the formal and informal sectors. Availability of power will enable businessmen to scale up their businesses while making it is possible to set up businesses such as salons, barber shops, photocopying machines, cyber cafes, welding, refrigeration of drinks among others. This will result in income improvements at the individual level and for the national economy. More

customers will be connected and retail of reliable electricity by the power utility firm will attract increased tax revenues to the government.

6.13.4.1 Significance of Impact

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

6.13.4.2 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

6.13.5 Education

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

6.13.5.1 Significance of Impact

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

6.13.5.2 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

6.13.6 Health Benefits of the Project

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

6.13.6.1 Enhancement Measures

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

6.13.7 Improved Standard of Living

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

6.13.7.1 Enhancement Measures

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

6.13.8 Security

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

6.13.8.1 Enhancement Measures

- KPLC should consider partnering with the county government in providing street lighting to improve security of the area.

6.13.9 Communications

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

6.13.9.1 Enhancement Measures

- Ensure that the power supply is reliable.

6.14 NEGATIVE IMPACTS – OPERATION PHASE

6.14.1 Impact on Soil

6.14.1.1 Soil compaction and Erosion

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

6.14.1.1.1 Embedded/in-built control

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

6.14.1.1.2 Significance of Impact

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

6.14.1.1.3 Additional Mitigation Measures

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

6.14.2 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 too small.

6.14.2.1 Embedded/in-built control

The waste generated will be disposed of through approved NEMA waste handlers.

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

6.14.2.1.1 Additional Mitigation measures

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

6.14.2.2 Significance of Impact

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

6.14.2.3 Additional Mitigation Measures

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

6.14.3 Impact on Water Quality and Scarcity

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

generation process.

Discussions with the residents in Kalokol confirmed that water is a major concern in the area. As noted earlier, the local community rely on ground water sources; borehole, with no feasible alternative. Therefore, the receptor (water resource) sensitive is assessed as high.

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

6.14.3.1 Embedded/in-built control

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

6.14.3.2 Significance of Impact

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

6.14.3.3 Additional Mitigation Measures

- 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;
- Workers to be sensitised about water conservation and encouraged use of water optimally;
- Recycling/reusing water to the extent possible.
- There is need to source for a sustainable water source for use
- Install water-conserving automatic taps
- Encourage water harvesting from rooftops and storage for cleaning purposes (washing the panels off dust)
- Any water leaks through damaged pipes and faulty taps should be fixed promptly.

6.14.4 Landscape and Visual Impacts

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

6.14.4.1 Significance of Impacts

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

6.14.4.2 Suggested mitigation measures

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

- Signage related to the mini-grid must be discrete and confined to entrance gates.

- The footprint of the operations and maintenance facilities, as well as parking and vehicular circulation, should be clearly defined, and not be allowed to spill over into other areas of the site;
- Construction of fencing or compound wall around the project boundary;
- Landscaping area around the site with the participation of the local community.

6.14.5 Increased oil Consumption

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

6.14.5.1 Significance of Impact

The impact will be of minor significance.

6.14.5.2 Mitigation Measures

To ensure efficient energy consumption during the operation phase of the project, the contractor to install an energy-efficient lighting system at the project site facilities. This will contribute immensely to energy saving during the operational phase of the project. In addition, the plant operators will be sensitized to ensure energy efficiently in their daily operations.

6.14.6 Increased Storm Water Flow

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

6.14.6.1 Significance of Impact

The impact will be of minor significance.

6.14.6.2 Mitigation Measures

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

6.14.7 Fire Outbreaks

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

6.14.7.1 Significance of Impact

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

6.14.7.2 Mitigation Measures

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

6.14.8 Sanitation

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

6.14.8.1 Significance of Impact

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

6.14.8.2 Mitigation Measures

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

6.14.9 Flooding

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

6.14.9.1 Significance of Impact

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

6.14.9.2 Mitigation measures

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

6.14.10 Noise and Vibration

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

6.14.10.1 Mitigation Measures

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

6.14.11 Electric and magnetic fields (EMFs)

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

6.14.12 Dust emissions

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

6.14.12.1 Mitigation Measures

- Trees can be planted around the plant/facility provided they do not cast shadows to the solar panels to act as wind breakers and hence decrease dust pollution
- Ensure planting of grass around and within the facility compound

6.14.13 Vehicle exhaust emissions

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

6.14.13.1 Significance of Impact

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

6.14.13.2 Mitigation Measures

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

6.14.14 Collision and Electrical hazards from Distribution Infrastructure

A number of birds' species were identified during the impact assessment. These include Speckled Pigeon, Purple-crested Turaco, Common Swift, Black-headed Heron, Speckled Mousebird, European Roller, Cardinal Woodpecker, Black-crowned Tchagra, Red-backed Shrike, Hunter's Sunbird among others.
The distribution lines and poles can potentially constitute an electrocution and collision hazard to birds. Some birds also utilize the distribution towers for nesting.

6.14.14.1 Embedded/ in-built Control

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

6.14.14.2 Significance of Impacts

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

6.14.14.3 Additional Mitigation Measures

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

- Design of distribution towers 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.

6.14.15 Impact on Occupational Safety and Health

During the operation phase, maintenance and repair will be done on the site. Therefore, there will be potential impacts on workers' health and safety due to exposure to risks through such activities that lead to accidents causing injuries and death. The most probable risks cause of accidental death and injury are:

- Safety risks such as: tripping; falling due to working at heights; potential fire due to hot work, smoking, failure in electrical installations; electric shocks.
- Health risks: Injuries such as: lifting, lowering, pushing, pulling and carrying; heat stress and working during high temperatures
- Safety risk due to working at heights during installation of power lines
- Exposure of workers to electro-magnetic field (EMF) during operation and maintenance of the mini-grids

6.14.15.1 Embedded/in-built control

- All maintenance activities will be carried out during daytime hours and vigilance should be maintained for any potential accidents;
- Personal Protective Equipment (PPEs) including safety shoes, helmet, goggles, ear muffs and face

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

6.14.15.2 Significance of Impacts

Because the maintenance activities will be conducted less frequently, the impact magnitude on occupational Safety and Health will be low. Considering that the accidents may result in injuries and death, the sensitivity is considered to be High. Therefore, the significance is Moderate.

6.14.15.3 Additional mitigation measures

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

6.14.16 Impact on Community Safety and Health

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

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

6.14.16.1 Embedded/in-built control

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

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

6.14.16.2 Significance of Impact

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

6.14.16.3 Additional Mitigation Measures

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

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

6.14.17 Gender Based Violence, SEA & SH

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

6.14.17.1 Significance of Impact

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

6.14.17.2 Mitigation measures

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

6.14.18 Exclusion of VMGs, Vulnerable Individuals and Households

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

There is a high likelihood that the targeted 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.

6.14.18.1 Significance of Impact

Considering the high sensitivity of the VMGs identified in the project and high magnitude, the impact significance is considered to be major. However, it is important to put into account the project site inhabitants are predominantly the Somali community.

6.14.18.2 Mitigation measures

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

6.14.19 Risk of Communicable Diseases

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

6.14.19.1 Significance of Impact

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

6.14.19.2 Mitigation measures

- The Contractor should develop and implement pre-employment screening measures for workers, which should include communicable diseases. Individuals found to be suffering from these diseases will need to be sensitized on prevention of transmission to others and management of the disease prior to mobilisation to site.
- The Contractor should develop and implement a Communicable Diseases Policy and an information document for all workers directly related to the Project. The document should address factual health issues as well as behaviour change issues around the transmission and infection of diseases.
- The Contractor will make condoms available to employees
- All project personnel should be inducted on a Code of Conduct that gives guidelines on worker-worker interactions, worker-community interactions and development of personal relationships with members of the local communities.
- If workers are found to be in contravention of the Code of Conduct, which they will be required to sign at the commencement of their contract, they will face disciplinary action including dismissal from duty.
- Sensitize all community segments and project workers on Covid 19 and precautionary measures that need to be observed;
- Restrict site access to only Authorised persons; and
- Continuously adhere to the MoH, WHO and World Bank guidelines on Covid-19 management.

6.14.20 Shocks and electrocutions to the beneficiaries

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

6.14.20.1 Significance of Impact

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

6.14.20.2 Mitigation Measures

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

- Inspect the wiring of the houses before connecting power
- Safety awareness campaigns to the community before connection of power on safety precautions such as
    - Require community to engage a certified technician to do wiring in the premises
    - Use of quality materials while wiring
    - Refraining from individual illegal extensions of power lines to other houses
    - Observing safety measures while using electricity such as not touching sockets and switches with wet hands or wiping with wet cloths
    - Keeping off all electricity infrastructure e.g., not tying livestock on electric poles, no cutting earth wires that run along some electric poles, not interfering with sockets or switches
    - Reporting any electric wire/conductors if found fallen on the ground
    - Report any incident regarding electricity at the local office –staff in charge of operating the Mini-grid

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

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

6.14.21.1 Significance of Impact

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

6.14.21.2 Mitigation Measures

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

6.15 DECOMMISSIONING PHASE

6.15.1 Preparation for decommissioning

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

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

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

6.15.2 Employment Opportunities

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

6.15.2.1 Significance of Impact

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

6.15.2.2 Enhancement Measures

- Notify the GRC, Local leadership, the County Government reps of the specific jobs and the skills required for the work
- Prioritize the employment of unskilled labour from the local communities.
- Prioritize the procurement of goods and services from within Turkana County.
- Develop and implement a fair and transparent employment and procurement policy.
- Advertise all jobs and tenders. (The jobs can be advised through local administrative offices, GRC meetings)
- Ensure gender mainstreaming during employment
- The contractor shall inform the workers and local community about the duration of work; and
- Reduction of worker will be done phase wise and corresponding to completion of each activity.

6.15.3 Site Rehabilitation

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

6.16 NEGATIVE IMPACTS – DECOMMISSIONING PHASE

6.16.1 Impact on Soil

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

6.16.1.1 Significance of Impacts

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

6.16.1.2 Additional Mitigations

- Vehicles will utilize the existing roads to access the site;
- No unauthorized dumping of used oil and other hazardous waste should be undertaken at site;

- All waste should be stored in a shed that is protected from the elements (wind, rain, storms, etc.) and away from natural drainage channels;
- Solid waste should be Segregated in color coded waste receptacles.
- In case of accidental/unintended spillage on small area, the contaminated soil should be immediately collected and stored as hazardous waste;
- Compacting of loose soil in excavated areas.
- Enclose the demolition site and protect the soil to prevent the waste soils and other debris from being washed away by surface runoff and wind.
- Any soil potentially contaminated by chemicals, oils, fuels to be collected and disposed of by a NEMA authorized waste handler

6.16.2 Impact on Air Quality

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

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

6.16.2.1 Embedded/in-built control

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

6.16.2.2 Significance of Impact

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

6.16.2.3 Additional Mitigation Measures

- Periodic access road wetting to reduce nuisance dust levels.
- Visual inspection of dust pollution from roads and the demolition site and appropriate intervention if dust levels are high.
- Speed restriction of the vehicles to a speed of 10-15km/h or less on the site and on the access roads to the site.
- Maintenance and servicing of machines and engines off-site.
- Grievance procedure for dust complaints.
- The use of appropriate Personal Protective Equipment (PPE) such as dust masks, in particular, for the site workers.
- All demolition wastes will be transported in designated trucks which will be covered.

6.16.3 Impact on Ambient Noise

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

6.16.3.1 Assessment Criteria for Impact on Ambient Noise

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

- Demolition activities;

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

6.16.3.2 Embedded/in-built control

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

6.16.3.3 Significance of Impact

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

6.16.3.4 Additional Mitigation Measures

- Only well-maintained equipment should be operated on-site;
- If it is noticed that any particular equipment is generating too much noise then lubricating moving parts, tightening loose parts and replacing worn out components should be carried out to bring down the noise and placing such machinery far away from the households as possible;
- Machinery and equipment that may be in intermittent use should be shut down or throttled down during non-work periods; and
- Minimal use of vehicle horns and heavy engine breaking in the area needs to be encouraged.
- The machineries should be maintained regularly to reduce noise resulting from friction;
- Normal working hours of the contractor to be defined (preferable 8 am to 5pm). If work needs to be undertaken outside these hours, it should be limited to activities which do not generate noise;
- Sensitize the truck drivers to switch off vehicle engines while loading materials.

6.16.4 Impacts on Waste Generation and Soil Contamination

General demolition waste generated onsite will comprise of concrete, steel cuttings/filings, packaging paper or plastic etc. solid wastes consisting of food waste, plastic, glass and waste paper will also be generated by the workforce. A small proportion of the waste generated during construction phase will be hazardous and will include waste fuel, grease and waste oil containing rags. Therefore, the receptor sensitivity has been assessed as medium.

6.16.4.1.1 Embedded/in-built control

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

6.16.4.1.2 Significance of Impact

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

6.16.4.1.3 Additional Mitigation Measures

- Contractor should ensure that no unauthorized dumping of used oil and other hazardous waste is undertaken at the site;
- Demolition Waste should be stored separately and be periodically collected by an authorized treatment and storage facility;
- All waste should be stored in a shed that is protected from the elements (wind, rain, storms, etc.) and away from natural drainage channels;
- A log book should be maintained for quantity and type of hazardous waste generated; and

- In case of accidental/unintended spillage, the contaminated soil should be immediately collected and stored as hazardous waste.

6.16.5 Impact on Economy and Employment

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

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

6.16.5.1 Significance of Impact

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

6.16.5.2 Additional Mitigation Measures

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

- Notify the GRC, Local leadership, the County Government reps of the specific jobs and the skills required for the Project
- Prioritize the employment of unskilled labour from the local communities.
- Prioritize the procurement of goods and services from within Turkana County.
- Develop and implement a fair and transparent employment and procurement policy.
- Advertise all jobs and tenders. (The jobs can be advised through local administrative offices, GRC meetings)
- Ensure gender mainstreaming during employment
- The contractor shall inform the workers and local community about the duration of work; and
- Reduction of worker will be done phase wise and corresponding to completion of each activity.

6.16.6 Impact on Occupational Health and Safety

There will be potential impacts on workers' health and safety due to exposure to risks through demolition activities that lead to accidents causing injuries and death. The most probable risks cause of accidental death and injury are:

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

6.16.6.1 Embedded/in-built control

- All demolition activities will be carried out during daytime hours and vigilance should be maintained for any potential accidents;
- Personal Protective Equipment (PPEs) including safety shoes, helmet, goggles, ear muffs and face masks;

6.16.6.2 Significance of Impacts

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

6.16.6.3 Additional mitigation measures

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

6.16.7 Gender Based Violence, SEA & SH

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

6.16.7.1 Significance of Impact

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

6.16.7.2 Mitigation measures

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

6.16.8 Exclusion of VMGs, Vulnerable Individuals and Households

A significant risk associated with this project is the potential for the exclusion of Vulnerable and Marginalized Groups (VMGs), vulnerable individuals and households including the elderly, PLWDs, widows, widowers, orphan-led households, minority clans/sub-clans from participating and or benefiting from the mini-grids

project. VMGs participation and inclusion could be disadvantaged based on social identity, which may be across dimensions of gender, age, location, occupation, race, ethnicity, disability, sexual orientation and religion. There is potential risk of lack of intentional actions by the mini-grids contractor(s) and implementing agencies for the inclusion of VMGs in the project activities and benefits. This potentially leads to the exclusion of VMGS from the benefits and opportunities during the decommissioning phase.

6.16.8.1 Significance of Impact

Considering the high sensitivity of the VMGs identified in the project and high magnitude, the impact significance is considered to be major. However, it is important to put into account the project site inhabitants are predominantly the Somali community.

6.16.8.2 Mitigation measures

- Participation will be through meetings with the different groups of the vulnerable people identified primarily to ensure that;
  - The VMGs are Aware of any restrictions and negative impacts
  - Provide support to VMG participation arrangements in the project
- Commit to open and transparent communication and engagement from the beginning and have a considered approach in place
- Ensure that all representatives of the contractor and Proponent staff carrying out the specific sub project investment including third party subcontractors and agents are well briefed on local customs, history and legal status, and understand the need for cultural sensitivity
- Monitor performance in engagement
- Enlist the services of reputable advisers with good local knowledge
- Implement the existing grievance redress mechanism

6.16.9 Risk of Communicable Diseases

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

6.16.9.1 Significance of Impact

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

6.16.9.2 Mitigation measures

- The Contractor should develop and implement pre-employment screening measures for workers, which should include communicable diseases. Individuals found to be suffering from these diseases will need to be sensitized on prevention of transmission to others and management of the disease prior to mobilisation to site.
- The Contractor should develop and implement a Communicable Diseases Policy and an information document for all workers directly related to the Project. The document should address factual health issues as well as behaviour change issues around the transmission and infection of diseases.
- The Contractor will make condoms available to employees and communities neighbouring the site during decommissioning.
- All project personnel should be inducted on a Code of Conduct that gives guidelines on worker-worker interactions, worker-community interactions and development of personal relationships with members

of the local communities.

- If workers are found to be in contravention of the Code of Conduct, which they will be required to sign at the commencement of their contract, they will face disciplinary action including dismissal from duty.
- Sensitize all community segments and project workers on Covid 19 and precautionary measures that need to be observed;
- Restrict site access to only Authorised persons; and
- Continuously adhere to the MoH, WHO and World Bank guidelines on Covid-19 management.

6.16.10 Child labour

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

6.16.10.1 Significance of Impact

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

6.16.10.2 Mitigation measures

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

6.16.11 Forced Labor

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

6.16.11.1 Significance of Impact

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

6.16.11.2 Mitigation Measures

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

6.17 CUMULATIVE IMPACTS

6.17.1 Cumulative Impact Assessment

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

7 ENVIRONMENTAL AND SOCIAL MITIGATION AND MANAGEMENT PLAN (ESMMP) FOR THE PROPOSED PROJECT

7.1 INTRODUCTION

ESMMP for developing projects is used to provide a logical framework within which identified negative environmental impacts can be avoided, mitigated and monitored. 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 ESMMP is a vital output of an Environmental and Social Impact Assessment as it provides a checklist for project monitoring and evaluation. The ESMMP outlined below will address the identified potential negative impacts and mitigation measures of the project.

By design, the project's potential positive impacts can be easily optimized, while the majority of the project's negative environmental and social impacts are mostly limited to the planning and construction phases, with the negative impacts experienced during the project's operation phase mitigated by continuous system maintenance. These are classified as negligible, minor to moderate, reversible and short-term, and manageable through well-defined mitigation and monitoring strategies.

7.2 POSSIBLE ENHANCEMENT MEASURES

The following are some examples of potentially positive impact enhancement measures:

- Construction should follow best design practices that make efficient and cost-effective use of locally available resources such as materials, expertise, and labor;
- The project should be run in accordance with the operations and maintenance specifications produced in conjunction with the design;
- Ascertain that the project under GRM will provide for the underprivileged and other vulnerable groups in the project area;
- Ensure that social services provide instruction on acceptable hygienic conditions, taking gender-specific duties and responsibilities into account.

7.3 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

The potential negative impacts from the proposed project as well as their mitigation measures have been discussed in Chapter 8 of the ESIA Report. This chapter highlights the various mitigation measures, the party responsible for implementing it and the costs, this data makes up the Environmental and Social Management Plan (ESMP) which is presented in table below.

The costs of the proposed mitigation measures some of which will have already been included in the main engineering Bills of Quantities and therefore need not be included in the Environmental and social mitigation costs, should be included in the Bill of Quantities as the Environmental and Social Mitigation Costs.

7.3.1 Pre-Construction, Construction, Operational and Decommissioning Phases

The following are the necessary objectives, activities, mitigation measures, cost and responsibility allocations for the prevention, minimization, and monitoring of significant negative impacts and maximization of positive impacts related with the project's construction phase.

Table 18: Environmental and Social Management Plan

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
Social Impacts						
Local employment	-Prioritize hire of locals for all unskilled labour. -Implement a local recruitment plan that is fair and transparent (including recruitment processes that ensure inclusivity of both men and women, vulnerable individuals, minority clans, ethnic groups and VMGs. -Adhere to labour laws, and labour management practices (timely renumeration, equitable compensation for both genders for equal work etc.) -Create awareness to workers and the community on worker and project grievance redress mechanisms.	Construction Operations Decommissioning	Proponent, 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		-Number and types of businesses sourced from, businesses owned and operated by vulnerable individuals, types and quantities of materials etc.	Quarterly	No additional cost

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

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

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	workers if the need for such resources may result to competition e.g., water. -Establish and operationalize an effective Grievance Redress Mechanism accessible to community members. -The contractor and the project/community grievance redress committee to work closely address complains raised on time. -Include gender considerations in employment opportunities. -Provide appropriate compensation for work done. -Respect for community values/culture. -Prompt payment of workers as per the contractual agreements/terms.					
Child labor	-Employ workers who are 18 years and above, and with a valid national ID at the time of hire. -Implement and monitor the employment register regularly. Compliance with the national labor laws and labour management practices.	Construction Decomissioning	Proponent, 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)
	-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 Decomissioning	Proponent, construction, O&M Contractor	-Minutes of awareness creation sessions for the community and workers on GBV-SEA/SH. -Code of conduct signed by all those with physical presence on site. -GRM that ensures confidentiality of GBV cases in place. Documented referral services for survivors. -Grievances raised, aggrieved persons and status on resolution etc	Quarterly	50,000.00
Forced Labor	-Adhere to the Employment Act which outlaws any form of forced labor. -Report any form of forced labor at the site.	Construction Decomissioning	Proponent, construction, O&M Contractor	-Number of reported cases of forced labor.	Quarterly	20,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	-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	Proponent, construction, O&M Contractor	-Availabiliy of and implementation of the Stakeholder Engagement Plan. -# of stakeholder consultations held -Record of stakeholder consultations held (minutes of meetings and list of participants). -Information disclosed, to whom it was disclosed (men women, PWD, youth, vulnerable individuals and households etc., methods and languages used in the disclosure (culturally appropriate and accessible), grievances raised and status on resolution etc.	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	Pre-construction Construction Operations Decommissioning	Proponent, 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)
	fully resolved in a timely manner. • Access to culturally appropriate project benefits and opportunities.					
Inaccessibility of project benefits to VMGs and other vulnerable individuals due to affordability challenges	-Consult VMGs and Vulnerable individuals and households on charges for sub project services, and put in place specific interventions to ensure the vulnerable equally access project benefits.	Operations	Proponent, 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.	Construction Operations Decommissioning	Proponent, construction, O&M Contractor	-Local Grievances Committee in place, composition of committee, awareness of community and workers on project and worker GRMs,	Quarterly	No additional cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	-Awareness on the culturally appropriate and accessible GRM to all community segments including VMGs, vulnerable individuals and households and CSOs -All reported grievances are logged, dated, processed, resolved and closed out in a timely manner. -Proportionate representation of VMGs and vulnerable individuals in the local grievances committee. -GRM provides for confidential reporting of particularly sensitive social aspects such as GBV, as well as anonymity.			updated GRM logs, types of grievances -Availability of grievance redress process -Number of grievances reported -Number of grievances resolved in a timely manner -Number of grievances escalated to national courts and the World Bank Grievances Redress Service and Inspection Panel.		
Environmental Impacts						

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
Vegetation clearance	1. Clear only the necessary areas 2. Ensure proper demarcation and delineation of the project area to be affected by construction works. 3. Specify locations for vehicles and equipment, and areas of the site which should be kept free of traffic, equipment, and storage. 4. Designate access routes and parking areas ***5.*** Re-vegetation including planting of trees around the plant/facility	Construction	Proponent, construction, O&M Contractor	-Number of trees cleared -Planted trees	Once off	50,000.00
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	Construction	Proponent, 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)
	should be addressed through landscaping and grassing, carting away and proper disposal of construction materials 4. Use silt traps where necessary 5. Cover soil stock piles 6. Landscaping with grass on areas without electrical installation (lower areas) 7. Monitoring of areas of exposed soil during rainy seasons to ensure that any incidents of erosion are quickly controlled.					

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
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	Proponent, construction, O&M Contractor	Records of any leakages from construction equipment/ vehicles.	Quarterly	50,000.00
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	Construction	Proponent, 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)
	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 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					

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
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 5. The stack chimney of the generators will be increased from its normal height of 3 meters to 6 meters	Construction	Proponent, construction, O&M Contractor	-Engine maintenance records - inspection of stacks	Quarterly	100,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
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,	Construction	Proponent, 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)
	thereby reducing the amount of waste generated over time 7. Recovery of materials remains and return to stores 8. Re-use of materials where possible 9. Proper budgeting to avoid waste generation 10. Proper disposal of waste in line with solid waste regulation 6. Construction wastes to be managed in accordance with construction standards in Kenya					
Impacts on Water Resources and Water Quality	1. Clear the necessary areas only. 2. Appropriate remedial measures shall be implemented by the contractor in the event of erosion.	Construction	Proponent, 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)
	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 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	Proponent, construction, O&M Contractor	Noise levels-Records of noise measurements done by contractor within the project area and at distances of 30m from the Solar mini-grid	Quarterly	150,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
Impacts from Hazardous materials -	1. Maintenance of construction vehicles will not be done on site 2. All hazardous products and waste should be labeled and handled properly to avoid contact with the ground 3. Dispose hazardous waste through a NEMA approved waste handler	Construction	Proponent, construction, O&M Contractor	Presence of well-maintained receptacles and centralized collection points	Quarterly	100,000.00
Accidental Oil Spills or Leaks	1. In the event of accidental leaks, contaminated top soil should be scooped and disposed of appropriately. 2. Refueling and maintenance of vehicles will not take place at the construction site. 3. Create awareness for the employees on site on procedures of dealing with spills and leaks 4. Vehicles and equipment must be serviced regularly and kept in good state to avoid leaks. 5. In case of spillage the contractor should isolate	Construction	Proponent, 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)
	the source of oil spill and contain the spillage using sandbags, sawdust, absorbent materials and/or other materials approved by materials. 6. All chemicals should be stored within the bunded areas and clearly labeled detailing the nature and quantity of chemicals within individual containers.					
Fire Hazards	1. Create awareness to the construction workers on potential fire hazards 2. Provision of firefighting equipment on site during construction. 3. No smoking shall be done on construction site 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	Construction	Proponent, 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)
	the construction site including procedures to take when a fire is reported. 6. Designate an assembly point					
Impacts of construction material sourcing (e.g., quarrying)	1. Source all building materials such as stone, sand, ballast and hard core from NEMA approved sites. 2. Ensure accurate budgeting and estimation of actual construction materials to avoid wastage. 3. Reuse of construction materials where possible.	Construction	Proponent, 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	Proponent, construction, O&M Contractor	Water usage records	Quarterly	Part of contractor's cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	construction and operation phase.					
Energy Consumption	1. Ensure responsible electricity use at the construction site through sensitization of staff to conserve electricity by switching off electrical equipment or appliances when they are not being used. 2. Proper planning of transportation of materials will ensure that fossil fuels (diesel, 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.	Construction	Proponent, construction, O&M Contractor	Energy consumption records	Quarterly	No additional cost
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	Construction	Proponent, construction, O&M Contractor	Records of any near misses, incident, and accidents.	Quarterly	1,000,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	workers while at construction site 3. Workers coming to the site should be knowledgeable on safety precautions to take 4. Appropriate PPE (helmet, safety harness, boots, masks, climbing irons) 5. Proper general house keeping 6. Close supervision of workers 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			Records of corrective actions implemented if there was an accident.		

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	13. Establish safety committees					
Community safety –access	1. Proper barricading 2. Hazard communication. 3. Controlled access to the site by designated personnel 4. Maintain records of any person who comes to site	Construction	Proponent, 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	Construction	Proponent, 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)
	3. Informing workers on local cultural values and health matters. 4. Provision of condoms to workers 5. Allowing migrant workers time to be with their families 6. The contractor is impressed upon not to set a construction camp on site. 7. The contractor will provide public education/information about HIV/AIDS transmission and prevention measures. 8. Ensure equal treatment of workers 9. Provide all appropriate COVID-19 preventive measures including campaign to maintain					

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	individual measures at the workplace.					
Sanitary waste	**1.** Construct/ install pit latrines for both genders clearly labelled	Construction	Proponent, construction, O&M Contractor	Presence of separate and clean washrooms for both the gents and ladies	Quarterly	300,000.00
Solid Waste Generation	1. Provide waste handling facilities such as labeled waste bins 2. Emphasis on prudent waste generation and give priority to reduction at source 3. Solid waste management awareness to operators 4. Operator to contract a NEMA licensed waste handler to collect and dispose solid waste	Operation	Proponent, construction, O&M Contractor	Presence of well-maintained receptacles and centralized collection points	Quarterly	50,000.00
Liquid Waste/Oils Generation	*1.* Proper storage of the oil is required to ensure no leakages 2. Frequent inspection and maintenance of the	Operation	Proponent, construction, O&M Contractor	-Engine maintenance records -Oil spill containment plan	Quarterly	200,000.00

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

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

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
Occupation health and Safety	1. Ensure only qualified staff are employed to work in the facility 2. All workers operating the Mini-grid must be equipped with appropriate and adequate person protective equipment (PPE) such as; safety footwear, helmet among others. 3. Operators must be skilled on firefighting management 4. Annual environmental audits should be done 5. WIBA cover for staff is mandatory	Operation	Proponent, construction, O&M Contractor	-Provision of PPEs and WIBA cover -Environmental audit reports	Quarterly	100,000.00
Hazardous waste-damaged panels	1. Segregation from other waste streams 2. Proper disposal through a NEMA approved/licensed handler	Operation	Proponent, construction, O&M Contractor	Presence of well-maintained receptacles and centralized collection	Quarterly	200,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
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	Proponent, 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
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	Operation	Proponent, construction, O&M Contractor	-Records of awareness sessions conducted -Incidences report	Quarterly	No additional cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	touching sockets and switches with wet hands or wiping with wet cloths ○ Keeping off all electricity infrastructure e.g., not tying livestock on electric poles, no cutting earth wires that run along some electric poles, not interfering with sockets or switches ○ Reporting any electric wire/conductors if found fallen on the ground ○ Report any incident regarding electricity at the local office –staff in charge of operating the Mini-grid					
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	Operation	Proponent, 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)
	2. Controlled access to the site only with prior approval 3. Maintain records of any person who comes to site					
Risks related to poor or inadequate stakeholder engagement (Conflict)	1. Employ from the community to the extent possible 2. Engage the community members and other stakeholders in a timely manner 3. Work closely with the GRM committee members in solving the conflicts 4. Solve all conflicts/grievances at the earliest time possible 5. Ensure all grievances are logged and closed 6. Monitoring the pattern of grievances to come up will long term measures	Operation	Proponent, construction, O&M Contractor	Grievance records	Quarterly	20,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
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	Proponent, 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 HIV/AIDS and other sexually transmitted diseases, through staff awareness and awareness campaigns for the community 2. Provision of condoms to workers 3. Allowing migrant workers time to be with their families	Operation	Proponent, construction, O&M Contractor	Number of awareness creation sessions conducted. -Availability of and distribution of condoms		20,000.00
Public health Impacts -Covid 19 disease	1. Social distance must be observed	Operation	Proponent, construction, O&M Contractor	Availability of hand washing facilities	Quarterly	30,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	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 may be issued from time to time			Utilization of hand washing facilities Number of Covid-19 cases reported		

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
Dust Emission	**1.** Trees can be planted around the plant/facility provided they do not cast shadows to the solar panels to act as wind breakers and hence decrease dust pollution 2. Ensure planting of grass around and within the facility compound	Operation	Proponent, 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	Proponent, construction, O&M Contractor	Engine maintenance records	Quarterly	No additional cost

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

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
Solid Waste Generation	1. Demolition contractor to adhere to the various manufacturer's guidelines and requirements regarding demolition and disposal 2. Segregation of waste in order to separate hazardous waste from nonhazardous waste and other streams of waste 3. Provision of facilities for proper handling and storage of demolition materials to reduce the amount of waste caused by damage or exposure to the elements 4. Adequate collection and storage of waste on site 5. Safe transportation to the disposal sites / designated area	Decommissioning	Proponent, 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)
	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	Proponent, construction, O&M Contractor	Visual inspection	Daily	20,000.00
Public Health-HIV/AIDS	The project will sensitize workers and the surrounding communities on prevention and mitigation of HIV/AIDS and other sexually transmitted diseases, through staff training and awareness campaigns/ to the community.	Decommissioning	Proponent, construction, O&M Contractor	Records of awareness creation sessions conducted. -Availability of and distribution of condoms	Once off	20,000.00
	Total					4,380,000.00

Table 19: Institutional Framework and Compliance/Implementation of the ESIA/ESMMP

No	Institution	Role/Function
1	The National Environment Management Authority (NEMA)	NEMA: • Approves the ESIA Report; • Issues EIA License for project implementation; and • Carries out independent Audit to determine compliance with ESMMP.
2	Directorate of Occupational Safety and Health Services (DOSHS)	DOSHS: • Provides OSH permits for workplaces of the project including campsites and quarries; and • Conducts inspections to ensure conformance to OSHA.
3	Water Resources Authority (WRA)	WRA: • Provides necessary water abstraction permits for boreholes and surface water sources (rivers, streams etc.); and • Monitors water use in the region and provide guidance water use.
4	National Land Commission (NLC)	NLC: • To exercise the powers of compulsory land acquisition on behalf of MoE
5	National Gender and Equality Commission	The Commission: • Ensures that there is gender equality and equity throughout the implementation of the project; and • Representatives will monitor and evaluate gender quality and equity with regards to job provision and harassment cases on site to ensure compliance with the law
6	Turkana County-Department of Gender women, social services and children	• Work with poor, marginalized, vulnerable and disadvantaged communities as its primary target group will ensure that this group is supported and is not left out of the project implementation.
7	County Government of Turkana	County Governments will: • Provide approval for the project & project site; • Approval of community land consent & verification; and • Provide support.
8	Supervision Consultant	Supervising Consultant: • Will engage the following dedicated full-time safeguards staff to support risk management: ✓ Supervising Engineer (RE) ✓ Social Safeguards Specialist ✓ Environmental Safeguards Specialist • Review and approval of the ESMMPs and other plans; • Day to day supervision of Contractor implementation of the ESMMPs and other plans; • Regular reporting on the ESMMP implementation; and • Has full time Environmental, Health and Safety and Social Specialists
9	Contractor	Contractor: • Will engage the following dedicated full-time safeguards staff; ✓ Environmental Safeguards Specialist ✓ Social Safeguards Specialist

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

7.4 MANAGEMENT PLAN DURING CONSTRUCTION PHASE

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

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

7.4.1 Construction Management Plan

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

a) Management of Fuels and other Hazardous Materials

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

b) Management of the Construction Site

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

c) Fire Prevention and Management

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

d) Management of Air Quality

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

e) Neighboring Land Owner and Occupier Relations

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

f) Complaints Register

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

g) Construction Control

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

Control of Access

The contractor shall ensure that the construction site is accessed by authorized persons only and up-to-date records kept

Control of material supply and burrow areas

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

7.4.2 Rehabilitation and Site Closure Plan

- After completion of construction activities, the contractor shall clear the site of construction materials and dispose wastes in appropriate disposal sites.
- The contractor shall remove all temporary works on the construction site and grow grass on areas that are not covered by the installations to control erosion.

7.4.3 Local Recruitment Plan

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

- Comply with the provisions of Employment Act, 2007

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

The mitigation measure is:

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

7.4.4 Workplace Health and Safety Plan

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

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

7.4.5 Community Health and Safety Plan

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

- Adherence to OSHA 2007 Act and its subsidiary legislations to ensure that health and safety of immediate neighbors and the public is not threatened.
- The contractor to ensure that construction work is undertaken in manner not likely pose risks to community health and safety.
- The contractor shall undertake an independent risk assessment prior to construction. The findings of this assessment will inform the development of a community safety plan and create awareness to the community on the same.

7.4.6 Emergency Preparedness Plan

The Contractor shall develop an emergency plan that will enable rapid and effective response to all types of environmental emergencies in accordance with recognized national and international standards.
The emergency plan shall include establishment of a network of communication between the Contractor and emergency services including police, ambulance services, and fire brigades among others.

7.4.7 SEA/SH Prevention and Response Action Plan

The contractor will prepare a SEA/SH Prevention and Response Action Plan that will include a Grievance Mechanism (GM) that ensures confidentiality. The plan should have an Accountability and Response Framework. The plan will include the necessary measures for prevention and response of GBV impacts.
The mitigation measures shall include:

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

7.4.8 Stakeholder Engagement Plan

A Stakeholder Engagement Plan is a formal approach to communicate with project stakeholders to achieve their support for the project. The plan prepared shall specifies the frequency and type of communications, media, contact persons, and locations of communication events. The SEP is a useful tool for managing communications between the contractor and other stakeholder. The plan should meet the following objective of a SEP.

- To help improve project design and implementation
- To inform third parties about changes that affect them
- To take their views into account in the implementation of projects
- To identify adverse impacts and mechanisms to enhance project benefits
- To identify risks from and to a project

- To increase project ownership and sustainability
- To comply with Bank policies that require consultations

The plan shall put this measure in to consideration:

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

7.4.9 Labor Influx Management Plan

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

The objectives of this plan are as follows:

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

The plan shall consider these measures:

❖ Prepare and Implement a Labour Management Plan (LMP) with policies and measures for ensuring that:
- Subproject managers and workers are sensitised on:
  - ✓ County/National Labour laws
  - ✓ County/National Child Labour laws
  - ✓ National/International Forced Labour laws
- Enforce:
  - ✓ The Code of conduct
  - ✓ County/National Labour laws
  - ✓
  - ✓ County/National Child Labour laws
  - ✓ National/International Forced Labour laws

7.5 Grievance Redress Mechanism

7.5.1 Grievance Mechanism at Kalokol.

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

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

The roles of GRC include among others the following:

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

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

8 IMPACT SUMMARY AND CONCLUSION

8.1 INTRODUCTION

This chapter gives a summary of impacts conclusion and recommendations

8.2 SUMMARY OF IMPACTS IDENTIFIED AND ASSESSED

8.2.1 Construction Phase Impacts

A number of impacts have been identified as a result of the construction of the proposed Kalokol 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.

8.2.2 Operational Phase Impacts

A number of impacts have also been identified to be associated with the operational phase of the proposed Kalokol 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

8.3 SA AND VMGP CONCLUSION

The Kalokol 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. Kalokol area is overwhelmingly IP/VMG area and is inhabited predominantly by the Turkana and the minority tribes include; Kalenjin, Somali, Luhya, Luo, Congolese. This is addition to The Kenya Constitution requirement to protect and promote the interests and rights of minorities and marginalized communities and the relevant laws and regulations of the Government of Kenya concerning VMG (Vulnerable and Marginalized Groups). The OP 4.10 Indigenous Peoples contributes to the Bank's mission of poverty reduction and sustainable development by guaranteeing that the development process fully takes due regard to the dignity, human rights and cultures of indigenous people. The Bank requires that the Borrower engage the IPs/VMGs in a process of Free, Prior and Informed Consultations. This was the basis of the public participation done in Kalokol Centre on 14th January 2022 in Kalokol involving all the communities in the area which resulted in broad community support for the project by the affected IPs/VMGs. During the ESIA study the community members further

identified members of the community they consider vulnerable by the community member. The vulnerable were identified to include;

- Widows-approximately 70
- Orphans –approximately 300
- Persons Living with Disabilities- Approximately 50
- The elderly (80 years and above)- approximately 150

Elements of VMGP are captured in the ESMP.

8.4 CONCLUSION AND RECOMMENDATIONS

With all the identified impacts, mitigation will reduce the significance of such impacts to a minor or negligible level. The mitigation measures provided and the management of residual impacts are described in the ESMP has been described as a vehicle for the continued integrated management of all such impacts.

An Environmental and Social Management Plan (ESMP) has been prepared to ensure that social and environmental impacts and risks identified during the ESIA process are effectively managed during the construction and operations of the Project. The ESMP specifies the mitigation and management measures to which the Project Proponent and the Contractor will be committed and shows how the Project will mobilize organizational capacity and resources to implement these measures. The ESMP also shows how mitigation and management measures will be scheduled and will ensure that the Project complies with the applicable laws and regulations within Kenya, as well as the requirements of WB OPs on environmental and social sustainability. The consultant is confident that every effort will be made by the Project Proponent and Contractor to accommodate the mitigation measures recommended during the ESIA process to the extent that is practically possible, without compromising the economic viability of the Project or having a lasting impact on the environment.

In summary, based on the findings of this assessment, the consultant finds no reason why the proposed Project, should not be moved to the next stage of Project planning and development, contingent on the mitigations and monitoring for potential environmental and socio-economic impacts as outlined in the ESMP

APPENDICES

APPENDIX 1:ABBREVIATED RESETTLEMENT ACTION PLAN (A-RAP)

1. Kalokol Sub-project Site

The Kalokol sub-project site is on unregistered community land and held in trust by the County Government of Turkana on behalf of the community, in line with the Community Land Act 2016. The proposed site is uninhabited, has no structures, community facilities, or encumbrances. Consultations leading to the identification and selection of the sub-project site are captured in the Environmental and Social Screening report for Kalokol. *Refer to Chapter 3 of the ESIA for the comprehensive socio-economic profile.*

2. Actual Census Survey of PAPs and Valuation of Affected Assets

The number of project-affected persons (PAPs) is 12000 (approximately 1100 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 0.7284 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 1 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 Kalokol community requested for the improvement of water supply by drilling more boreholes and doing water reticulation; the improvement of the medical facility; improvement of the existing medical facility, and provision of electricity power to the local institutions. The value of the priority community project will be proportional to or higher than the value of land under acquisition. In addition, loss or damage to crops, trees, structures, and community facilities will be compensated in line with the provisions of the RPF, and as summarized in the entitlement matrix below.

3.1 Entitlement Matrix

Types of Impact	Person(s) Affected/Eligible for Compensation	Compensation/Entitlement/Benefits	Responsible organization
1. Loss of Land			
Loss of unregistered community land.	Community.	Compensation in-kind as prioritized by the community.	REREC
Loss of land in unregistered group ranches.	Group ranch members.	Compensation in-kind as prioritized by the community.	
Loss of land in registered group ranches.	Group ranch members.	Compensation in-kind as prioritized by the community.	
Loss of land owned by the National Police, county governments and the Ministry of Interior	Government agencies.	No compensation for public land allocated to another government body.	
Loss of land owned by the Kenya Forest Service (KFS) and Kenya Wildlife Service (KWS).	Government agencies.	No compensation for public land allocated to another government body. However, payment of conservation fees to KWS and KFS as stipulated under their respective regulations is foreseen.	
2. Loss of Use on Land			
Loss of use on public land (e.g., grazing, farming etc.).	Communities utilizing public land.	Communities do not own public land; however, they utilize public land with consent from the relevant agencies. The project will implement the infrastructure project prioritized by the community as compensation for the loss of public land use.	REREC
Loss of use on unregistered community land, unregistered group ranches and registered group ranches (e.g., grazing, farming etc.).	Communities utilizing unregistered community land, unregistered group ranches, and registered group ranches.	Compensation in-kind as prioritized by the community.	
3. Loss of /Damage to Assets on Land			
Trees	Community members on unregistered community land; community members utilizing public land; members of registered and unregistered group ranches and government entities.	During detailed design for power distribution lines and construction of the mini grid and community project, any crops, structures, trees, and community facilities shall be avoided to the extent possible. However, loss	REREC
Crops			
Structures			

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

4. Consultations with PAPs About Acceptable Compensation Options and Alternatives that have been Considered

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

4.1 Engagement of Project -Affected Persons (PAPs)

Local administration and County Renewable Energy Officers (CREOs) supported the proponent and implementing agency (IA) to mobilize community members and other stakeholders for public consultations and engagement activities. National and county government entities, community segments (men, women, youth, elders, persons with disability, vulnerable and marginalized groups, etc.), NGOs, and local leaders were engaged through key informant interviews, community meetings, and focus-group discussions. The proponent and IA implemented appropriate measures to ensure PAPs effectively participated in the consultations. *Refer to Chapter 5 of the ESIA on public consultation and engagement.*

Once the compensation award and Bill of Quantities (BoQs) are known, the Implementing Agency (IA) will engage the community and agree on the community project to be executed as in-kind compensation. During these consultations, the IA and the community will define the roles and responsibilities of the community in monitoring the implementation of in-kind compensation and maintenance once the IA hands it over to the community. Thus, the IA and the community will effect an agreement to be signed by the local leadership; representatives of the Grievance Redress Committees at the locational, county, and national levels; A-RAP Implementation Committee, and Implementing Agencies.

4.2 Identification of Community Representatives

The Kalokol 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 5 of the ESIA on the Grievance Redress Committees.* Further, the community will constitute the A-RAP Implementation Committee responsible for coordinating community engagements on the A-RAP and monitoring the implementation and closure of the A-RAP. The representation of the committee will consider gender, vulnerability, and intergenerational sensitivities.

Figure 1: _____

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

4.3 Summary of Consultations on Land Acquisition and Compensation Options

Date	Objective	Implementing Entities	Land Acquisition and Compensation Aspects Discussed	Key Issues Raised	Responses Given
March 11th, 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
January 14th, 2022	Environmental and Social Impact Assessment.	Consultants MoE KPLC REREC	Land acquisition through compulsory acquisition (not voluntary land donation). Selection of three priority community projects, whereby one is to be implemented as in-kind compensation for land.	Community requested for the improvement of water supply by drilling more boreholes and doing water reticulation; the improvement of the medical facility; improvement of the existing medical facility, and provision of electricity power to the local institutions	The proponent has set aside KES 1 million to implement the priority in-kind compensation project. The value of the project will be proportional to or greater than the value of land. NLC will determine the value of land.
May 2023	Compulsory Land Acquisition.	NLC	Site inspection and inquiries. Land valuation. Award of compensation.		

5. Institutional Responsibility for Implementation of the ARAP

Entity	Role
Ministry of Energy	• Coordinate A-RAP implementation and provide budget for in-kind compensation.
National Land Commission	• Implement the statutory process for compulsorily land acquisition, including site gazettement and inspections, inquiries, valuation, and award of compensation.
REREC	• Monitor all land acquisition and compensation aspects (including A-RAP closure), complemented by a third-party monitor. • Provide budgets for stakeholder engagement, grievance management, and monitoring, including the facilitation of the Land Acquisition and Compensation Implementation Committee, and the Grievance Redress Committee.
Mini-grid Contractor	• Implement in-kind compensation concurrently with the solar mini-grid project.
Supervising Consultant	• Monitor and report on implementation of in-kind compensation, and overall project compliance with social safeguards.
Grievance Redress Committees	• Formed at the locational, county, and national levels, and responsible for resolving complaints, including A-RAP related grievances.
A-RAP Implementation Committee	• Coordinate A-RAP engagements at the community level, monitoring A-RAP implementation and closure.
Affected Community	• Responsible for the operation and maintenance (O&M) of in-kind compensation project. An agreement stipulating the O&M roles and responsibilities of the community will be effected.

6. Procedures for Grievance Redress

The Project procedures for grievance redress were established through a public consultation process and informed by the existing conflict resolution structures in the community. The Grievance Redress Mechanism (GRM) comprises tiers at the project, county, and national levels. *Refer to Chapter 5 of the ESIA for a detailed GRM.*

7. Implementation Timetable and Budget for the ARAP Implementation

7.1 Timelines

The proponent will commission the community project by May 25th, 2025, before operationalizing the mini-grid. The mini-grid contractor will implement the mini-grid and the community project simultaneously. The Supervision Consultant and IAs will implement a commitment register to ensure the mini-grid contractor can achieve the agreed-upon milestones. The register will be complete with clear and practical timebound indicators, which can be monitored by all parties – the PAPs, IAs, the Ministry, third-party monitor, and the Bank.

7.2 Budget

The proponent has set aside KES 1 million for the community project (budget captured in the ESMP). The compensation award from NLC and the Bill of Quantities will inform the final cost of the community project. The costs for in-kind compensation, stakeholder engagement, grievance management (including the facilitation of the GRCs and the A-RAP Implementation Committee), and monitoring are covered under the project.

APPENDIX 2 – ESIA PUBLIC MEETING PARTICIPANTS' REGISTER

Ministry of Energy and Petroleum

REREC

Kenya Power

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

Venue: Kalokol

Date: 10/1/2021 Time: 11:00 am

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	Lydia Komen	EIA EXPERT - Women 07 180	F	0717153250	
2.	JOSEPH EKITELA	WARDA ADMIN - KANGATOTHA	M	0718866631	
3.	JAMADA STEPHEN	CHIEF - KALOKOL	M	0723247188	
4.	GABRIEL KOMOT EKUWAM	WARD ADMINISTRATOR	M	0713656835	
5.	Umulkheir Qeballe Abdi	EIA EXPERT - CENTRIC AFR	F	0795023954	
6.	Japhleth kipsang Bor	EIA Expert Norken (Int)Ltd	M	0725650810	
7.	Kemedy D.K. Shisoka	MOE ENG.	m	0722541628	
8.					
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CHIEF
KALOKOL LOCATION
P.O. BOX LODWAR
JAMADA STEPHEN

CENTRIC AFRICA

Ministry of Energy and Petroleum

REREC

Kenya Power

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

Venue: .....

Date: 14/01/2022 Time: 9:12 – 13:45

List of Participants

FGD MEN KALOKOL

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	PETER KALENG	Pastor Region	M	0716157246	
2.	ERIC PAUL	Pastor Religious	M	0715056028	
3.	JOHN ALEMU	Sec-Kalokol Ward	M	0797379087	
4.	JOHN EWAAR EKOMWA	Rev Religious	M	0722994222	
5.	Philip Lore	Rev. "	M	0715720471	
6.	JOSEPH EREGAE	PASTOR - Religious	M	0728093242	
7.	EMASE DAVID	PASTOR - RELIGIOUS	M	0710232300	
8.	DOMINIC NAKUSI	OOP - CHIEF	M	0702782525	
9.	MUSA MORUESE	VILLAGE ELDER	M	0715457088	
10.	LUCAS AKWAITA	KNCCI Director	M	0794 500 849	
11.	Sammy EKAL	Pastor	M	0704854877	
12.	MICHAEL N. LOKWAKOL	PWD'S / DPO	M	0790604608	
13.	ALFRED ESEIKON MEYENI	CJPC	M	0714333509	
14.	PETER AKORIYERA	MZEE WA KIJIJI	M	0798435474	
15.	ECHAKAN LONGOL			0769752336	
16	MICHAEL EPUU ETOLO	PASTOR	M	0703840895	

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

Venue: Kalokol ~~BARAZA~~

Date: 19/01/2022 Time: 11:00 AM

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	NATOO ROBERT EKAI	KI - YOUTH LEADER	M	0758154462	
2.	DAVIS [illegible]	[illegible]	M	[illegible]	
3.	ELIUD E. ARIC	PROFESSIONAL	M	0711197140	
4.	PAULO ECHAKAN	ELDER	M	—	
5.	PETER KORIYARA	ELDER	M	0798435474	
6.	LUCAS AKWAITA ESINYEN	KNCCI Director	M	0794500849	
7.	NELSON EBENYO LOKERITH	KALOKOL	M	0728467703	
8.	JOSKEN EKALE ESEKON	KALOKOL	M	0712216789	
9.	EJIKON DANIEL LOSIYOL	KALOKOL	M	0729203428	
10.	CHRISTOPHER ETANAE KINAT	PUBLIC WELLSMAN	M	0711463802	
11.	MICHAEL N. LOKWAKOL	P.W.D'S D.P.O.	M	0790604608	
12.	CHARLES EKAI NAYAM	KALOKOL	M	0728719441	
13.	DAVID EKAI	KALOKOL	M	—	
14.	DOMINIC LOKAALA	ASST. CHIEF - NAPEIKAR	M	0702782525	

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

Venue: Kalokol BARAZA

Date: 19/01/22 Time: 11:00 AM

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	LEAH EWOI LOOMWA	LEADER	F	0700491363	
2.	JECINTA AKENO LONGORIA	WOMEN GROUP REP.	F	0792838332	
3.	MAURICE MOJONG LASURU	KALOKOL	M	0702977405	
4.	PAULINA ACHUKA CHOBKIN	KALOKOL	F	0719444430	
5.	MIKE EJIKON EKITAM		M	0702944131	
6.	EPETET E JOSIAH	KSA / YOUTH LEADER	M	0712401035	
7.	CARLYSTUS EREE	KSA	M	0745784225	
8.	ANTHONY ERIKA	KDA	M	0707464009	
9.	DANIEL ETABO	TEACHER.	M	0721915579	
10.	MICHAEL EPUU ETORE	PASTOR	M	0703540895	
11.	SILAS WINE	NURSE - MOH	M	0722725968	
12.	JOSEPHAT MTEE LOGIEL	KALOKOL NAREMIET BMU	M	0716707197	
13.	RECHO NACHODOK	NGISIKNIA	F	0725453056	
14.	SAMMY ENAMIKOK LOKOR	Natural.	M.	0748341455	

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

Venue: KALOKOL BARAZA

Date: 1/9/2022 Time: 10:00 AM

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	NANCY ELMILIM	BUSINESS	F	0713454136	
2.	PAULINE EKitela	BUSINESS	F	0711386048	
3.	JOSEPHAT L. EMURA	KALOKOL Y-G	M	0707171603	
4.	MICHAEL EKARU ESUKUT	YOUTH	M	0794018598	
5.	JACOB-ATOK	KALOKOL	M	0791652545	
6.	BONFACE EKMALE	KALOKOL	M	0700062689	
7.	ESINYEN LOREE	KALOKOL	M	0799759133	
8.	DOMINIC JUNIOR	KALOKOL	M	0798776663	
9.	ANDREW TOTO NAKALEE	KALOKOL	M	0718482285	
10.	ISAIA LOCHILIA	KALOKOL	M	0726512063	
11.	PAUL EMASE	KALOKOL	M	0113584887	
12.	EMASE DAVID	KALOKOL	M	0710232350	
13.	EKUNYUK MARTIN	KALOKOL	M	0799119028	
14.	SIMON EMEKWI MEYAN	KALOKOL	M	0713270946	

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

Venue: Kalokol BARAZA

Date: 14/01/2022 Time: 11:00 AM

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	PETER AREMAN	BUSSINES	M	0728267901	[signature]
2.	SUSAN ATIIR	BUSSINES	F	0716285977	[signature]
3.	ERICK BURU LOKADEA	COMM. REP	M	0716911692	[signature]
4.	ENOCK ARWOTO	PS.	M.	0796784855	[signature]
5.	DAVID EIPA LOGEL	BMU CHAIR	M	0704302683	[signature]
6.	DAVID EKAI EREMON	CHAIRMAN KALOKOL CU	M	0720078448	[signature]
7.	JACKSON NAKUNA	NATIRAE BMU	M	0704998817	[signature]
8.	SAMSON ERIDOR	O S WSK.	M.	0715000939	[signature]
9.	Kipchomba Masgale	Bosness	F	0790319227	[signature]
10.	HASSAN AHMED		M	0712828207	[signature]
11.	ABDI HUSEIN	HASSAN		0712599638	[signature]
12.	DAUDI ERUDI	KEVIN	M	0701493661	[signature]
13.	SUSAN AKUWOM		F	0114213512	[signature]
14.	BELINDA AKINGOL		F	0717331200	[signature]

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[signature]
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FDG YOUTH (FOCUSED DISCUSSION GROUP)

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

Venue: Kalokol

Date: 14/6/2022 Time: 11:14AM.

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	DAVID EKAI	N/A	M	-	
2.	ERICK EKIRU	N/A	M	0716911692	
3.	JOEL EKUWOM	BUSINESS	M	0703809817	
4.	EKUNYUK E MARTIN	YOUTH LEADER	M	0799119028	
5.	JACKSON NAKUWA	BUSINESS/MUSICIAN	M	0704998817	
6.					
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Youths FGDs (Kalokol)

Ministry of Energy and Petroleum

REREC

Kenya Power

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

Venue: Kalokol

Date: 14/7/2022 Time: 11:00 AM

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	EPETET E JOSIAH	KCA/YOUTH LEADER	M	0712401035	
2.	LOTIENG ALIMIDO DOMINIC	YOUTH REP	M	0713011739	
3.	CARLYSTUS EREE	KSA REP	M	0745784225	
4.	NATOO ROBERT	YOUTH LEADER	M	0758154462	
5.	ESEKON KAPELO	YOUTH	M	0759805748	
6.	JOSEPHAT L EMURIA	"	M	0707171603	
7.	BONFACE EKALALE	BUSINESS	M	0700062689	
8.	EKIDOR STEPHEN	"	M	0705963339	
9.	EKUWOM STEPHEN	"	M	0724713354	
10.	CHARLES EDONGA	BODABODA REP	M	0748131518	
11.	CHARLES NAYAM	BUSINESS	M	0729719441	
12.	DAVID EKAI EREMON	CHV CHAIR	M	0720078448	
13.	CHRISTOPHER EYANAE	BUSINESS PERSON	M	0711463802	
14.	ALEPER DAVIES	WATER PERSONNEL	M	0715572577	

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Tapérech

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

Venue: Kalokol F.G.D Women

Date: 14th Jan 2021 Time: 13:00

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	Margarete Kipchumba	Chairlady [illegible]	F	[illegible]	[signature]
2.	Belinda Akiragbl	Kalokol	F	0717331260	[signature]
3.	Susan Afir	"	F	0716285977	[signature]
4.	Alice Asingen	"	F	0718002586	[signature]
5.	Susan Akoong	"	F	0114921352	[signature]
6.	Ngatule Kamara	"	F	0768865930	[signature]
7.	Paulina Chafshules	"	"	0717444830	[signature]
8.	Leah Luhums	"	"	None	[signature]
9.	Kayenta Akeno	"	F	0792838333	[signature]
10.	Racheal Lokipi	"	F	0725453056	[signature]
11.					
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APPENDIX 4 –LAND ACQUISITION MINUTES AND ATTENDANCE LIST

Minutes of the community consultation meeting held on 11/03/2021 at Kalokol market centre, from 13.27 pm.

AGENDA

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

In attendance (refer to annexed list of participants)

MIN 1.0 WELCOMING AND OPENING

The meeting started at 13.27pm and was opened with a word of prayer by David Emase. In his remarks the Assistant Chief Jamada Stephen Panyako termed the visit by KOSAP team as God's grace to the residents. He told the community to keenly listen to what the visitors had to tell them.

The area Chief Daniel Emuron Namojong said REREC, KPLC and MoE had come to sensitize the community on a proposed electrification propject in the area. He thanked residents particularly Boda Boda operators, business people, youth, women and elders for turning up for the meeting. He said Kalokol was is a very strategic town which serves a big neighbouring population. There were about 10 primary schools, 3 secondary schools, polytechnic, and tens of businesses that could benefit from power connection. Power will also boost food/fish storage and also encourage the establishment of light industries.

The area ward administrator said KOSAP intends to construct a power project in collaboration with the World Bank and one of the requirements was project land.

The MCA proposed that the project be centrally located so that it can capture all public facilities, households and businesses. He proposed that it should be located in vacant land next to the Ward administrator's office.

He then invited the visitors to address the Baraza. The visiting team introduced themselves as follows;

13. Kioko Maithya - Social Safeguards Officer - REREC
14. Irene Kawira - Senior Environmentalist - REREC
15. Caleb Ewoi - CREO - CREO
16. Agnes Gachoki - Senior Surveyor - REREC
17. Lawrence Lorika - Technician - KPLC (lodwar)
18. Myra Mukulu - Technical Advisor Cook Stoves - MOE

2.0 KOSAP AND KALOKOL MINI GRID

Ms Myra Mukulu informed the participants that the proposed project is part the Kenya off Grid Solar Access Project (KOSAP) which is funded by the World Bank and is being implemented by the Ministry of Energy, the Kenya Power and Lighting Company (KPLC) and the Rural Electrification and Renewable Energy Corporation (REREC). MoE will provide overall coordination of the Project including responsibility for safeguards due diligence, and compliance monitoring. REREC will implement the mini grid and will be responsible for the implementation of Resettlement Framework Plan, Environmental

Social Management Framework and Social Assessment. She said the Government is committed to providing electricity to communities that have not been served by the national grid such as Kalokol because it recognises energy as key to advancing development.

She said KOSAP entails the following components;

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

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

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

3.0 PROJECT LAND REQUIREMENTS: RIGHTS AND ENTITLEMENTS OPTIONS AND IMPLICATIONS

The Surveyor, Ms. Agnes Gachoki told the Baraza that the main purpose of the Baraza was to seek community consent for land donation for the project. Land required for the construction of the Mini grid is 2-5 acres. Land in Kalokol, falls under the Community land category. It is yet to be registered, has no title but is jointly owned by the community. Its use and management is governed by the Community Land Act 2016.

She explained the various forms of acquiring interest in land including; allocation, land adjudication process, compulsory acquisition, settlement programs, transfers, donation and long-term leases. The Surveyor informed the meeting that if they opted to consent to donation of the project land following VLD criteria has to be met;

VLD criteria

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

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

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

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

d) Payment of cash for the land that has been identified for the project. For this to take place the land is has to be valued first. All monies payable as compensation for acquisition unregistered community land are then held in trust by the county government. Any such monies shall be deposited in a special interest earning account by the County Government and shall be released to the community upon registration of the community land.

e) Compensation of land for land. The community would identify a similar piece of land in value to the project site and request that the same is purchased for the community.

f) A further option is compensation in kind. This option is for the community to grant land for the project and request for compensation in kind. This could be in the form of a project for the benefit of the community like the construction of classrooms or a borehole. This is the most preferred option.

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

4.0 PROJECT TECHNICAL DESCRIPTION, WIRING, CONNECTION AND PAYMENTS

Mr. Lawrence Lorika from KPLC told the meeting the proposed mini grid will comprise a solar system and a thermal unit (generator). The Mini-grid will have a capacity of 31KVA and PV 104kwp). He said based on an aerial survey done on 2019, Kalokol has a potential customers base of approximately 448 households and 12non-residential users. These customers are mapped for connection. Energy meters will be installed by KPLC staff and the locals living within the required 3 km radius would be connected to power. He said to be connected one will be required to pay a one-off connection fee of kshs.1000 as opposed to other places like Lodwar, Kitale and other big towns whereby they pay kshs.15000 or more.

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

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

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

MIN 5.0 SOCIAL AND ENVIRONMENTAL ISSUES

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

Potential positive impacts:

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

Potential negative impacts:

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

She affirmed that the project beneficiaries were the Yapakunur Clan, a major sub-tribe of the Turkana language group who are Indigenous people and are the only VMG residing near the sub-project area thus the sole project beneficiary. Construction of the mini grid could restrict the access of VMGs to grazing land thus affecting availability of pasture, and consequently their main source of livelihoods, and forcing families to relocate grazing activities elsewhere. Consequently, a VMGP may not be required. The project can include specific interventions in the final ESMP to ensure the community has access to culturally appropriate benefits. The project will strive to minimize adverse impacts on the indigenous people and ensure that they fully and continuously participate in the consultation process

and receive culturally appropriate benefits from construction of the mini grid. The ESIA study would be conducted before the onset of the project and an ESMP developed outlining viable mitigation measures.

Screening would be undertaken to ensure that the project is designed and implemented in an environmentally and socially sustainable manner, taking into account Kenya's relevant sector legislation as well as World Bank Safeguard Policies. This would be undertaken using screening checklists in reference to requirements of the Environmental Management and Coordination Act, 1999 (amended 2019) and KOSAP-Environmental and Social Management Framework (ESMF). The screening process would consider potential impacts of the project and propose viable mitigation measures. She assured the community that temporary or minor impacts which are foreseen during project implementation will be sufficiently mitigated.

6.0 GRIEVANCE RESOLUTION COMMITTEE (GRC)

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

j) Date of compliant
k) Name of complainant
l) ID of complainant
m) Telephone contact of complainant
n) Nature of complaint
o) Name of the Person handling the complaint
p) Contacts of person addressing the complaint
q) Action taken
r) Date of conclusion of complaint

Existing indigenous grievance redress mechanism

Conflicts occasionally arise within individuals and families. The Kaaling community like in all other parts of the Turkana society is endowed with elaborate and systematic traditional mechanisms of conflict management. When disputes occur, they are referred elders (*Ng'akasukou*). The elders then summon involved parties and witnesses to the meeting point (*Ekitoe Ng'akasukou*).The elders will listen to the conflicting parties/individuals, weigh adduced evidence and pronounce the verdict accordingly.

Any matter that is not resolved or when the parties are not satisfied they can report to the chief or seek discourse in a court of law.

The summary of the comments/remarks from the community in the meeting held at Kalokol on 11/03/2021

QUESTION/COMMENTS ANSWER/REMARKS

QUESTION/COMMENTS	ANSWER/REMARKS
Michael Lokwakol This is a great project. Some of us will be able to increase our income for working for long hours	Noted
John Esekon **Tumekua tukiuliza stima itafika uku lini. Sasa hii stima wenye wako bali awatafutiwa? We have given you land freely, so what are you giving to the society?**	**Those beyong 3kms radius can use KOSAP home solar systems**
Paul Koriang Don't bring foreign labour, use locals.	Only technical labour will be sourced outside. Locals to do unskilled jobs.
Charles Erot MoE walieka solar kwa shule lakini haifanyi kazi. How long will project take to construct?	REREC is currently undertaking a mantaince programme on solar for schools and other institutions. Completion of minigrid to take less than one year.
Reuben Esibitar Is 1000 registration fee?	No it is connection fee. Its payable once.

7.0 FOCUS GROUP DISCUSSIONS

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

FGD-MEN

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

Kioko them the FGD was a good avenue for the elders to express their opinions and freely ask any questions they might not have been unable to ask in front of the youth and women, He said that at the end of the FGD discussion the group should come into consensus on issues discussed in the earlier meeting, select a representatives to the GRC. Matters agreed on and selected representatives would then be presented to the main meeting for adoption.

During the meeting the elders agreed to voluntary land donation and selected the following as their representatives in the GRC;

Michael N. Lokwakol	**10986387**	**0790604608**
Joseph E. Ekunoit	13647323	0792977119
David M. Emase	11512716	0710232300

FGD - questions/Answers (MEN)

John Ngatia **Hii stima je, wakati inapoletwa karibu na nyumba, inaweza kubaliana na miti green? Watoto wakishika io miti si watachomeka?**	**KPLC will pass cables away from trees. Trees near cables/poles are regularly pruned.**
Charles Leto Payment of 1000 is for what? If it burns fridge or house what happens? Will grass thatched houses be supplied**?**	It is connection fee You can report and request for compensation. However ensure whoever carries out wiring for you is qualified All houses are eligible for connection
Michael Ekune Does it use normal poles? Some connection cables are loose and children may touch by mistake	No it uses treated poles. Wire is insulated and earthed. Safety education shall also be carried out by contractor
Lukas Ekale Who does wiring? Self or contractor How is token amount determined?	 Self Amount less statutory deductions
Abraham Ekiru If iam connected can I sambazia power to jirani mwenye hana?	Yes so long the two of you have an agreement
Joseph Ekuloit How much do I spent on tokens per month?	Depends on usage. If it is just for lights it will be less than 300 bob

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Question, Suggestions, feedback and responses for Focus group discussion with men

FGD-WOMEN

The women seemed not to have understood the issue. Therefore Myra repeated the introduction of the project and the benefits as well as the need to have voluntary land donation so as to construct KOSAP minigrids. Thereafter the women asked questions.

Name of Person making the contribution (e.g. comment or question)	**Question, Comment, Suggestion**	**Feedback/Responses by project team**
Jacinta Asimit	Will we need to pay for labour for wiring of the house?	Myra responded that yes households will need to pay for wiring of the house. Nevertheless the project will ensure that poles transmitting electricity are brought to the proximity of the house
Mary Eliwan	I am far from the road. Will I still get power?	Myra responded that the power is provided within a 3km radius from the power plant. There is also the option of KOSAP component 2 which provides solar home systems for those who will not be reached by the minigrid.
Malvin Akai	I live in a far village – Nakria. Will I benefit from the power	Myra responded that the power is provided within a 3km radius from the power plant. There is also the option of KOSAP component 2 which provides solar home systems for those who will not be reached by the minigrid.

After the discussions in the FGD for women, Myra requested that they elect 2 women who will be in charge of communicating any grievances to the Ministry of Energy and implementing agencies.
The following were nominated:

Name	ID number	Telephone number
Catherine Loreng’	30777499	0793951779
Jacinta Asimit	3999839	0727903293

FGD - YOUTH

The youth said they had understood the issue of the minigrid, had no more questions and proceeded to nominate the following representatives as a member of the GRC

Name	ID number	Telephone number
Lobwin Haron	36331935	0708037547

8.0 REVIEW OF FEEDBACK FROM FGDS BY ALL COMMUNITY MEMBERS

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

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

The community nominated the following as members of the GRC:

No	Name	Design.	1D No.	Mobile No.
1	Michael N. Lokwakol	Men	10986387	0790604608
2	Joseph E. Ekunoit	Men	13647323	0792977119
3	David M. Emase	Men	11512716	0710232300
4	Catherine Loreng'	Women	30777499	0793951779
5	Jacinta Asimit	Women	3999839	0727903293
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REPUBLIC OF KENYA

MINISTRY OF ENERGY

KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP).
ENVIRONMENTAL, SOCIAL SCREENING AND LAND ACQUISITION FOR PROPOSED SOLAR MINI-GRID FOR COMMUNITY FACILITIES, ENTERPRISES, AND HOUSEHOLDS.

SITE ..KALOKOL.....

MEETING VENUE..KALOKOL.....

DATE..11/03/2021..... PLENARY

LIST OF ATTENDANCE/PARTICIPANTS LIST

No	NAME	Identification number –ID No	Mobile No.	Gender Male/Female	Village	Do you agree to donation of land Yes/no	SIGN.
1.	JOSEPH EKUNOIT	13647373	0792977119	M/L	KALEGE	YES	
2.	CHARLES KEMEIKETOY	28559977	0748661312				
3.	SIMON KIBEI	36152560	0740076970	M	NASUKUA	YES	

	NAME	ID NO.	MOBILE NO	GENDER M/F	Village	Do you agree to Donation of land YES/NO.	
4.	NATOO ROBERT Elee	31924623	0726162259	M	NASIKIRA	YES	
5.	KIPICENOI Evans	33084982	0710003449	M	NAKATORONOT	YES	
6.	EKADELI PHILEMON	33788784	0792104070	M	FISHERIES	YES	
7.	DANIEL NANGIRO	27925091	0706353971	M	KAILELE	YES	
8.	MICHAEL EKURE						
9.	FRANCIS LOKADUTO	8738212	0790287512	M	Kalokol	YES	
10	MARATUKOR	8738890	0723541941	M	Kalokol	YES.	
11	PHILIP KAMAU	0797770057	0610401	M	KALO	YES	
12	IRENE KAWIRA	26961056	0729081220	F	NAIROBI	N/A	
13	Kioko Mailtye	109290666	0722176597	M	NRB	YES	
14	LAWRENCE LOKAMAR	23663661	0716062907	M	LODWAR	YES	
15	Caleb Ewoi	28058415	0714371688	M	LODWAR	YES	
16	AGNO GATHOKI	11595322	0725833869	F	NRB	N/A	
17	Myra Mukull	21796290	0722659305	F	NRB	N/A	Mukull
18							

	NAME	I.D. NO	MOBILE NO	GENDER	VILLAGE	DO YOU AGREE TO DONATION OF LAND YES/NO	SIGN
4.	CHIEF DANIEL NAMOSENC	06100246	0726476279	M	KALOKOL	YES	
5.	ASST. CHIEF - STEPHEN JAMADA	20684722	0723247188	M	KALOKOL	YES	
6.	EMASE MAJUKITENG DAVID	11512716	0710232300	M	KALOKOL	YES	
7.	PHILIP EKALUCAN	4797098	0719622888	M	KALOKOL	YES	
8.	DAVID NGIPAE	4792687	0714364143	M	KALOKOL	YES	
9.	EKAE LOCHONGA	0610442	0708965038	M	KALOKOL	YES	
10	MICHAEL NAKUNA LOKWAKOL	10986387	0790604608	M	KALOKOL	YES	
11	EROT EDUKUON TIRIKWER	4806123	0713164171	M	KALOKOL	YES	
12	John ESIRIE	0610633	0713384159	M	KALOKOL	Yes	
13	REUBEN ESIBITAR	23782597	0725160552	M	KALOKOL	Yes	
14	Malvin EKAI	36914236	0769253521	F	KALOKOL	Yes	
15	EKUNYUK MARGIN	27960384	0795119078	M	KALOKOL	YES	
16	JONES -E. EKAI	20071784	0745798419	M	KALOKOL	Yes	
17	SAMUEL ELAAR	36142727	0705699688	M	KALOKOL	Yes	
18	EBENTO LOKOMER	23263658		M	KALOKOL	-	

	NEME	ID NO.	MOBILE NO.	GENDER M/F	VILLAGE	DO YOU AGREE TO DONATE LAND YES/NO	SIGN
19	JOHN EROO MOIKE	8205226	0727401909	M	KALOKOL	YES	[signature]
20	Peter Kaling	12433449	0711157246	M	Kalokol	Yes	[signature]
21	Jonathan Kamary	22449984 / 07777	0759728096	M	KALOKOL	Yes	[signature]
22	GIDEON EKIRU	32248971	0708892797	M	KALOKOL	Yes	[signature]
23	James Elabo	25670253	0707418130	M	KALOKOL	yes	[signature]
24	EROT IGNATIUS EGEILAN	31922334	0748061656	M	KALOKOL	YES	[signature]
25	JOHN EBEI	26767643	0794703484	M	KALOKOL	YES	[signature]
26	JOHN NAMORU LOUREN	33644894	0713003660	M	KALOKOL	YES	[signature]
27	PETER MZEE	30766100	0758342731	M	KALOKOL	yes	[signature]
28	PHILIP EDAPAL	0144203		M	KALOKOL	YES	[signature]
29	PAUL LOKWEE	31981267	0708791634	M	KALOKOL	YES	[signature]
30	Daniel Emase	31485069	0798931114	M	KALOKOL	YES	[signature]
31	CHARLES EFOO	0610008	0724453009	M	KALOKOL	YES	[signature]
32	Brenda AMEKWI	34000009	0742739983	F	KALOKOL	YES	[signature]
33	Jenerica LOKIRU	32555409	0717484956	F	Kalokol	yes.	[signature]

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