MINISTRY OF ENERGY
Nairobi
Republic of Kenya

REREC
RURAL ELECTRIFICATION & RENEWABLE ENERGY CORPORATION

THE WORLD BANK

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

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

Comprehensive Project Report (CPR) FOR THE PROPOSED NAPOSIMORU OFF-GRID SOLAR PROJECT AT COORDINATES 2°40'03.2088" N 35°50'40.3368" E

2023

Norken International Ltd
ENGINEERING AND MANAGEMENT CONSULTANTS
ISO 9001:2015 CERTIFIED

CENTRIC AFRICA LTD

CERTIFICATION

This Comprehensive Project Report (CPR) has been prepared by ESIA /EA Firm of Experts, **Centric Africa Ltd, Reg. No.7112 and Norken International Ltd, Reg. No.0181.** The report has been written with diligence in accordance with the World Bank Operational Procedures OP, Environmental Safeguards Standards (ESS), the EMCA 1999 *(Amended, 2015)* and the Environmental and Social Impact Assessment and Audit Regulations, 2003 to bring out the true nature of the intended development**.** The report was prepared based on the information provided by various stakeholders and community members at Naposimoru, Turkana County as well as from primary and secondary sources. It is therefore, issued without any prejudice.

We the undersigned, certify that the particulars in this CPR are correct and righteous to the best of our knowledge.

PROPONENT:

Represenatives of

1. *Ministry Of Energy*

   Mr/Mrs. .....Sign .....Date.....

   Position /Desiganation.....

ESIA/EA FIRM OF EXPERTS:

Norken International Ltd
ENGINEERING AND MANAGEMENT CONSULTANTS

CENTRIC
AFRICA LTD

Signature: _____ Date: _____

Isaiah Kegora
NEMA Expert (Reg. No. 1893).
For Norken (I) Ltd & Centric Africa Ltd

ACKNOWLEDGEMENT

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Finally, the consultant wishes to acknowledge and appreciate the efforts and inputs by MOEP, the Implementing Agencies (KPLC and REREC), and the World Bank Group teams in reviewing this report to the required standards.

LIST OF ACRONYMS

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
ESMS	Environmental and Social Management Systems
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

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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 Turkan County, one of the target counties, the Proponent is proposing to develop a number of mini grid facilities including Naposimoru 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 Naposimoru 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 Naposimoru 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 Enhancement 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 Naposimoru Sub-location, 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 topography of the project area is diverse, featuring vast plains, scattered low-lying hills, and occasional rocky outcrops. It is part of a semi-arid landscape with undulating terrain. The flat plains offer space for livestock grazing, while the hills provide some relief and shelter. However, the irregular topography poses challenges to agriculture and water management, influencing water runoff and drainage patterns. Overall, the project site is relatively flat.

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

E-6 Project Description

The Naposimoru Mini Grid project aims to provide electricity to approximately 403 (399 Residential and 4 Non-Residential) consumers in Naposimoru Village, Naposimoru Sub-location, Lochwaa location, Lokichar ward, Turkana South Sub-County in 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 estimated cost of the project is around USD 443,215.46 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 Naposimoru Mini Grid approximately 0.6 hectares of land the 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 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 Naposimoru Mini Grid is chosen as the most suitable location for the mini-grid based on factors such as sunlight availability and the community's lack of grid connectivity. The use of wind power, thermal power, fossil fuels, and power import from neighbouring countries are considered as alternative methods of power

generation but are found to have limitations or environmental concerns. Solar energy is favored due to its low production costs, versatility, clean nature, and economic savings. The "No Project" alternative is deemed unfavorable as it would maintain the current lack of electricity access and hinder socio-economic development. The project will be constructed using modern materials and technology, with a focus on public health, safety, security, and environmental requirements. The technology will involve a Battery Energy Storage System.

E-8 Stakeholder Engagement

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

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

During the ESIA stakeholder engagement public meeting, which took place on January 14th, 2022, a total of 113 stakeholders attended. The meeting provided an opportunity to discuss project details, including the preliminary design, positive and negative impacts, and Enhancement Measures. Stakeholders were encouraged to share their views and provide feedback on the project.

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

E-9 – Impacts and Enhancement Measures

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

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

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

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

Table 0-1: Summary of Pre-construction Impacts

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

Table 0-2: Summary of Construction Phase Impacts

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

Table 0-3: Summary of Operation Phase Impacts

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

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

Table 0-4: Summary of Decommissioning Impacts

Impact	Significance Of Impact (Pre-Mitigation)	Residual Impacts (Post-Mitigation)
Employment opportunities	Positive	Positive
Site rehabilitation	Positive	Positive
Soil environment	Minor	Negligible
Air quality	Moderate	Negligible
Ambient Noise	Minor	Negligible
Waste generation and soil contamination	Minor	Negligible
Occupational safety and health	Moderate	Minor
Gender based violence, SEA and SH	Minor	Negligible
Exclusion of VMGs, Vulnerable individuals and households	Major	Minor
Risk of communicable diseases	Minor	Negligible

E-10 Environmental and Social Management and Monitoring Plan

A comprehensive set of Enhancement 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 Enhancement 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 Enhancement 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 Enhancement 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

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. Turkana county was identified as one of the underserved Counties and others include Mandera, Narok, Garissa, Tana River, Samburu, Isiolo, Marsabit, West Pokot, Turkana, Taita Taveta, Kwale, Kilifi and Lamu.

Driven by the imperative to provide equal opportunities across the entire Kenyan territory as key to achieving Kenya's Vision 2030, and the National target of achieving universal access to electricity by 2020, the GoK now seeks to close the access gap by providing electricity services to remote, low density, and traditionally underserved areas of the country. The World Bank's (WB) Country Partnerships Strategy (CPS) for Kenya (2014-18) also recognizes the access to basic electricity, as a key developmental issue. The Strategy sets at improving core infrastructure as one of the Projects the WB will be engaged in. It also emphasizes the importance of mobilizing concessional funding to expand the sector including electricity generation, transmission, and distribution to meet the Government's economic growth targets.

KOSAP 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. The population in Turkana County 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 Coordination (Amendment) Act, 2015, Environmental (Impact Assessment And Audit) Amendment) Regulations, 2019 and World Bank's Environmental and Social Safeguards. 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 ESS. 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 KOSAP.

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.

1.2 Project Overview

The project is located 58km North East of Lokichar town in Naposimoru Village, Naposimoru Sub-location, Lochwaa location, Lokichar ward, Turkana South Sub-County in Turkana County at GPS coordinates of Latitude 2°40'03.2088"N and Longitude 35°50'40.3368"E. The proposed solar mini grid will be located on an approximately 0.6 Ha piece of land.

Figure 1. Map showing the proposed site

The solar mini grid will contain Solar panels, batteries, invertors, perimeter fence and length of transmission line to cover a circuit distance of approximately 13.79 km.

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 Enhancement Measures and an Environmental and Social Management Plan (ESMP) for the project. The report also evaluates the environmental and social risks associated with the project and implements Enhancement Measures to avoid adverse impacts for the remainder of the project's lifecycle. The project must comply with international standards (World Bank Environmental and Social Safeguards) along with applicable national, state, and local regulations.

1.4 ESIA Methodology

1.4.1 Screening and Scoping

1.4.1.1 Screening Methodology

Evaluation of ESIA procedure has been undertaken as a fundamental procedure to implementation of the solar power mini-grid development project which is systematically mainstreamed into the project's Cycle. World Banks Social safeguards 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 ESIA TEAM

The ESIA Team comprised of the following Team members;

NAME	ORGANISATION
Samwel Olela	REREC
Samuel Ebei	MOE
Miss. Loise	Centric Africa Limited
Miss. Watiri	Centric Africa Limited
Martin Mbabu	Norken International Limited
Patrick Ngari	Centric Africa Limited

1.4.3 Data Collection

The approach and methodology applied during the study enabled collection of both primary and secondary data. Qualitative and quantitative methods of data collection were employed. Secondary data was obtained through literature reviews while primary data was obtained through physical observations, photography, interviews and stakeholders' consultation. During the ESIA process consultations were also undertaken to obtain the views of immediate community, interested groups and affected groups within the site's immediate area of influence. The consultation was done with the immediate neighbourhood of the proposed site.

1.4.4 Environmental Impact Assessment

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

1.4.4.1 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 for Turkana was done on 13th January 2022 as the teams disperse for field assessment.

1.4.4.2 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 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.

1.4.5 Project Description

The consultant firm 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 projects 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

1.4.6 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 entails 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 CPR report. The ecological and biophysical environment will focus on describing the *flora* and *fauna* resident in the Turkana County at the mini-grid site level. This will be based on ecological surveys, KPIs on local indigenous knowledge on historical and status of rare, endemic, and endangered plant and animal species known to occur in these localities. 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.

1.4.7 Impact Assessment 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. 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 will be 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 will include the poor, elderly persons, PWDs, the sick, poor women, poor single mothers, child-headed households. The VMG's include ethnic minority communities that are present in Naposimoru 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.

1.4.8 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 as 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 Enhancement 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 through the project cycle. This plan follows through a description of the impacts and areas affected, key Enhancement Measures, monitor-able indicators, timeframe, responsibilities, and budget implications.

The ESMP include an implementation schedule and budget cost estimates for the Enhancement Measures both capital and recurrent costs estimates and the financing entity. It also describes institutional arrangements regarding 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 Enhancement Measures that will be implemented in the event physical cultural resources are encountered during subproject 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, labor rights and the employment of community members. The ESMP also have a budget to guide the contractor on resources required for the implementation and monitoring of the ESMP.

Figure 2 is a summary of the methodology the firm will adopt in undertaking environmental and social impacts assessment for the proposed KOSAP project

Figure 2: Summary of Environmental and Social Impact Assessment Methodology

1.5 Limitations

The limitations experienced during the study are illustrated below.

- ✓ Risk of being infected or transmitting COVID-19. The teams had to adopt preventive measures by wearing face mask and providing the community members with face mask and sanitizers during the public meetings and interactions.
- ✓ 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 experiencing bandit attacks by the hostile community individuals. This was mitigated by having informed Kenya police and receiving escort where need be as the study was being conducted.
- ✓ The risk of having mechanical failure due to poor roads. This was mitigated by making back up vehicles/plans when this happened.

1.6 Layout of the Report

Table 5. Structure of the ESIA Report

SECTION	TITLE	DESCRIPTION
Section 1	Introduction	(*This section*) Introduction to the Project and ESIA scope and methodology adopted.
Section 2	Project Description and Alternatives	Technical description of the Project & related infrastructure and activities.
Section 4	Environmental, Ecology and Social Baseline	Outlines Environmental, Ecology and Social Baseline status in the study area of the Project
Section 3	Policy, Legal and Regulatory Framework	Discusses the applicable environmental and social regulatory framework and its relevance for the Project. (The world bank safeguards and EMCA and environmental regulations)
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 Enhancement Measures	This section includes details of identified environmental impacts and associated risks due to Project activities, assessment of significance of impacts and presents Enhancement Measures for minimizing and /or offsetting adverse impacts identified.
Section 7	Environmental and Social Management Plan	Outline of the ESMP considering identified impacts and planned Enhancement 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 AND 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 and facilitates and identification of the potential impacts on resources and receptors that could result from project activities during the pre-construction, construction, operation, and decommissioning stages.

The components of the proposed solar mini grid are provided as follows.

Table 6. Component of the proposed Solar Mini-grid

S/NO.	PARTICULARS	DESCRIPTION
1.	Project location	The project is located 58km North East of Lokichar town in Naposimoru Village, Naposimoru Sub-location, Lochwaa location, Lokichar ward, Turkana South Sub-County in Turkana County at GPS coordinates of Latitude 2°40'03.2088"N and Longitude 35°50'40.3368"E. The proposed solar mini grid will be located on an approximately 0.6 Ha piece of unregistered community land.
2.	Land Size/Tenure	The proposed solar mini grid will be located on an approximate 0.6 Ha piece of land near Naposimoru village in an open space with very little vegetation. The land is an unregistered community land.
3.	Minigrid Power	PV Array (DC-kW) of 100kw; 250kWh Battery; Diesel generator Diesel Prime Rating 60 kVA.
4.	Distribution line	LV Circuit of 13.79km
5.	Target Consumers	403 (399 Residential and 4 Non-Residential) with an average of 20 shops, 3 butcheries, two schools, 3 churches and a health unit.
6.	Climatic condition	The county experiences annual average relative humidity of 22 per cent. Monthly temperatures in Turkana County between 20 and 40°C. South-eastern Turkana is significantly hotter than the rest of the county. The long rainy season is significantly wetter than the short rainy season. The dry season runs from the end December into February. April experiences the most rainfall (more than 50 mm per month). The county is prone to seasonal flash flooding during the rainy seasons which makes roads impassable.
8.	Site Conditions	The site is generally in open area with minimal and scarce *fauna* and *flora*.
9.	Road Accessibility	Off Kapenguria- lodwar road: 23km Earth road
10.	Nearest Airport	Lodwar International Airport at about 58km
11.	River/canal/nallah/ pond present in project footprint	None
12.	Protected areas (National Park/ Sanctuary)/ Forest land within 10 kms	None
13.	Existing grievance redress mechanisms	There are elders in the community who provide leadership and oversight to the community. These elders are responsible for dealing with conflicts or grievances or any issue in the community. Any of the grievances that is difficult to resolve is referred to the office of the Chief. Most of the grievances are solved by the elders and we rarely have any cases going to the chief

2.2 Project Location

The project site is located in in Naposimoru Village, Naposimoru Sub-location, Lochwaa location, Lokichar ward, Turkana South Sub-County in Turkana County at GPS coordinates of Latitude 2°40'03.2088" N and Longitude 35°50'40.3368" E. The proposed project will be constructed on an unregistered community land measuring approximately 0.6 Ha.

The site soil is primarily sandy within the area. The project site is approximately 58km North East of Lokichar town.

Figure 3: Proposed site for the Napusimoru Solar Mini-grid project with scarce vegetation

Figure 4: Project location

2.2.1 Project site setting

The proposed Naposimoru mini grid is in Turkana County. It falls under cluster 1 with a total of 147 minigrids and lot 1 which has a total of 23 mini-grids in Turkana. Geographically, Naposimoru site falls on coordinates Latitude 2°40'03.2088"N and Longitude 35°50'40.3368"E.

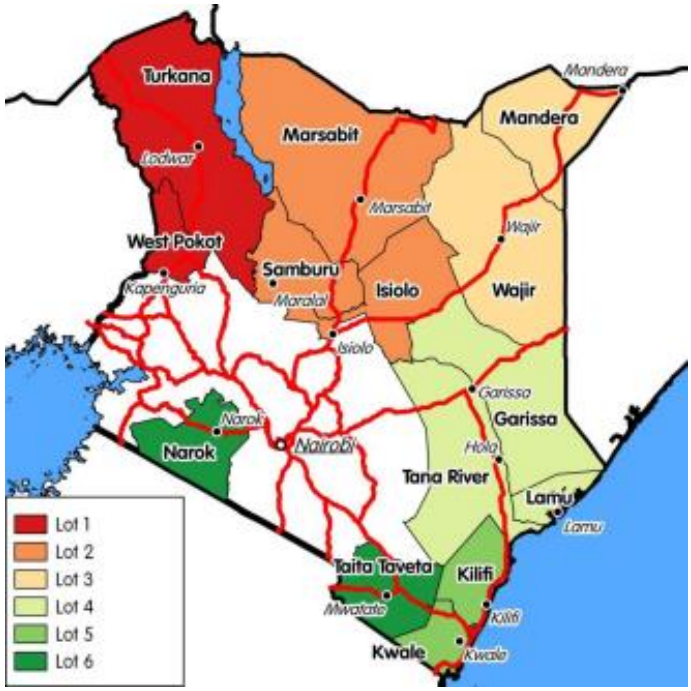


Figure 5: Map Showing the KOSAP Counties Lot 1

2.3 Description of Project and Alternatives

2.3.1 Project Components

2.3.1.1 Solar PV modules

The project will use PV Array (DC-kW) 100 polycrystalline silicon module with three strings connected in series. Each string will have five sets of panels connected in series, with output converged at the six-way combiners. The life expectancy of the PV modules is estimated at 25-30 years.

2.3.1.2 Battery Energy Storage System

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

2.3.1.2.1 Lifetime

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

2.3.1.3 Battery Inverters/ Chargers

The Inverters/charges shall be designed for nominal voltage of 415 Vac which will be 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. The inverter shall be 3-phase multi-mode (DC to AC and AC to DC), bi-directional, four-quadrant capability.

2.3.1.4 Distribution lines

The site will have a distribution line circuit of 13.79km 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. Among the consumers will be 403 (399 Residential and 4 Non-Residential) with an average of 20 shops, 3 butcheries, two schools, 3 churches and a health unit. The connection cables shall be rodent proof to reduce cables being chewed by rodents on that could lead to short circuiting

2.3.1.5 Project cost

Naposimoru project cost is estimated at **USD. 443,215.46**

2.3.2 Project Phases and 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.

2.3.2.1 Construction Procedures

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

The project inputs will include the following.

- Construction of raw materials will include solar modules, inverter, wires, metals, among others. All these will be obtained from licensed dealers and especially those that have complied with the environmental management guidelines and policies.
- Construction machines will include machinery such as trucks, and other relevant construction equipment. These will be used for the transportation of materials, clearing of resulting construction debris.
- A construction labour force of both skilled and non-skilled workers will be required.

Construction activities will include the following:

- Contractor mobilization.
- Site Preparation.
- Procurement of construction material from approved dealers and transport to the site.
- Storage of PV modules delivery and their installation.
- Laying of internal electrical connections.
- Installation of inverters, Battery Energy storage system and transformers.

2.3.2.2 Land Tenure

Land ownership in Turkana County is mainly community land, trust land and private land. The land for the proposed site is on unregistered communal land. The community has since offered the land to the project proponent establishment of the proposed project.

An A-RAP applies where affected persons are not physically displaced, and less than 10% of their productive assets are lost, or fewer than 200 people are displaced. In the case of KOSAP sub-projects, there is no physical displacement of affected persons, and the foreseen impacts on livelihoods such as grazing occasioned by mini-grid construction, wayleaves acquisition, and implementation of community projects are considered minor. A-RAPs will be implemented for sub-project sites on registered and unregistered community land/group ranches.

2.3.2.3 Compensation Details

Compensation for the land for the proposed project will be in kind where the Proponent will undertake some projects for the community as token.

The main key area for development activities identified by the community in Naposimoru included; water, health and school. They are listed as foolws:

- **1st Priority** – Specifically, the community gave priority to water reticulation by solarization of borehole water through pumping and distributing it to the community water kiosks.
- **2nd Priority** - The second priority was provision of better services in Naposimoru Dispensary by constructing laboratory, maternity wards and provision of drugs.
- **3rd Priority** - The third priority was to provide access to better education by constructing classes and dormitories and offering scholarships to students/pupils.

2.4 Resource Requirement

2.4.1 Workforce Requirement

Approximately 40 skilled, semi-skilled and unskilled Laboure's will be required at the construction stage. During the operation phase, the following personnel will be required; one operations and maintenance head, 2 engineers and 5 technicians.

Approximately 5 unskilled workers will be involved during operation phase of the project for grass cutting and module cleaning. Also, two trained security guards will be engaged at the operations phase. The first priority will be given to the losevencals who will form the huge number of the employed.

2.4.2 Water Requirement and Source

2.4.2.1 Construction Phase

It has been estimated that approximately 50,000 liters 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 upon the mobilization of construction workers at site. The water for the construction phase will be sourced from the local water points, the nearest is community borehole located at about 300m to the proposed site. The available water points within Naposimoru area are sourced from a borehole which is about 300m and the rest is fetched from shallow hand dug wells in the nearby laggas which dry up on drought seasons. The contractor will use water resource in a sustainable manner to avoid community conflict. The extraction of the said water will need to be improved to serve all.

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. Water requirement during operational phase of the project will be met from the water vendors in the area.

Approximately, 10 employees (direct and contractual) will be working during operation phase. For this workforce, approximately between 5,000 Liters of water will be required weekly for domestic consumption. Community members will be given the first priority dependant upon the skill set they can provide.

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 appropriate sources within or outside the country.

2.4.3.2 Operation Phase

There will not be 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 is in the implementation stage.

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 site and on the fence.

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 Risk 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. The maintenance of the site will also involve vegetation and weed control due to the fact that undergrowth weeds can cause shading. This will mainly be controlled by mainly Mowing and spraying herbicides.

The solar panels might have hot spots that might cause fire. Some of the factors that could cause hot spots include the quality of PV cells, improper installations, and maintenances, shading situations or even bird excrement, etc. The damaged or blocked areas of a PV cell can heat up and cause fire. The key to preventing this fires is high quality design, installation and testing in accordance with applicable electrical codes and minimizing the combustible loading.

2.5 Pollution Streams during Construction Phase

2.5.1 Solid Waste Generation

2.5.1.1 Construction Phase

The key solid waste that is expected to be generated during construction phase include. Broken solar panels and PV Modules, Hazardous waste like waste oil, lubricants, oil contaminated rags and Domestic soil from the temporary site office.

The hazardous wastes will be stored onsite at separate designated covered area provided with impervious flooring and secondary containment. The storage containers/ bins/ drum will be clearly marked, and color coded for their hazards. The waste will then be collected by a NEMA approved waste handler.
Any broken solar panels or PV Modules will be sent back to the vendor as part of buyback arrangement. Alternatively, the e-waste will be disposed by licensed waste handlers in sites that are licensed by NEMA and local authorities to dump e-waste. All the other domestic solid waste will be disposed at the nearest municipality dumpsite.

2.5.1.2 Operation Phase

During operation phase, waste generated from the project will include domestic waste at site office, scrap materials like scrap tools, damaged PPEs etc.; hazardous waste like waste oil, lubricants, used transformer oil; damaged batteries; electronic waste like damaged PV modules etc.

The hazardous wastes will be stored onsite at separate designated covered area provided with impervious flooring and secondary containment. The storage containers/ bins/ drum will be clearly marked, and color coded for their hazards. The waste will then be collected by a NEMA approved waste handler.

Any broken solar panels or PV Modules will be sent back to the vendor as part of buyback arrangement. Alternatively, the e-waste will be disposed by licensed waste handlers in sites that are licensed by NEMA and local authorities to dump e-waste. All the other domestic solid waste will be disposed at the nearest municipality dumpsite.

2.5.2 Air Emissions

2.5.2.1 Construction Phase

Air quality will be impacted due to onsite construction activities. The likely emissions from construction activities would include the following:

i. Dust emissions from the dusty roads leading to the site.

ii. Increased vehicular emissions due to the high traffic of vehicles transporting construction materials, PV Modules, and accessories.

iii. Dust emissions from site clearing, material handling, piling and use of the construction machinery.

iv. Exhaust emissions from the diesel generator.

The high dust emissions arising from various activities such as piling, transportation of material (loading and unloading), vehicular movement (on unpaved roads) should be minimized through sprinkling of water and maintaining vehicular speed to 10-15 km/hr.

All the vehicles and the Diesel generator should be well maintained and serviced to reduce the rate of exhaust emissions.

2.5.2.2 Operation Phase

It is expected that the normal operations of the site will produce minimal gaseous emissions from all the operating areas. The minimal gaseous and fugitive dust emissions will be attributed to the in and out movement of the maintenance vehicles. It will be ensured that well maintained vehicles are used for maintenance purposes.

2.5.3 Waste Generation

2.5.3.1 Construction Phase

The liquid effluents generated during the construction phase will include domestic sewage from temporary site offices, kitchen and washing areas. As part of the site preparation stage, septic tank will be constructed for the camp and site office. Sewage disposal trucks should be used to periodically remove the sludge/sewage from the septic tank.

2.5.3.2 Operation Phase

The operational phase will have negligible wastewater generation at site office. Septic tank and soak pits will be provided at the site office for disposal of sewage.

2.5.4 Noise Emissions

2.5.4.1 Construction Phase

Noise emissions will be generated from piling, movement of vehicle and other construction machinery and operation of the Diesel Generator. The main noise receptors will be the neighboring settlements and the construction workers. Noise from Diesel Generators will be minimized through provision of acoustic enclosures and occasional maintenance of the generator. Every single noise generating activity will be restricted to Day time only.

2.5.4.2 Operation Phase

Under normal operations, none of the activities of solar power plant will generate noise. The only noise that can be generated at this phase is during the maintenance works and it will be restricted to daytime only. However, during cloudy periods and when solar energy is low, the backup generator that will be utilized will produce noise. Mufflers and silencers will be installed so as to minimize noise pollution from the backup generator.

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.

2.5.5 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 which located south of Naposimoru Village. The site was identified based on the location of settlement areas, commercial/ public facilities in Naposimoru. The site is within 400m to the village and at a central location to the settlement areas within Naposimoru.

Further details on the other locations identified were not available.

- No settlement present in the project site;
- The project site land is predominantly unregistered community land held in trust by the county government on behave of the community;
- The project site has few scattered trees and shrubs.
- The project site land is on flat sandy ground where no agriculture is done.

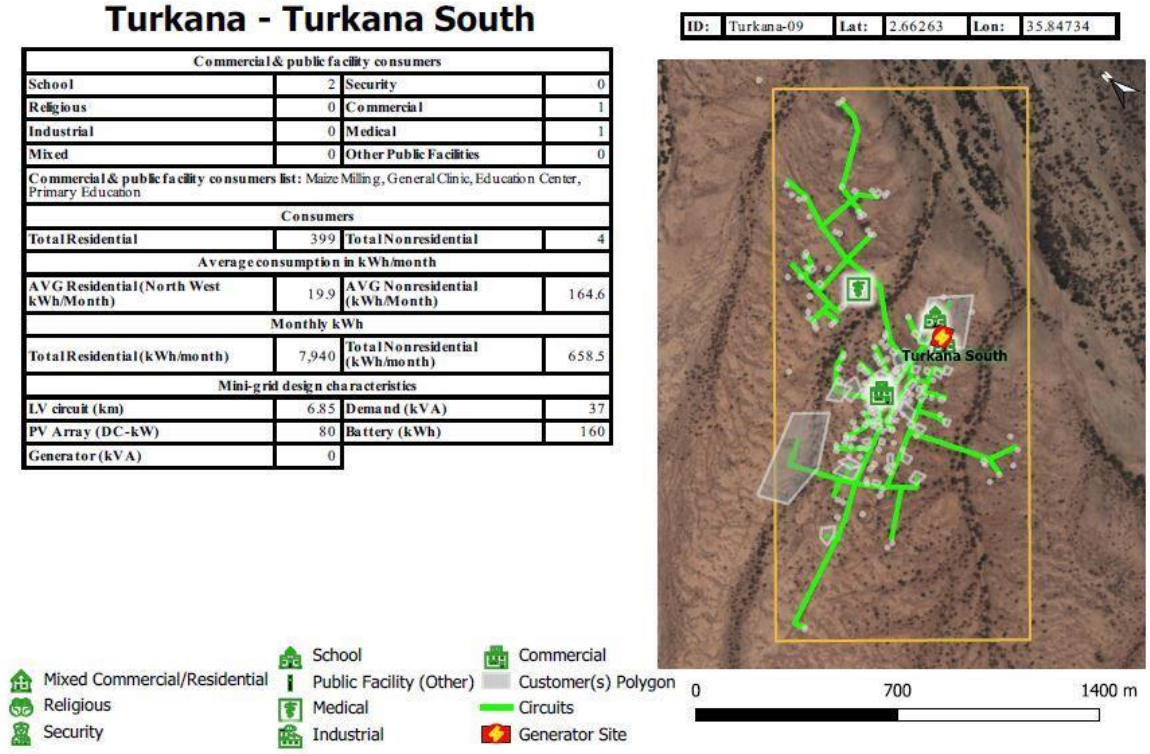
The proposed project site has the following location advantages:

- The land is unoccupied and does not have any ecological sensitive receptor such as national parks, Wildlife Sanctuary within 10 km radius;
- No cultural property of archeological importance within 5 km radius and
- The closest available power from National grid is located at about 58 km away, at Lokichar township

PROPOSED PROJECT SITE & PROXIMITY TO CONSUMER SITES

Naposmoru
Turkana - Turkana South

Commercial & public facility consumers			
School	2	Security	0
Religious	0	Commercial	1
Industrial	0	Medical	1
Mixed	0	Other Public Facilities	0
Commercial & public facility consumers list: Maize Milling, General Clinic, Education Center, Primary Education			
Consumers			
Total Residential	399	Total Nonresidential	4
Average consumption in kWh/month			
AVG Residential (North West kWh/Month)	19.9	AVG Nonresidential (kWh/Month)	164.6
Monthly kWh			
Total Residential (kWh/month)	7,940	Total Nonresidential (kWh/month)	658.5
Mini-grid design characteristics			
LV circuit (km)	6.85	Demand (kVA)	37
PV Array (DC-kW)	80	Battery (kWh)	160
Generator (kVA)	0		



2.5.6 Power Scenario at Naposimoru

Lochwaa location has an estimate of 18,675 number of people with approximately 983 households within the area. The proposed solar off grid project is estimated to cover up to 403 residential and non-residential consumers within the area. This will reach out to over 52% of the population within the area.

Most of the Turkana county households depend on wood fuel (Firewood and Charcoal) for cooking and others depend on kerosene lantern for lighting and others on electricity especially in grid connected towns which are very few. A huge percent of households use traditional stone fire for cooking.

The existing sources of energy at Lochwaa location include solar powered appliances supplied by private enterprises such as D-light. The current energy availability provided by the solar appliances is insufficient and does not meet the objective of the aim of project. Solar energy is mainly utilized for lighting and charging mobile phones. Whereas wood fuel is utilized for cooking, heating water and providing for warmth.

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 Naposimoru 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.

2.5.7 Analysis of Alternative

As per IFC Performance Standards, an analysis of probable alternatives for the chosen technology and location of project site along with other similar factors that contribute to the project as a whole has been carried out. The following scenarios have been taken into consideration:

- Alternate Location for Project Site
- Alternate Sources of Energy
- Zero or No Project Alternative

2.5.8 Alternate Location for Project Site

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

- The availability of primary resources required for the operation of the minigrid i.e Sunlight
- Availability of land to locate the site and associated infrastructure.
- Availability of security since the area is prone to raids.
- The availability and accessibility of infrastructure for the provision of services, manpower and social structure for the construction and operation of the solar minigrid.
- General environmental acceptability in terms of social impacts, water utilization, general ecology, etc.

Naposimoru was identified as the most suitable area for the establishment of the proposed minigrid based on the following factors:

Location: The area is in a predominantly pastoral setting. The population density is low, and majority of the surrounding land is de-vegetated grazing lands and tree cover is currently low at 15%. There is enough grazing land for the community and use of the site to construct the mini grid will not significantly impact grazing land.

Proximity to consumer sites: Lochwaa location has an estimate of 18676 number of people with approximately 983 households within the area. The proposed solar offgrid project is estimated to cover up to 403 residential and non-residential consumers within the area. This will reach out to over 52% of the population within the area.

1.6.4 Alternate Sources of Energy

Harnessing solar energy is an eco-friendly process, with an inexhaustible solar resource and minimal pollution. There are minimal fuel requirements for operational activities. Solar energy has a short development timeframe, more predictable energy output and low maintenance costs as compared to some other forms of renewable energy sources.

The possible alternatives to solar energy include;

- Wind power: shortfalls associated with wind power includes; lack of time series data of wind, trained human resources to intricate design of wind power etc, providing wind power for Naposimoru residents is technically and financially challenging, expensive to install, dependent on wind pattern (not strong in Naposimoru). However, generation is cheap, low emissions & insignificant pollution levels.
- Thermal power: High fossil consumption, high emissions levels, high water consumption levels (water highly scarce in Naposimoru). Besides coal and petroleum products used in thermal power processing are not readily available within Naposimoru area and may have to be sourced from far locations. Therefore, thermal power option based on coal and petroleum products is not a viable option for Naposimoru. It however has high distribution and large-scale production potential
- Nuclear power: disadvantages include; use of other fuel sources, has hazards associated with radioactive materials, expensive disposal of waste, high cost of project and long gestation period. The mode however does not emit smoke particles, low fuel cost, low emission levels and continuous electricity production.
- Wood fuel/ Firewood: The use of firewood and solid waste for electricity generation using thermal technology is another option. But the issue of air pollution and destruction of vegetative cover through firewood harvesting and charcoal burning already are environmental problems of serious concern which will further aggravate the natural environment. For these reasons, the wood fuel options evaluated above seem inappropriate for Naposimoru on environmental as well as economic grounds

Solar energy was a desirable option because:

- It has low energy-production costs
- The project is environment friendly with minimal greenhouse gas emissions
- Versatile installation
- It is a clean source of energy hence minimal impact on the environment air quality
- Economic savings.

2.5.9 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 Lochwaa location and Turkana South as a whole. The village and the surrounding area will continue to have no electricity, and this will not help in maximizing and utilizing the area facilities. The No Project Option is the least preferred from the socio-economic and partly environmental perspective due to the following factors:

- The economic status of the local people would remain unchanged.
- Employment opportunities will not be created.
- Increased poverty in the area.

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

2.5.10 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. 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.

2.5.11 Conclusion

The proposed project site is the best alternative based on the community need assessment and should be upheld to support the local community based.

2.6 Land Requirement and Procurement Process

2.6.1 Land Requirement

The land on which the proposed Naposimoru minigrid will be constructed covers an approximate total of 0.6 Ha in size.

2.6.1.1 Land Tenure

The entire county is categorized as community land. In Naposimoru, the site falls on Unregistered Communal land.

2.6.1.2 Compensation Details

The main key area for development activities identified by the community in Naposimoru included; water, health and school.

They are listed as follows:

- **1st Priority** – Specifically, the community gave priority to water reticulation by solarization of borehole water through pumping and distributing it to the community water kiosks.
- **2nd Priority** - The second priority was provision of better services in Naposimoru Dispensary by constructing laboratory, maternity wards and provision of drugs.
- **3rd Priority** - The third priority was to provide access to better education by constructing classes and dormitories and offering scholarships to students/pupils.

3 BASELINE SETTINGS- ENVIRONMENT, ECOLOGY AND SOCIAL

3.1 Study Area

The project site is located in Naposimoru Village, Naposimoru Sub-location, Lochwaa location, Lokichar ward, Turkana South Sub-County in Turkana County. Based on the secondary information of the region, the following baseline information on environment, ecology and social has been discussed under the sections below.

3.2 Environment Baseline

3.2.1 Geology and Soil

The county is generally covered with young sedimentary rocks with loamy soils in the north bordering the Sudan. The county has considerable deposits of Limestone and sand. The soils in the project location were predominantly sandy soil with patches of depressed land of loam and clay soil.

3.2.2 Topography

Turkana County is traversed by the extensive Eastern African Rift System. The topography of Turkana varies between semi-arid and arid landscapes consisting of low-lying plains and isolated hills and mountain ranges (Opiyo et al., 2015). The altitude extends from 369m at Lake Turkana to the highest point at around 900m near the Ugandan border in the west. The topography of the project site is an open area and relatively flat with a general hilly eastward and westward. Historical, monthly temperatures in Turkana County between 20 and 40°C. South-eastern Turkana is significantly hotter than the rest of the county. The long rainy season is significantly wetter than the short rainy season. The dry season runs from the end December into February. April experiences the most rainfall (more than 50 mm per month). The county is prone to seasonal flash flooding during the rainy seasons which makes roads impassable.

3.2.3 Hydrogeology and Drainage

The county is prone to seasonal flooding during the rainy seasons which makes roads impassable. 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 (Turkana County Investment Plan, 2016-2020). 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 semi- arid.

3.2.4 Ground Water Development

The ground water resources were majorly identified during the site assessment by means of observation and selected data hydrological model of the area. The site has two boreholes indicating presence of underground water. However, the water is slightly salty and very salty in some areas.

3.3 Ecological Conditions

The project area encompasses low trees, grass, and shrubs. Turkana County is a semi-arid area falling in the ecological zone V-VI. Zone V receives rainfall between 300-600mm annually, has low trees, grass, and shrubs. On the other hand, zone VI receives an annual rainfall of 200-400mm. No Crop activity is carried out in this area. All crops are procured in neighboring towns..

Naposimoru has drought tolerant flora tree species (Acacia spps including Vachellia reficiens and Commiphora Spps, Balanites aegyptiaca, Azadirachta indica (Mwarobaini), Salvadora persica) and gum tree. The Fauna: include the Avian Spps (Kite, Heron, Sacred Bird and Marabou Stork).

Plate 1. View of site locality with some of the tree species present

3.4 Climatic Conditions

The county experiences annual average relative humidity of 22 per cent. Monthly temperatures in Turkana County is between 20 and 40°C. South-eastern Turkana is significantly hotter than the rest of the county. The long rainy season is significantly wetter than the short rainy season. The dry season runs from the end December into February. April experiences the most rainfall (more than 50 mm per month). The county is prone to seasonal flash flooding during the rainy seasons which makes roads impassable.

3.5 Socio-economic Environment

3.5.1 Community Profile

Naposimoru village is in Lokichar ward, Turkana South sub-county in Turkana County. The project is located 58km North East of Lokichar town. The top community development priorities are 1st water, 2nd education and 3rd health in that order. The village has been in existence since 1983. 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. The community support mechanism includes emergency relief food/feed (for livestock and human). The main clan present in the area is Turkana. Christianity is the dominant religion. Below is a summary of demographic profile of Naposimoru.

Plate 2. Comunity household at Napusimoru

Attribute	Magnitude/Number
Approx. population	18,675(Location)
Households	983
Gender.	Male – 70% Female – 30%
Ave. No. per household	7 per household
Indigenous	Indigenous- 100% Settlers – 0%
Vulnerable classes	Elderly, PLWDs
Dominant ethnic group	Turkana
Primary religion	Christian
Other groups	None
Employment (formal/Informal)	Formal – Less than 5% Informal – 95%

Table 7: Demographic profile of Napusimoru

3.5.2 Socio-economic status of Study Area

3.5.2.1 Demographic Profile

The information shared on community profile by the area chief (Lochwaa location) showed that Naposimoru has a population of approximately 18,675, and with an estimated number of households to be 983 with an average of 7 people per household. Naposimoru has a gender ratio that is currently estimated to be about 70% male and 30% female.

3.5.2.2 Educational Infrastructure

The village has one primary school within the area. The school has a total of 360 pupils (240 Boys and 120 Girls) with 11 teachers (7Male and 4 Female). The school completion rate among the Boys is higher than that of the girls. Most pupils drop out at class 8 or Form 4 mainly due to lack of school fees, early marriages, lack of food and child labor (Taking care of livestock).

3.5.2.3 Occupation and Livelihood Profile

Naposimoru communities are mainly pastoralists moving with livestock in search of pasture and water. Major livestock kept are camel, cattle, sheep, goats, and local chicken. The communities rely on livestock products for food at the household level and for income generation. Formal employment is at 5%. Other sources of income in the society include sale of wood fuel/charcoal and firewood, building materials and retail shops. Due to the aridity of the county, food production (crop growing) is limited and contributes little to food security. The resident reported that no farming is done in this region.

3.5.2.4 Land Use

Land in the community is mainly communal. The land is used for homesteads and mainly for livestock grazing. Underground water is also harnessed from the land. No crop farming is practiced in Naposimoru.

3.5.2.5 Health facilities

Naposimoru has only one public health unit known as Naposimoru dispensary with 1 nurse, 1 PA (Patient Attendant) and 1 community health assistant. The facility has one room and the main service provided is Out-patient services. The facility lacks water, electricity, emergency vehicle, beds, adequate toilet facility and other basic equipment. The dispensary is open between 0800hrs and 1700hrs but offers 24hrs emergency services which is free of charge.

3.5.2.6 Social and Physical Infrastructure

Water: There are two sources of water in the village; borehole and shallow hand dug wells from which is 300m away.

Plate 2. Hand pump borehole at Napusimoru

Sanitation: Private toilet facilities are provided in the school, dispensary, churches and few households within the area. Open defecation (OP) also practiced in the village leading into poor waste management.

Road Network: Roads connectivity within the area is also poor and not regularly maintained. The main forms of transport within the area are matatus, lories and Motor bikes while donkeys and camels also provide alternative modes of transport from the villages. The proposed site is off Kapenguria to Lokichar road along an earth road 23km away.

Mobile Network Coverage: Network connectivity is very poor**.** *Safaricom* is the only Network coverage within the village which most of the time it does not connect and majority of people do not have access to the internet services. With poor service connection, basic phone connectivity is a very big problem in the area.

Power/electricity: - the community is not connected to the main grid. The population use mainly portable solar at the household for charging mobiles and lighting.

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 Policy Provisions

4.2.1 Kenya Energy Policy, 2014

The Energy Policy sets out the national policies and strategies for the energy sector that align to the Constitution of Kenya and Kenya's Vision 2030.

The Energy Policy envisages promoting an energy mix that includes solar energy at both the household/institutional levels as well as large-scale solar energy generation. The Government of Kenya has initiated and has been promoting programmes for the provision of electricity to institutions far from the grid through solar PV systems. The Government has also embarked on a programme to provide solar/diesel and solar/wind hybrid generation capacity to off-grid stations.

The Policy strategizes the need to:

- promote the widespread use of solar energy while enforcing existing regulations and standards.
- provide incentives to promote the local production and use of efficient solar systems.
- provide a framework for connecting electricity generated from solar energy to the national and isolated grids, through direct sale or net metering.
- promote the use of hybrid power generation systems involving solar and other energy sources; and
- facilitate the generation of electricity from solar energy by, among other things, funding, provision of land, fast-tracking issuance of permits and licenses, as well as acquisition of data and information to realize at least 100 MW from solar by 2017, 200 MW by 2022 and 500 MW by 2030.

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). Under the Energy Act of 2006, the Ministry is responsible for formulation and articulation of policies to provide an enabling environment for operators and other stakeholders in the energy sector. Relevant stakeholders in the ESI are briefly described below.

Table 8. Kenya power stakeholders and their roles

Stakeholders	Role
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 Regulatory Commission (ERC) (1).
The Energy and Petroleum Regulatory Authority (EPRA)	Established by the Energy Act of 2019. The EPRA's mandate extends beyond electricity and includes natural gas (including petroleum), renewables and all other forms of energy. The generation, transmission, distribution, supply, import and export of electricity can only be carried out by parties in possession of a license, or a permit issued by the EPRA. If 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.
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 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 Geothermal Development Company (GDC):	Is a 100% state-owned company, formed by the Government of Kenya as a Special Purpose Vehicle to fast track the development of geothermal resources in the country. The creation of GDC was based on the government's policy on energy - Sessional paper No. 4 of 2004, and the energy Act No. 12 of 2006.
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.

(1) As per the Energy Act of 2019, this role will now be performed by the Energy and Petroleum Regulatory Authority (EPRA).

4.2.2 Policy paper on Environment and Development (Sessional Paper No. 6 of 1999)

The overall goal of this Sessional Paper is to ensure that environmental concerns are integrated into the national planning and management processes and provide guidelines for environmentally sustainable development. The objectives of the Paper are to conserve and manage the natural resources of Kenya including air, land, flora, and fauna and promote environmental conservation about soil fertility and conservation, biodiversity, to foster afforestation activities, and to protect water catchment areas. More importantly, the Policy emphasizes the enhancement of public awareness and appreciation of the essential linkages between development and environment, involving NGOs, private sector, and local communities in the management of natural resources and their living environment and ensures that an environmental impact assessment report is undertaken for all public and private projects and programmes.

The proposed solar plant facility must ensure that it promotes this integrated approach to environmental management and development, without compromising the livelihoods of the local community.

4.2.3 National Policy on Water Resources Management and Development, 1999

While the National Policy on Water Resources Management and Development enhances a systematic development of water facilities in all sectors for promotion of the country's socio-economic progress, it also recognizes the by-products of this process as wastewater. The Policy therefore calls for development of appropriate sanitation systems to protect people's health and water resources from institutional pollution. This implies that industrial and business development activities should be accompanied by corresponding waste management systems to handle the wastewater and other waste emanating therefrom.

During construction, water will be required for concrete works and during the operational period water supply may be necessary for cleaning the PV modules. Appropriate water treatment and waste handling must be incorporated into the Project design to be in alignment with this policy.

4.2.4 Sessional Paper No. 10 of 2014 on the National Environmental Policy, 2014

The overall goal of this Session Paper is to ensure better quality of life for present and future generations through sustainable management and use of the environment and natural resources. This Session Paper calls for the use of environmentally sound technologies based on the best available techniques and policies as a way of minimizing negative impacts to the environment.

Section 5.6 of this Session Paper focusses on infrastructure development and environment and makes explicit policy statements to ensure sustainable management and use of the environment and natural resources during the construction and operation of infrastructure developments. These policy statements require the commitment of the government to:

- Ensure Strategic Environmental Assessment (SEA), Environmental Impact Assessment, Social Impact Assessment and Public participation in the planning and approval of infrastructural projects.
- Develop and implement environmentally friendly national infrastructural development strategy and action plan.
- Ensure that periodic Environmental Audits are carried out for all infrastructural projects

In line with the above policy statements, this ESIA has been conducted for the proposed solar project (including the associated infrastructure) to ensure that environmental and social issues are appropriately addressed.

Once approved by NEMA, the Project Proponent will also need to conduct periodic Environmental Audits to ensure continuous conformity with the overall goal of this Session Paper. In addition, this ESIA has considered analysis of alternatives including alternatives to technology to ensure that the best available and appropriate technology is used.

4.2.5 Kenya Off-grid Solar Access Project (KOSAP) Environmental & Social Management Framework, 2017

The World Bank is concerned about the environmental and social impacts of its activities and requires environmental assessments be done for all projects it finances. Its safeguard policies are aimed at preventing and mitigating undue harm to people and their environment in the development process also provide a platform for the participation of stakeholders in project design and implementation.

The framework was prepared because the geographic coverage for KOSAP was generally known but the exact locations for the sub projects had not been identified. The ESMF provides guidelines for MoE, KPLC & REREC in determining the appropriate level of environmental and social assessment required for the sub-projects and in preparing the necessary environmental and social Enhancement Measures for these sub-projects.

The proposed project will consider all relevant guidelines as provided by the KOSAP- ESMF

4.2.6 Resettlement Policy Framework (RPF)

The RPF states that K-OSAP component 1 (Mini grids for Community Facilities, Enterprises, and Households) which involves installation of mini grids will require land acquisition.

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

There will be no displacement of people/crops/etc. as the land allocated for Minigrid construction in open public Land. The land is part of the wider parcel set aside by the community that they have allocated to the project. Compensation for the land will be in Kind.

4.2.7 Vulnerable and marginalized Groups Framework (VMGF) for KOSAP

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

VMGF describes the policy requirements and planning procedures that during the preparation and implementation of components especially those identified as occurring in areas where VMGs are present.

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

The project area is inhabited by predominantly by the Turkana Community. Their presence in the project's footprint was clear with the only other communities present in the area that will benefit from the project being the Turkana, Somali and the Rendile

The Turkana, Samburu, Somali and the Rendile falls under communities in Kenya who are categorized by the World Bank's OP 4.10 and the Constitution of Kenya, 2010, as vulnerable and marginalized groups. Thus the VMGs that have been identified as those who would potentially be impacted by the project are mainly Samburu, Turkana, somali and the rendile who are mainly the minority.

4.3 National Legal Framework

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 9. 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.

4.4 Relevant statutes

The current legal provisions for natural resource management in Kenya are contained in over seventy sector-specific statutes. For a long time, the country lacked an umbrella legislative guide for harmonious and holistic environmental management. As such, resources were managed sectoral in accordance with the statutes that were in place.

As these statutes were contradictory at times, in 1999, the Government of Kenya enacted the Environmental Management and Co-ordination Act (EMCA) which is an umbrella legal framework under which the environment is being managed. EMCA establishes the institutional framework under which environmental management is to be coordinated. EMCA prevails over all other Sectoral laws relating to the environment in cases of conflict or contradictions. It also grants the public a *locus standi* in matters of the environment.

Table 10. National Policy Framework

No	Legislation/ Guidelines	Description of the Legislation/Guideline	Relevance of the legislation/regulations in terms of license, permits, and other requirements
	NATIONAL POLICY FRAMEWORK		
1.	Vision 2030	Kenya Vision 2030 is the current national blueprint for development from its inception in 2008 until the milestone year of 2030. This plan is the national long-term development policy that aims to transform Kenya into a newly 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 management and the conservation	• The NEMA does not approve a development project unless the impacts of the proposed project are evaluated and Enhancement 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.

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

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

LAWS AND LEGISTLATIONS

1	The Constitution of Kenya, 2010	The Constitution of Kenya promulgated in 2010 is the supreme law of the republic and binds all persons and all State organs at all levels of government. The Constitution provides the broad framework regulating all existence and development aspects of interest to the people of Kenya, and along which all national and sectoral legislative documents are drawn.	The proposed project complies with the Constitution by proposing a structure in its ESIA on how to deal with Social, Health, safety and environmental issues for sustainable development.
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 National Environmental Management Authority (NEMA). The EIA/EA Regulations also provide information to project proponents on the requirements of either an EIA or EA as required by the EMCA.	• The proposed project is subject to relevant provisions of these regulations and subsequently, the ESIA has been undertaken in accordance with the requirements.
4	L.N. 120: WATER QUALITY REGULATIONS, 2006	These regulation provides for the sustainable management of water used for various purposes in Kenya. For effluent discharges into the environment and aquatic environment, a Proponent needs to apply directly to the NEMA.	• These regulations will apply to the proposed project during the construction and operational phases. The contractor will be required to properly manage the effluent from construction activities in accordance with the above regulations prior to discharge into the environment.

		For discharges into public sewers, a Proponent needs to apply for the license to the relevant county. The regulation contains discharge limits for various environmental parameters into public sewers and the environment.	
5	L.N. 121: WASTE MANAGEMENT REGULATIONS, 2006	These regulations are comprehensive and cover the management of various kinds of waste in Kenya. Generally, it is a requirement under the regulations that a waste generator segregates waste (hazardous and non-hazardous) by type and then disposes the them in an environmentally acceptable manner. Under the regulation, it is a requirement that waste is transported using a vehicle that has an approved "Waste Transportation License" issued by NEMA. Wastes generated in Kenya must be disposed of in a licensed disposal facility. Such a facility will require annual environmental audits to be undertaken by NEMA registered Lead Experts. The regulation requires that prior to generating any hazardous waste, a proponent shall undertake an EIA Study and seek approval from the NEMA. Labelling of hazardous wastes is mandatory under the regulation and the specific labelling requirements are provided in Rule 18. The treatment options for hazardous waste disposal provided in Rule 19 include incineration or any other option approved by the NEMA.	• During the construction and operation phases, the proposed project will generate various streams of wastes. For the most part, it is expected that the wastes will be non-hazardous in nature and can be disposed of in accordance with these regulations.

6	L.N. 61: NOISE AND EXCESSIVE VIBRATION CONTROL REGULATIONS, 2009	The general prohibition of these regulations states that no person shall make or cause to be made any loud, unreasonable, unnecessary, or unusual noise which annoys, disturbs, injures, or endangers the comfort, repose, health, or safety of others and the environment. The regulations further provide factors that will be considered in determining whether or not noise and vibration is loud, unreasonable, unnecessary, or unusual.	• Rules 13 and 14 of the regulations define the permissible noise levels for construction sites. These noise limits will be applicable to the proposed project.
7	LICENSES AND PERMITS REQUIRED UNDER THE EMCA	The subsidiary legislations under the EMCA are partially monitored through the use of permits and licenses. Subsequently all licenses and permits required during the construction phase shall be the responsibility of the individual contractors and their agents. During the operational phase, all permits and licenses required to operate the project will be the responsibility of the proponent.	The subsidiary legislations under the EMCA requires some or all the following types of permits to be available for inspection during the construction and operational phases of the project: ✓ Effluent Discharge License under Legal Notice 120: The Environment Management and Coordination (Water Quality) Regulations 2006; ✓ Waste Transport License under Legal Notice 121: The Environment Management and Coordination (Waste Management) Regulations 2006 for disposal of all types of wastes; and ✓ Noise Permit under Legal Notice 61: The Environment Management and Coordination (Noise and Excessive Vibration Control) Regulations, 2009.
8	OCCUPATIONAL HEALTH AND SAFETY ACT, 2007	The Occupational Safety and Health Act (OSHA) was enacted to provide for the health, safety and welfare of persons employed in workplaces, and for matters incidental thereto and connected therewith. Part II of the Act provides the General Duties to which the occupier must comply with respect to health and safety in the workplace. Such duties include undertaking safety and health (S&H) risk	The proposed project will be undertaken in compliance with the OSHA-2007 during the construction, design, and operational phases. During the construction phase, the contractors will be required to fully comply with the requirements of Legal Notice 40 titled: Building Operations and Works of Engineering Construction Rules, 1984 (BOWEC). Each contractor will develop and implement a formal construction health and safety plan for the entire construction phase duration in alignment with the OSHA and international health and safety best practices.

assessments, S&H audits, notification of accidents, injuries and dangerous occurrences. A number of sections under this part shall be applicable to the proposed project.

Part IV deals with the enforcement provisions that Directorate of Occupational Safety and Health Services (DOSHS) has under the Act. It discusses the instances when Improvement and Prohibition Notices can be issued as well as the powers of Occupational S&H officers. This part of the Act will be mandatory for the occupier to comply with for the proposed project.

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

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

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

Part X of the Act deals with the General Welfare conditions that must be present during the construction and operational phase of the project.

		Such conditions include first aid facilities, supply of drinking water, accommodation for clothing, ergonomics, etc. This part of the Act will apply to the proposed project during the construction and operational phases. Part XI of the Act contains Special Provisions on the management of health, safety, and welfare. These include work permit systems, PPE requirements and medical surveillance. Some sections of this part of the Act will be applicable to the proposed project during the construction and operational phase. Part XIII of the Act stipulates various fines and penalties associated with non-compliance with the Act. It includes those fines and penalties that are not included in other sections of the Act and will be important for the Occupier to read and understand the penalties for non-compliance with S&H provisions. Part XIV of the Act is the last section of the Act and contains miscellaneous provisions which are not covered elsewhere in the Act. Some sections under this part of the Act will apply to the proposed project and it is in the interest of the occupier to read, understand, and ensure compliance.	
9	L.N. 31: The Safety and Health Committee Rules, 2004	These rules came into effect on April 28, 2004, and require that an Occupier 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. The number of the committee members will be deducted by the number of staff hired by the contractor. The S&H Committee must meet at least quarterly, take minutes, circulate key action items on bulletin

		For the Proponent and Contractor, the OSHA and the S&H Committee Rules 2004 are important as they require compliance with the following measures: ○ Posting of an Abstract of the Factories and Other Places of Work Act in key sections of each area of the factory or other workplace; ○ Provision of first aid boxes in accordance with Legal Notice No. 160 of 1977; ○ Ensuring that there are an appropriate number of certified first aiders trained by an approved institution and that the certification of these first aiders is current; ○ Provision of a General Register for recording, amongst other things, all incidents, accidents, and occupational injuries; ○ Appointment of a S&H Committee made up of an equal number of members from management and workers based on the total number of employees in the workplace; ○ Training of the S&H Committee in accordance with these rules; and ○ Appointment of a S&H management representative for the Proponent.	boards, and may be required to send a copy of the minutes to the DOSHS provincial office. Appropriate record keeping including maintenance of all current certificates related to inspection of critical equipment such as cranes, air compressors, lifts, pulleys, etc. Such inspections need to be undertaken by an approved person registered by the Director of the DOSHS.
10	L.N. 24: Medical Examination Rules, 2005	These rules provide for Occupiers to mandatorily undertake pre-employment, periodic, and termination medical evaluations of workers whose occupations are stipulated in the Eighth Schedule to the OSHA and the First Schedule to this Rules. Workers that fall under the above two schedules are required to undergo medical evaluations by a	Some construction activities such as metal cutting and grinding, repair or maintenance of construction equipment could expose the construction workers during construction phase and operations and maintenance workers during operation phase to physical and chemical hazards The contractor should that the workers exposed to such hazards undergo requisite medical examinations as required by these rules

		registered medical health practitioner duly registered by the DOSHS.	
11	L.N. 25: Noise Prevention and Control Rules, 2005	The rules set the permissible level for occupational noise in any workplace (which includes construction sites) as follows: • 90 dB(A) over an 8-hour time weighted average (TWA) period over 24-hours; and • 140 dB(A) peak sound level at any given time. Additionally, the rules set permissible limits for community noise levels emanating from a workplace as follows: • 50 dB(A) during the day; and • 45 dB(A) at night. The Proponent is to ensure that • 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.	It is expected that during the construction phase of the project, there may be plant equipment that exceeds the threshold levels of noise stipulated under the Rules. It will therefore be incumbent on the contractor and his or her sub-contractors to ensure that their equipment is serviced properly and/or use equipment that complies with the threshold noise values given above. Alternatively, each contractor will be required to develop and implement a written hearing conservation programme during the construction phase.

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

stored in the refueling area at the construction site.

- Regulation 16 requires Proponents to ensure that electrical equipment is installed in accordance with the respective hazardous area classification system. It is also a requirement that all electrical equipment is inspected every six months by a competent person and the Proponent is required to keep records of such inspections.
- Regulation 22 provides a description of the functions of a fire-fighting team.
- Regulation 23 requires Proponents to mandatorily undertake fire drills at least once a year.
- Regulation 33 requires Proponents to have adequate fire water storage capacity. As a minimum this regulation requires Proponents to have at least 10 cubic meters of dedicated fire water storage capacity.
- Regulation 34 requires Proponents to develop and implement a comprehensive written Fire Safety Policy. This policy should contain a Fire Safety Policy Statement signed by the CEO, a Fire Safety Policy Manual and a brief summary of the Fire Safety Policy of the company.
- Regulation 35 requires a Proponent to notify the nearest Occupational S&H area office of a fire incident within 24 hours of

		its occurrence and a written report sent to the Director of DOSHS within 7 days.	
13	THE ENERGY ACT, 2019	The Energy Act deals with all matters relating to all forms of energy including the generation, transmission, distribution, supply, and use of electrical energy, as well as the legal basis for establishing the systems associated with these purposes. The Energy Act also established Energy and Petroleum Regulatory Authority (EPRA) in place of the Energy Regulatory Commission (ERC), whose mandate is to regulate all functions and players in the energy sector. One of the duties of the EPRA is to ensure compliance with environmental, health, and safety standards in the energy sector, as empowered by Section 99 of the Energy Act, 2019. In this respect, the following environmental issues will be considered before approval is granted: • The need to protect and manage the environment and conserve natural resources; and • The ability to operate in a manner designated to protect the health and safety of the project employees, the	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.

locals, and other potentially affected communities.

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

- Part VI Section 121 (1a) stipulates that the EPRA shall, before issuing a license, take into account the impact of the undertaking on the social, cultural or recreational life of the community.
- Part VI Section 121(1b) stipulates that the EPRA shall, before issuing a license, take into account the need to protect the environment and to conserve natural resources in accordance with the Environmental Management and Coordination Act.
- Part VI Section 136 (1a) stipulates that it shall be the duty of a transmission licensee to operate, maintain (including repair and replace if necessary) and protect its transmission grid to ensure the adequate, economic, reliable and safe transmission of electricity; and

14	THE ENERGY (SOLAR PHOTOVOLTAIC SYSTEMS) REGULATIONS, 2012	These regulations shall apply to a solar PV system manufacturer, importer, vendor, technician, contractor, system owner, a solar PV system installation and consumer devices. The Regulations prohibits any person from designing or installing any solar PV system unless he/she is licensed by EPRA.	The Regulations regulates, the design and installation of PV systems. The Proponent will ensure that persons engaged in the designing and installation of the Mini-Grid are licensed by EPRA
15	THE PUBLIC HEALTH ACT (CAP. 242)	The Act prohibits the project proponents from engaging in activities that cause environmental nuisance or those that cause danger, discomfort or annoyance to inhabitants or is hazardous to human and environmental health and safety.	The proponent will be in line with the regulations of this act and will ensure suppression of infectious diseases and maintain proper sanitation during all the phases of the project.
16	COMMUNITY LAND ACT, 2016	This Act is critical for the proposed project is within community land. Section 6(1) of the Act provides that 'county governments shall hold in trust all unregistered community land on behalf of the communities for which it is held'. Furthermore, Section 6(2) maintains that 'the respective county government shall hold in trust for a community any monies payable as compensation for compulsory acquisition of any unregistered community land'. Therefore, the proposed road project can access land or water resources in community land that may be unregistered and	The proposed project site falls on unregistered community land set aside by the community for development projects. The community has since offered to the land in kind for project use. The establishment of the minigrid will convert communal land to industrial use for long term. Further, based on community need assessment the proponent will undertake in kind development project to support the community and they have requested for improved water supply and improvement of the existing medical facility. The proponent should adhere to the provision of this legislation

pay compensation to the County Government which the law authorizes to hold such monies in trust for the communities.

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

(a) Sustainably and productively;

(b) For the benefit of the whole community including future generations;

(c) With transparency and accountability; and

		(d) On the basis of equitable sharing of accruing benefits'. The concept of community land has been defined broadly enough to include VMGs. Women, children, old people and future generations have been thought of as beneficiaries and thus their rights secured in this Act	
17	HIV AIDS PREVENTION AND CONTROL (CAP 246A)	This Act is to promote public awareness about the causes, modes of transmission, consequences, means of prevention and control of HIV and AIDS. It also seeks to positively address and seek to address conditions that aggravate the spread of HIV infection.	Like other projects, the proposed project is expected to attract new people to the project area seeking employment. This can lead to increased transmission of HIV/AIDS and other sexually transmitted diseases (STDs) as they engage in sexual relationships amongst themselves and/or local community members. In line with the requirements of this Act, the Contractors will create awareness and sensitize the workers and other persons on the risks of infections to foster prevention and control.
18	THE PHYSICAL AND LAND USE PLANNING ACT, 2019	This Act of Parliament makes provision for the planning, use, regulation and development of land and for connected purposes. The objects of this Act related to the project include; (a) the principles, procedures and standards for the preparation and implementation of physical and land use development plans at the national, county, urban, rural and cities level; (b) the procedures and standards for development control and the regulation of physical planning and land use; (d) a	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 – NarokCounty.

		framework for the co-ordination of physical and land use planning by county governments; (c) a framework for equitable and sustainable use, planning and management of land;	
19	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 labor influx on a project when workers are believed to be interacting with community women. Hence, abusive behavior 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.
20	The Children Act, 2012	Part 2 of the Act denotes the rights of the children and their welfare shall be protected from child labor and armed conflict i.e. Every child shall be protected from economic exploitation and any work that is likely to be hazardous or to interfere	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.

		with the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral or social development. The Act also notes that a shall be protected from sexual exploitation and use in prostitution, inducement or coercion to engage in any sexual activity, and exposure to obscene materials.	
21	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.
22	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	Land in Shantabak is community land. The project site land has been 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 and health sectors. The community will choose the project for purposes of compensation

		government and county government. Section 5 introduces a list of the forms in which compensation can be made.	
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.

4.5 National Administrative Requirements

A brief description of the relevant enforcement agencies with respect to the institutional framework is described in the table below.

Table 11: Relevant Enforcement agencies

Main Actors	Key Functions
Ministry of Energy	Under the leadership of a Cabinet Secretary, the ministry is responsible for formulation and articulation of energy policies through which it provides an enabling environment for all stakeholders. Its tasks include national energy planning, training of manpower and mobilization of financial resources.
Energy and Petroleum Regulatory Authority (EPRA)	The Energy Act establishes the EPRA to, among other functions: regulate production, conversion, distribution, supply, marketing and use of renewable energy; collect and maintain energy data; ensure, in collaboration with the Kenya Bureau of Standards, that only energy-efficient and cost-effective appliances and equipment are imported into the country; and co-ordinate the development and implementation of a national energy efficiency and conservation action plan. The powers of the Authority include, but are not limited to, the power to: issue and renew licenses and permits for all undertakings and activities in the energy sector; manage electric power tariffs and tariff structures; investigate tariff charges; formulate, set, enforce and review environmental, health, safety and quality standards for the energy sector; approve electric power purchase and network service contracts for all persons engaging in electric power undertakings; investigate and determine complaints or disputes between parties over any matter relating to licenses and license conditions under the Energy Act; and impose such sanctions and fines as may be appropriate for violation.
Energy and Petroleum Tribunal	The Energy Act establishes the Tribunal to hear and determine civil disputes and appeals from the EPRA and any other licensing authority relating to the energy and petroleum sector. The Tribunal has powers to grant equitable reliefs including, but not limited to injunctions, penalties, damages, specific performance, and the power to, on its own motion or upon application by an aggrieved party, review its judgments and orders.
Rural Electrification and Renewable Energy Corporation (REREC)	The main purposes of the RERC are to spearhead development of renewable energy resources in Kenya and to accelerate the pace of rural electrification in the country. The REREC is mandated under The Petroleum Act to undertake feasibility studies and maintain data with a view to availing the same to developers of renewable energy resources and provide an enabling framework for the efficient and sustainable production, conversion, distribution, marketing, and utilization of renewable sources in Kenya.
Renewable Energy Resource Advisory Committee	The Committee is intended to play an advisory role to the Cabinet Secretary for the Ministry of Energy and Petroleum on the criteria for allocation of renewable energy resource, licensing of renewable energy resource areas, management of water towers and catchment areas, development of multi-purpose projects such as dams and reservoirs for power generation and management and development of renewable energy resources.

4.6 International Safeguard Requirements

The table below shows the applicability of World Bank Operational Safeguards as it applies to the proposed project in Naposimoru site

Table 12. World Bank Safeguards

The objective of the World Bank's environmental and social safeguard policies is to prevent and mitigate undue harm to people and their environment in the development process. These policies provide guidelines for the bank and borrower staffs in the identification, preparation, and implementation of programs and projects. Safeguard policies have often provided a platform for the participation of stakeholders in project design and have been an important instrument for building ownership among local population.

The Safeguard Policies aims at improving decision making, to ensure that project options under consideration are sound and sustainable, and that potentially affected people have been properly consulted.

S.No.	Safeguard Policy	Objective	Applicability
1.	Environment Assessment	The objective of this policy is to ensure that Bank-financed projects are	The policy is applicable to this project because there are

S.No.	Safeguard Policy	Objective	Applicability
	(Operational Policy, OP/BP 4.01)	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.	environmental and social concerns associated with the construction and operation of the proposed project. In response, the KPLC 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 will not significantly affect natural habitats due to its area of coverage. 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	OP 4.10 will be applicable due to the known presence of indigenous peoples (IPs)/vulnerable and marginalized groups (VMGs) at the project area. Naposimoru area is overwhelmingly IP/VMG area and is inhabited mainly by the Somali nomadic pastoralist community. The Somali are the

S.No.	Safeguard Policy	Objective	Applicability
		culturally appropriate, gender and inter-generationally inclusive social and economic benefits.	predominant inhabitant of Naposimoru area. Further the proponent will continue to engage the PAPs in a culturally appropriate way and allow for decision making in a free, prior and informed consent manner throughout the phases of the project.
4.	Involuntary Resettlement (Operational Policy, OP/BP 4.12)	The objective of this policy is to (i) avoid or minimize involuntary resettlement where feasible, exploring all viable alternative project designs; (ii) assist displaced persons in improving their former living standards, income earning capacity, and production levels, or at least in restoring them; (iii) encourage community participation in planning and implementing resettlement; and (iv) provide assistance to affected people regardless of the legality of land tenure.	The policy is applicable 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 for the Naposimoru 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 how the engagement with stakeholders will take place.
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 emphasizes on engagement in meaningful consultations with all stakeholders. The stakeholders 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 considered is in place.

Plate 3: The consultants addressing the Baraza at Napusimoru Livestock yard

The respective minutes and list of participants for the public consultation undertaken at Naposimoru livestock sale yard is enclosed under appendices of this report. Further, an initial communication was shared with the county commissioner and Deputy County Commissioner for Turkana on 13th January 2022, prior to the public participation meeting held on 14th January 2022 near Naposimoru minigrid site at Naposimoru livestock sale yard. Background information document (BID) with project details was posted clearly on one of the regular shops at Naposimoru shopping center.

5.2 Stakeholder Characterization and Identification

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

Table 13. Identified Stakeholders

Stakeholder Groups	Project Affected Persons	Interested Parties
Local Community	Local communities to be affected either directly or indirectly by the project. Vulnerable individuals and households Health institutions Education Institution	
Government agencies National regulatory bodies	National government are of primary importance in terms of establishing policy	NEMA County Government sub county and local administration
County Government	County Government are also of primary importance in county energy requirements and proposed interventions They will play an important role in implementation and sustainability of project.	

5.2.1 Stakeholder Mapping

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

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

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 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 14: 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 table below has been used to classify the identified stakeholders (directly or indirectly impacting the project) in accordance with their levels of influence on the project. The 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 s of low to medium or medium to high primarily imply that their influence and importance could vary in that 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 to make it comprehensive for any given period.

5.4 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 Naposimoru Solar Mini Grid was held in Naposimoru village, at Naposimoru Livestock sale yard on 14th January 2022 chaired by the Ward Admin and the Assistant Chief.

The general stakeholder consultation was done in a public meeting (Baraza) organized at Naposimoru livestock sale yard where 55 males and 49 women were in attendance. The meeting was chaired by the area ward administrator and the area assistant chief. The feedback received during the stakeholder consultation process has been summarized below.

Stakeholder Influence

Stakeholder Category	Relevant Stakeholders	Magnitude of Influence/Impact	Urgency/Likelihood of Influence	Overall rating of stakeholder rating
Project affected Persons /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			
Interested Parties / Secondary Stakeholders	Pastoralists	Small	Medium	Minor
		Small	Medium	Minor
		Medium	Low	Minor

5.4.1 Approach and methodology used in carrying out the Public participation

Owing to the different categories of the stakeholders, the ESIA team opted to employ various methods in engaging them. The methods included; face to face discussions for the national and county government officers and other interested parties, focused group discussions with the men, women and youth and a public baraza/meeting for the rest of the community members. A two weeks' notice was issued to the county leadership and the community in preparation for the consultations. Mobilization of the FGDs and the public baraza was done in coordination with the local leaders; youth, men and women leaders. Communication was via word of mouth and public announcements.

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

No	Concerns	Issues/comments discussed
1.	Timelines	Mrs. Linet said that the community has been waiting for the project for soo long. She also proposed if the community can choose Compensation in Kind project as school fence and build a dormitory at the school.
2.	Community compensation-priority project	Mr. Ejong explained that the village is experiencing water problems. He proposed of a water reticulation by solarisation of a borehole and pumping of water which is 3km away from the village.
5.	Project benefits	He explained that the village has a high need for electricity and they were being forced to use portable solar which sometimes can not charge their phones.

		He asked if after the project will continue helping them in other projects in future.
6.	Employment Opportunities	Mr. Nakadi requested job opportunities to be assigned to the locals as a first priority. He asked what the capacity building aspect is highlighted on the project. He requested training to be conducted to community members on how to operate the minigrid.

5.4.2 Positive Comments about the Project from the Participants

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

- ✓ Network connectivity will be improved.
- ✓ Learning will improve due to availability of lighting
- ✓ Medical services will improve due to availability of refrigeration services for drugs.
- ✓ Security at Naposimoru will improve due to availability of lighting
- ✓ Business opportunities will improve since livestock farmers will be able to cool their milk, welding business will arise
- ✓ Employment opportunities will increase for the youth due to increase in business opportunities
- ✓ The electricity will assist in pumping of water from the boreholes to community members homes.

5.4.3 The identified negative impacts of the project

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

- ✓ **Accidents**: some of the members raised concerns of possible occupational accidents as well as from falling poles, electrocution especially animals. The community was advised to take extra care while assigned to work in the site as well as report all hazards to avoid accidents
- ✓ **Employment Disputes:** There was a concern over the possibility of disputes arising between the local communities with people of different cultures in the construction sites. The locals also felt they might not be considered during employement. The community suggested that proponent should consider employing local construction workers including youth, women and men.
- ✓ **Security**: some of the members raised concerns of the security of the area especially when the grid is installed. Community members were informed that the project will be protected by security officers. However they were advised and encouraged to practice community policing to improve security.
- ✓ **Raw Material**: Questions were also raised on whether the labor and raw materials will be sourced from the community. It was communicated to the community members that some of the materials will be sourced locally

5.4.4 Additional Responses from the Consultant

The consultant while addressing the community's issues raised, gave the following response.

- ✓ Every resident, business or public facility will be connected to the electricity at an affordable cost
- ✓ That the Contractor/KOSAP will ensure there is no unnecessary clearing of vegetation.
- ✓ All non-skilled labor will be sourced from the Naposimoru Community and not from outside unless the skill needed is not available within the area. The woman and the youth will be considered in the process.

5.4.5 Consent

The Community members present agreed unanimously accepted the Project Proposal.

5.4.5.1 Gender Representation

Table 15. The consultative meeting had a wide representation

Category	Male	Female
Youth	13	1
Adult	55	49
TOTAL	**68**	**50**

5.4.6 Focused Group Discussions analysis

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 consultative meeting had a wide representation as follows:

Table 16. The consultative meeting had a wide representation

Category	Male	Female	Total
Youth	13	1	14
Adult	14	49	63
TOTAL	**27**	**50**	**77**

The target groups of the FGD were Males, Females, Health sector, Education sector as well as and the Youths.

5.4.6.1 Female Stakeholders' Consultation and Participation

The females' participants in the FGD were 49 and between 18-70 years of age. The women stated they knew eight female headed household within the locality whose husband were deseased. The following were their responses.

The project perception

The women indicated that the project would have a positive impact in their lives through boosting security, provision of lighting especially to be used by children for homework, and power for pumping of water for domestic use and livestock watering.

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

- ✓ Women and men don't have equal opportunities in the community however, Women control household equipment while male control livestock, land, dowry and other major assets.
- ✓ The challenges encountered by women include inadequate water causing hygiene issues, lack of proper sanitation.
- ✓ Women receive information about local issues and development or news through the local chief going around and spreading the information phone calls
- ✓ Women are currently involved in provision of household, roles that were exclusively for men. However, they are not able to.
- ✓ They are also involved in decision making of various issues in the community. Their decision can be overruled by the men/village elders
- ✓ Women feel safe in the community
- ✓ Women Build houses, fetch firewood and water.
- ✓ Cooking and other house chores are also their work.
- ✓ .

5.4.6.2 Male Stakeholders' Consultation and Participation

- ✓ The male participants were 14 in number between 40-70 years (100%) of age. The male participants are household heads. The following were the response during the male FGD.

The project perception

- ✓ The men indicated that they have heard about the project since March 2021.

Role of Men as per the FGD

- ✓ The findings showed that the roles of men are mainly siring of children, herding, and watering of livestock, providing leadership and security at the household level.
- ✓ Currently, Men generally feel safe in the community. However, small insecurity concerns for petty theft amongst community members.
- ✓ They indicated that women and men have equal opportunities in the community although women have more difficulties than men due to more responsibilities and challenges
- ✓ Men have more control over livestock than women
- ✓ The main challenges encountered by men in Naposimoru community mainly include drought which greatly affect the animals thus forcing them to trek for long distances in search of water and pasture.
- ✓ Men generally receive information about local issues and development or news through word of mouth and door to door, over phone calls to elders on rear cases due to poor network and sometime through radio thou rarely.
- ✓ Men do not have cultural groups
- ✓ Their top three community development priorities include water reticulation, health (provision of maternity wing and drugs) & education (Construction of classes and dormitories).

5.4.6.3 Youth Stakeholders' Consultation and Participation

- ✓ The youth participants were 14 in number, and consisted of 13 males and 1 female. The following opinions were provided by the youth participants during the FGD.

The project perception

- ✓ The youth disclosed that they are now aware and understood the importance of the project to the community.
- ✓ They suggested that the project had positive impact since it will bring with it employment opportunities, and improve quality of life.
- ✓ They also indicated that they will be able to also charge their phones and start online business.

Role of Youth

- ✓ The youth indicated that main community decision making is undertaken by the elders in consultation with youth and women. They are involved in decision making and their voices are heard.

Plate 5. Public Participation

Plate 4. Female FGD

Plate 6. Male FGD

Plate 10. Youth FGD

6 IMPACT ASSESSMENT AND ENHANCEMENT MEASURES

6.1 Introduction

This section provides an assessment of potential environmental and social impacts from the proposed Projects as well as the proposed Enhancement 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 Enhancement 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 Enhancement Measures to avoid, reduce or manage the potential impacts or enhancement measures to increase positive impacts; and
- Assessment of residual significant impacts after the application of mitigation and enhancement measures.

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

6.3 Defining Impact

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

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

6.4 ASSESSMENT OF SIGNIFICANCE

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

- Status of compliance with relevant Kenyan legislation, policies and plans and any relevant Kenyan or industry policies, standards or guidelines, as well as international best practice standards and guidelines;
- The magnitude (including nature, scale and duration) of the change to the natural or socioeconomic environment (e.g. an increase in coastal erosion, or an increase in employment opportunities), expressed, wherever practicable, in quantitative terms. The magnitude of all impacts is viewed from the perspective of those affected by considering the likely perceived importance as understood through stakeholder engagement;
- The nature and sensitivity of the impact receptor (physical, biological, or human). Where the receptor is physical, the assessment considers the quality, sensitivity to change and importance of the receptor. For a human receptor, the sensitivity of the household, community or wider societal group is considered along with their ability to adapt to and manage the effects of the impact; and
- The likelihood (probability) that the identified impact will occur. This is estimated based upon experience or evidence that such an outcome has previously occurred.

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

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

Table 6-1: Categories of Significance

Category	Significance
Positive impacts	Positive impacts provide resources or receptors, most often people, with positive benefits. It is noted that concepts of equity need to be considered in assessing the overall positive nature of some impacts such as economic benefits, or opportunities for employment
Negligible impacts (or Insignificant impacts)	Negligible impacts (or Insignificant impacts) are where a resource or receptor (including people) will not be affected in any way by a particular activity or the predicted effect is deemed to be 'negligible' or 'imperceptible' or is indistinguishable from natural background variations.
Minor	An impact of minor significance ('Minor impact') is one where an effect will be experienced, but the impact magnitude is sufficiently small (with or without mitigation) and well within accepted standards, and/or the receptor is of low sensitivity/value.
Moderate	An impact of moderate significance ('Moderate impact') is one within accepted limits and standards. Moderate impacts may cover a broad range, from a threshold below which the impact is minor, up to a level that might be just short of breaching a legal limit. Clearly to design an

	activity so that its effects only just avoid breaking a law and/or cause a major impact is not best practice. The emphasis for moderate impacts is therefore on demonstrating that the impact has been reduced to a level that is ALARP (as-low-as-reasonably-possible). This does not necessarily mean that 'Moderate' impacts have to be reduced to 'Minor' impacts, but that moderate impacts are being managed effectively and efficiently.
major	An impact of major significance ('Major impact') is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. An aim of EIA is to get to a position where the Project does not have any major residual impacts, certainly not ones that would endure into the long-term or extend over a large area. However, for some aspects there may be major residual impacts after all practicable mitigation options have been exhausted (i.e., ALARP has been applied). It is then the function of regulators and stakeholders to weigh such negative factors against the positive ones in coming to a decision on the Project.

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

Table 6-2: Overall Significance Criteria for Environmental Impacts

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

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

6.5 Magnitude of Impact

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

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

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

6.6 Sensitivity of Resources and Receptors

Sensitivities are defined as aspects of the natural or social environment which support and sustain people and nature. Once affected, their disruption could lead to a disturbance of the stability or the integrity of that environment. For ecological impacts, sensitivity can be assigned as low, medium or high based on the conservation importance of habitats and species. For habitats, these are based on naturalness, extent, rarity, fragility, diversity and importance as a community resource.

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

6.7 Likelihood

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

Table 6-3: Explanation of Terms Used for Likelihood of Occurrence

An impact with a		
High probability	Refers to a very likely impact	Refers to very frequent impacts
Medium probability	Refers to a likely impact	Refers to occasional impacts
Low probability	Refers to rare impacts	Refers to rare impacts
	As far as one-time events (e.g., air emissions) or 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 Enhancement Measures

Enhancement 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 "Enhancement 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 Enhancement 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 Enhancement Measures. Potential impacts assessed to be of minor significance are usually sufficiently managed through good industry practice, operational plans and procedures.

In developing Enhancement 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 Enhancement 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 0.6 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 Enhancement 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.
- 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 Enhancement 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.*

   Enhancement 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*

   Enhancement 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*

   Enhancement 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*

   Enhancement 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*

   Enhancement 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 Enhancement 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 Naposimoru 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 Napusmoru 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 Enhancement 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 Enhancement 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

6.12.4Impact 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 Enhancement 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 Enhancement 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 Enhancement 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 Enhancement Measures

The following Enhancement 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 Enhancement 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 Enhancement 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 Enhancement 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 Enhancement 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 Enhancement 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 Enhancement 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 Napusmoru 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 Enhancement 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 Enhancement Measures

The following risk Enhancement 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 Naposimoru 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 Enhancement 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 Enhancement 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 Enhancement 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 Enhancement 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 Enhancement 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 Enhancement 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 Enhancement 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 Enhancement Measures

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

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

6.13.2 Quality, Reliable Power Supply

There is no electricity in Naposimoru. 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 Enhancement Measures

No further Enhancement 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 Enhancement 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 Enhancement 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 Naposimoru 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 Enhancement 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 Enhancement Measures

The following Enhancement 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 Enhancement 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 Enhancement 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 Enhancement Measures in place the impact is evaluated to be of moderate significance due to high sensitivity and low magnitude.

6.14.7.2 Enhancement 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 Enhancement 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 Enhancement 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 Enhancement 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 Enhancement 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 Enhancement 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 Enhancement Measures

The following Enhancement 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 Enhancement 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 Enhancement Measures

The following risk Enhancement 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 Enhancement 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 Enhancement 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 Enhancement 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 Enhancement 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 Enhancement Measures the impact significance is minor to negligible.

6.14.21.2 Enhancement 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 Enhancement 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 Enhancement 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 Enhancement 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 Enhancement Measures

The decommissioning phase will require removal of machinery, workers and other temporary structures. The Enhancement 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 Enhancement 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 Enhancement 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 Enhancement 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 Enhancement 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 Naposimoru 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 Enhancement 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 Enhancement 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 Enhancement 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 Enhancement 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 Enhancement Measures have been discussed in Chapter 8 of the ESIA Report. This chapter highlights the various Enhancement 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 Enhancement 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, Enhancement 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.

Social Impacts

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

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	nities, and where necessary give opportunities to businesses owned or operated by vulnerable individuals.	Decomissioning		sourced from, businesses owned and operated by vulnerable individuals, types and quantities of materials etc.		
Land acquisition and compensation for land and assets on land	In line with the RPF provisions; -Prepare and implement an **Abbreviated Resettlement Action Plan (A-RAP)** to guide land acquisition for the mini-grid, 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.	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	Quarterly	Value of compensation in kind project will be equivalent to the value of land acquired as per NLC

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	-Compensate affected communities in-kind (priority project) for the loss of land. -The construction activities will be restricted to within the allocated land and the immediate surroundings only. -After construction work, any land taken for a temporary basis for storage of material will be restored to their original form. -Consultations with the community on the low voltage lines. -The design of the distribution line will utilize the existing road reserves. However, any damage to structures, crops, trees, community facilities and other assets will be compensated in line with the RPF provisions.			restoration of their land.		
Labor Influx and related impacts (SEA/SH,	-Tap into the local workforce to the extent possible to reduce labor influx. -Recruit local	Construction Decomissioning	Proponent, construction, O&M Contractor	-Records of employees/ updated employee register. -Number of local	Quarterly	50,000.00

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
HIV/AIDs and other STIs)	workforce to the extent possible especially for unskilled and semi-skilled jobs. -Consult with and involve local community in project planning and other phases of the project. -Raise awareness among local community and workers on the need to have a good /cordial working relation -Sensitize workers regarding engagement with local community. -Make provision to provide resources needed by the workers if the need for such resources may result to competition e.g., water. -Establish and operationalize an effective			community employees and external employees/ updated employee register.		

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	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	Construction Decomissioning	Proponent, construction, O&M Contractor	-Updated employment register	Quarterly	20,000.00

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	with a valid national ID at the time of hire. -Implement and monitor the employment register regularly. Compliance with the national labor laws and labour management practices. -Put visible signage on site "**No Jobs for children**" -Do not allow children at the project site.			indicating locals employed, their ages, national identification numbers etc. -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.	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	Quarterly	50,000.00

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	-Implement a code of conduct signed by all those with physical presence on site.			cases in place. Documented referral services for survivors. -Grievances raised, aggrieved persons and status on resolution etc		
Forced Labor	-Adhere to the Employment Act which outlaws any form of forced labor. -Report any form of forced labor at the site. -Ensure that all workers have a national ID card or documentation to show they are adults (above 18 years).	Construction Decomissioning	Proponent, construction, O&M Contractor	-Number of reported cases of forced labor.	Quarterly	20,000.00
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	Construction Operations Decomissioning	Proponent, construction, O&M Contractor	-Availabiliy of and implementation of the Stakeholder Engagement Plan. -# of stakeholder consultations held -Record of stakeholder	Quarterly	30,000.00

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	disclosure of project all project information, including project instruments, the full rights and entitlements of project affected persons, sub-project positive and negative impacts and opportunities, proposed subproject budget. -In line with the SEP, undertake adequate consultations prior to construction and throughout the project cycle with all segments of the community and other relevant stakeholders. -Prepare and implement a grievance redress mechanism to deal with grievances. -The grievance redress committee to include representatives from the community. -Sensitize stakeholders on SEP and GRM.			consultations held (minutes of meetings and list of participants). -Information disclosed, to whom it was disclosed (men women, PWD, youth, vulnerable individuals and households etc., methods and languages used in the disclosure (culturally appropriate and accessible), grievances raised and status on resolution etc. -Concerns raised andactons raised.		

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
Exclusion of VMGs and vulnerable individuals and households	In line with the provisions of the ESMF, VMGF and Social Assessment ensure the following. • Early identification and inclusion of VMGs and disadvantaged groups. • Meaningful consultation to effectively participate in the project. • Timely and prior disclosure of relevant project information to VMGs and disadvantaged groups. • Adequate and ongoing consultations with VMGs and disadvantaged groups in line with the SEP. • All concerns or grievances raised are fully resolved in a timely manner. • Access to culturally appropriate project benefits and	Pre-construction Construction Operations Decomissioning	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 Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	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	Construction Operations Decomissioning	Proponent, construction, O&M Contractor	-Local Grievances Committee in place, composition of committee,	Quarterly	No additional cost

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

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	anonymity.					
Environmental Impacts						
Vegetation clearance	1. Clear only the necessary areas 2. Ensure proper demarcation and delineation of the project area to be affected by construction works. 3. Specify locations for vehicles and equipment, and areas of the site which should be kept free of traffic, equipment, and storage. 4. Designate access routes and parking areas ***5.*** Re-vegetation including planting of trees around	Construction	Proponent, construction, O&M Contractor	-Number of trees cleared -Planted trees	Once off	50,000.00

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	the plant/facility					
Soil erosion	1. Avoid groundbreaking during the seasons of high rainfall to avoid erosion. 2. Monitoring of areas of exposed soil during rainy seasons to ensure that any incidents of erosion are quickly controlled. 3. Construction related impacts like erosion and cut slope destabilizing	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 Enhancement 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 Enhancement 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	Construction	Proponent, construction, O&M Contractor	-Visual Observation of dust -Provision of PPEs	Daily	100,000.00

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	2. Suppress dust during dry periods by use of water sprays; **3.** Stockpiles of excavated soil should be enclosed/covered/watered during dry or windy conditions to reduce dust emissions. 4. Burning of woody debris & construction waste to be prohibited **5.** Use of personnel protective equipment (PPE) -masks should be provided to all personnel in areas prone to dust emissions 6. Restrict speed on loose surface roads during dry or			especially masks		

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	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					
Vehicle exhaust and emissions from Generator	1. Drivers of construction vehicles must be sensitized so that they do not leave vehicles idling so that	Construction	Proponent, construction, O&M Contractor	-Engine maintenance records - inspection of stacks	Quarterly	100,000.00

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	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					

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

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	and comply with a site waste management plan 5. The contractor should comply with the requirement of OSHA ACT 2007 and Building rules on storage of construction materials 6. Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of waste generated over time 7. Recovery of materials remains and return to stores 8. Re-use of materials					

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

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

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	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	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

	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					

Potential Impacts	Recommended Enhancement 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	Construction	Proponent, construction, O&M Contractor	Records of all accidental spills and number of liters	Quarterly	150,000.00

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	place at the construction site. 3. Create awareness for the employees on site on procedures of dealing with spills and leaks 4. Vehicles and equipment must be serviced regularly and kept in good state to avoid leaks. 5. In case of spillage the contractor should isolate the source of oil spill and contain the spillage using sandbags, sawdust, absorbent materials and/or other materials					

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	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	Proponent, construction, O&M Contractor	-Records of any Fire incidences -Fire equipment and evacuation plan	Quarterly	100,000.00

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	construction site 5. A fire risk assessment and evacuation plan should be prepared and must be posted in various points of the construction site including procedures to take when a fire is reported. 6. Designate an assembly point					
Impacts of construction material sourcing (e.g., quarrying)	1. Source all building materials such as stone, sand, ballast and hard core from NEMA approved sites. 2. Ensure accurate budgeting and estimation of	Construction	Proponent, construction, O&M Contractor	Sources of raw materials (from local community)	Quarterly	Part of contractor's cost

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

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	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					

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	reduction of energy use.					
Occupational Health and safety Impacts	1. Use skilled personnel for activities which demand skills/technical tasks 2. Awareness creation/Tool box talks on safety to workers while at construction site 3. Workers coming to the site should be knowledgeable on safety precautions to take 4. Appropriate PPE (helmet, safety harness, boots, masks, climbing irons) 5. Proper general house keeping	Construction	Proponent, construction, O&M Contractor	Records of any near misses, incident, and accidents. Records of corrective actions implemented if there was an accident.	Quarterly	1,000,000.00

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	6. Close supervision of workers 7. Risk assessment by contractor of the construction activities and implement Enhancement 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					

Potential Impacts	Recommended Enhancement 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.*	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 Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	2. Awareness creation and consultations with local communities prior and during construction on the dangers of these diseases 3. Informing workers on local cultural values and health matters. 4. Provision of condoms to workers 5. Allowing migrant workers time to be with their families 6. The contractor is impressed upon not to set a construction camp on site. 7. The contractor will provide public education/information about					

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	HIV/AIDS transmission and prevention measures. 8. Ensure equal treatment of workers 9. Provide all appropriate COVID-19 preventive measures including campaign to maintain individual measures at the workplace.					
Sanitary waste	**1.** Construct/ install pit latrines for both genders clearly labelled	Construction	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	Operation	Proponent, construction, O&M Contractor	Presence of well-maintained receptacles and centralized collection points	Quarterly	50,000.00

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	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					
Liquid Waste/ Oils Generation	*1.* Proper storage of the oil is required to ensure no leakages 2. Frequent inspection and maintenance of the generator to minimize leakages. 3. No vehicles should be serviced or maintained at the Mini-grid area. 4. The waste oil or used oil must be	Operation	Proponent, construction, O&M Contractor	-Engine maintenance records -Oil spill containment plan	Quarterly	200,000.00

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	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 Enhancement 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	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 Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	should be and installed 3. A fire evacuation plan should be prepared and posted at strategic points and should include procedures to take when a fire is reported. 4. Workers especially operators of the plant must be trained on fire management 5. 'No smoking' signs shall be posted within the Mini-grid area 6. A fire Assembly point should be identified and marked					
Visual Impacts	1. Fence round the solar Mini-grid to keep off/screen the solar panels.	Operation	Proponent, construction, O&M Contractor	Presence of a perimeter fence	Quarterly inspections	No additional cost

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
Water demand	1. Ensure prudent use of water. 2. Install water-conserving automatic taps. 3. Any water leaks through damaged pipes and faulty taps should be fixed promptly.	Operation	Proponent, construction, O&M Contractor	Water usage records	Quarterly	20,000.00
Sanitary waste	1. Provide sanitary waste facilities for both genders clearly marked 2. Disposal of waste through septic tanks	Operation	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	Operation	Proponent, construction, O&M Contractor	-Provision of drainage system -Raised foundations for the structures	Quarterly	100,000.00

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	or expand existing ones 3. Raise foundations of the solar panels and ensure a proper and from concrete base 4. Create flooding diversions and or spill ways to divert water from getting into the solar power facility					
Occupation health and Safety	1. Ensure only qualified staff are employed to work in the facility 2. All workers operating the Mini-grid must be equipped with appropriate and adequate person protective equipment (PPE) such as; safety	Operation	Proponent, construction, O&M Contractor	-Provision of PPEs and WIBA cover -Environmental audit reports	Quarterly	100,000.00

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	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					
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
Noise and Vibration	1. Generator room should be sound proof to ensure no noise of a nuisance level will be produced.	Operation	Proponent, construction, O&M Contractor	Noise levels- Records of noise measurements done by contractor within the project	Quarterly	Part of contractor's cost

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	2. Monitor noise levels			area and at distances of 30m from the Solar mini-grid		
Shocks and electrocutions	1. Inspect the wiring of the houses before connecting power 2. Safety awareness campaigns to the community before connection of power on safety precautions such as: o Require community to engage a certified technician to do wiring in the premises o Use of quality materials while wiring o Refraining from	Operation	Proponent, construction, O&M Contractor, Consumer	-Records of awareness sessions conducted -Incidences report	Quarterly	No additional cost

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	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					

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	with sockets or switches ○ Reporting any electric wire/conductors if found fallen on the ground ○ Report any incident regarding electricity at the local office –staff in charge of operating the Mini-grid					
Community Safety-Access to site by general public	1. Fencing off the facility to keep of community members, children and livestock from entering into the facility 2. Controlled access to the site only with prior approval 3. Maintain records of any person who comes to site	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 Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
Risks related to poor or inadequate stakeholder engagement (Conflict)	1. Employ from the community to the extent possible 2. Engage the community members and other stakeholders in a timely manner 3. Work closely with the GRM committee members in solving the conflicts 4. Solve all conflicts/grievances at the earliest time possible 5. Ensure all grievances are logged and closed 6. Monitoring the pattern of grievances to come up will long term measures	Operation	Proponent, construction, O&M Contractor	Grievance records	Quarterly	20,000.00
Gender Based Violence	To manage GBV risks, the contractor will prepare a	Operation	Proponent, construction, O&M Contractor	-SEA/SH Prevention and	Quarterly	20,000.00

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
–SEA and SH	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			Response Action Plan -Grievance records		
Public Health Impacts – HIV/AIDs	1. Sensitize workers and the community on prevention and mitigation of HIV/AIDS and other sexually transmitted diseases, through staff awareness and awareness campaigns for the community	Operation	Proponent, construction, O&M Contractor	Number of awareness creation sessions conducted. -Availability of and distribution of condoms		20,000.00

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	2. Provision of condoms to workers 3. Allowing migrant workers time to be with their families					
Public health Impacts -Covid 19 disease	1. Social distance must be observed 2. Provision of hand wash facilities before access 3. Temperature check and monitoring of the temperature of workers and any other person coming to site 4. Enforce wearing of masks 5. Make provision for testing and treating especially of workers 6. Provision of contact numbers for the nearest	Operation	Proponent, construction, O&M Contractor	Availability of hand washing facilities Utilization of hand washing facilities Number of Covid-19 cases reported	Quarterly	30,000.00

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	health facility for testing and treatment 7. Adhering to any other measures from the ministry of health which may be issued from time to time					
Dust Emission	**1.** Trees can be planted around the plant/facility provided they do not cast shadows to the solar panels to act as wind breakers and hence decrease dust pollution 2. Ensure planting of grass around and within the facility compound	Operation	Proponent, construction, O&M Contractor	Visual inspection	Quarterly	50,000.00

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
Vehicle Exhaust Emissions	1. Drivers of the vehicles must be sensitized so that they do not leave vehicles idling so that exhaust emissions are lowered. 2. Company vehicles should be well maintained	Operation	Proponent, construction, O&M Contractor	Engine maintenance records	Quarterly	No additional cost
Noise and Vibration	1. Install portable barriers to shield compressors and other small stationary equipment where necessary. 2. Use quiet equipment (i.e., equipment designed with noise control elements). 3. Co-ordinate with relevant agencies in case the noise produced will	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 Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	require a license. 4. Limit pickup trucks and other small equipment to a minimum idling time and observe a common-sense approach to vehicle use and encourage workers to shut off vehicle engines whenever possible. 5. Demolish mainly during the day when most of the neighbors are out working.					
Solid Waste Generation	1. Demolition contractor to adhere to the various manufacturer's guidelines and requirements regarding	Decommissioning	Proponent, construction, O&M Contractor	Presence of well-maintained receptacles and centralized collection points	Daily	700,000.00

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	demolition and disposal 2. Segregation of waste in order to separate hazardous waste from nonhazardous waste and other streams of waste 3. Provision of facilities for proper handling and storage of demolition materials to reduce the amount of waste caused by damage or exposure to the elements 4. Adequate collection and storage of waste on site 5. Safe transportation to the disposal sites / designated area 6. Hazardous waste must					

Potential Impacts	Recommended Enhancement Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	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 7-1: 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.

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

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 Enhancement 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 Enhancement 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 Introduction

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

The constitution of Kenya section 159, Land and Environmental Court Act 2011, National Land Commission Act 2012, and Land Act 2012 advocates for alternative dispute resolution mechanisms before seeking formal legal redress in disputes relating to environment, land, and resettlement. In practice this can be the village head and other local or traditional dispute resolution mechanisms.

The Land Act 2012 and National Land Commission Act 2012 obligate the NLC to support grievances and disputes related to resettlement or land amicably in conjunction with the implementing agencies-KPLC/REREC. KPLC/REREC will be expected to put in place mechanisms and structures that arbitrate or negotiate with PAPs whenever there are any grievances concerning land or environment.

7.5.2 Grievance Mechanism

One of the key roles of the Grievance Redress Committees, is to address disputes led by the administrative chiefs. All PAPs will be informed how to register grievances or complaints, including specific concerns about land and environment. The PAPs will be informed about the dispute resolution process, specifically about how the disputes will be resolved in an impartial and timely manner. Environmental and Land Court will provide opportunity for appeal when a solution will not be found using the established local mechanisms. The court will deal with land related disputes. However, the Land Act 2012 and Environment and Land Court Act 2011 advocates for Alternative Dispute Resolution (ADR) methods in tackling land related disputes. Alternative dispute resolution approaches will be given preference and based on customary rules, arbitration, or third-party mediation. ADR will be promoted or defended as a resolution to disputes related to land.

7.5.3 National Grievances Redress Committee (NGRC)

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

Members to **NGRC** include representation from the following agencies and entities

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

Functions of the National Grievances Redress Committee

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

7.5.4 County Grievance Redress Committees (CGRC)

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

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

1. Representative of NLC, to grant legitimacy to the acquisition process and ensure that legal procedures as outlined in Land Act 2012

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

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

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

7.5.6 Locational Grievance Redress Committee (LGRC)

Since counties are large, further decentralized Grievance Redress Committee for Naposimoru was established and will handle the grievances arising from Naposimoru solar off grid project.

At the time of assessment, the committee had already been constituted during the land acquisition forum. The memberships of LGRCs were elected from each category of PAPs except the locational Chief and assistant chiefs who will be automatic members of the team by virtue of their positions.

The implementing agency representatives present during this forum included MoE, KPLC and REREC (County Renewable Energy Officer). They held a consultative forum with the community and constituted an LGRC consisting of six (6) members. The members consisted of two (2) ladies, two (2) men and two (2) youth all identified and elected from each category of PAP except for the location Chief and village administrator who are automatic members of the team.

It was however identified that the LGRC was yet to formulate a leadership structure by electing their chairperson and secretary among themselves as at the time of assessment.

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

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

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

The committee representatives present during the public consultation forum informed that they were yet to have an initial meeting and equally the members were yet to be informed of their specific roles on the project.

The LGRC will be assigned specific roles for the projects. The anticipated roles will include the following;

The roles of LRCCs will include among others:

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

7.5.7 Grievance Redress Mechanism

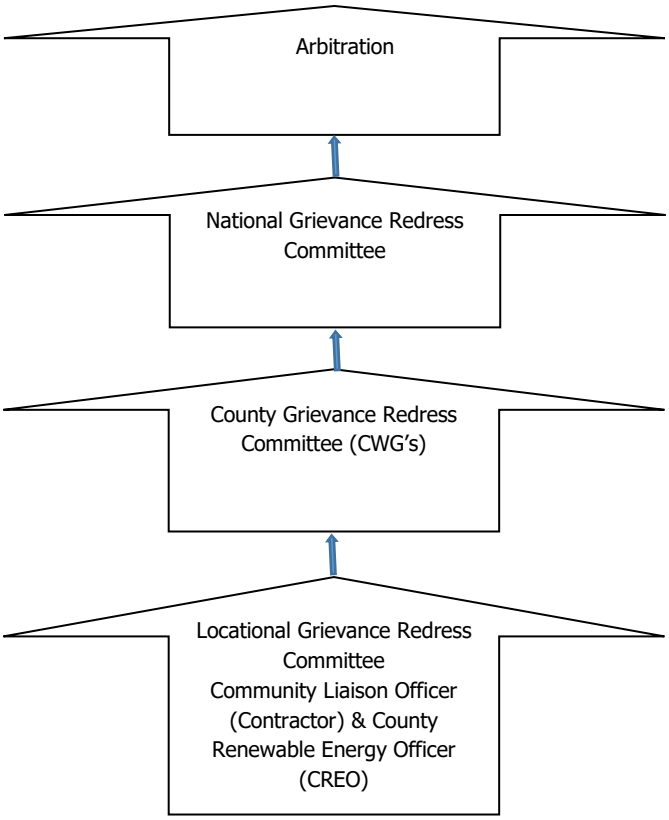


Figure 8. KOSAP Grievance Redress Mechanism

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

It is expected that most disputes will be resolved at the lowest level-Locational Grievance Redress Committee in coordination with existing GRM.

A record of any/all grievances received and handled should be kept at all phases of the implementation process.

8 IMPACT SUMMARY AND CONCLUSION

8.1 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 Naposimoru Village, Naposimoru sub-location Lochwaa location, Lokichar ward, Turkana South sub-county in Turkana County. During the implementation of the project, there shall be some impacts both positive and negative. The negative impact shall be controlled through suggested Enhancement Measures.

8.2 Impacts Requiring Detailed Assessment

During the assessment of the proposed site the following negative impacts were identified by the experts in consultation with the community and other stakeholders. They included air pollution (dust/particulate, smoke emissions and noise/vibrations) which shall be minimized through sprinkling of water in dusty areas, provision of mouth masks to reduce the inhalation of emissions by the construction worker, repair of vehicles and grout machineries to avoid excess emission of smoke. Degradation of vegetation and associated fauna. Destruction of trees and other vegetation shall be avoided at any cost. Construction waste generation like empty cement bags, cartons, empty containers of paint shall be managed through collection and dumping in receptacles later transported to disposed to designated by the authorities. Accidents (falls, slips, flying object are some of the causes of accidents) during construction shall be managed by provision of PPEs to the construction workers. Signage and warnings shall be placed conspicuously. Fire or explosion within the store shall be managed by training the workers and installing fire extinguishers with construction materials

8.3 Conclusion

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

The proponent/contractor to consult all relevant service providers and authorities (i.e., County Administrators, NEMA, amongst others) to harmonize the projects infrastructural and socio-economic developments with existing facilities. The contractor will prepare and implement a C-ESMP informed by the proponent's ESMP. A qualified Social Specialist to oversee the C-ESMP implementation will be engaged as well. The contractor will engage a Community Liaison Officer to act as the link between the community and the contractor and support the Social Specialist.
Note: *The Solar Mini-grid will be installed operated and maintained by the contractor for the first seve (7) years and then handed over to KPLC engineers and operators. So, for the seven years KPLC will be monitoring the operations of the contractor.*

It is recommended that during the project cycle the proponent and contractor shall adhere to ESMP to minimize risks and delays that may occur. This shall also reduce the cost of the project in the long run. It is also suggested that the positive impacts that emanate from such activities shall be enhanced as much as possible.

Lastly, this CPR to be cleared and approved by WB while the National Environment Management Authority (NEMA) to issue ESIA license subject to annual environmental audits after operating for one year. It is recommended that an Environmental Audit (EA) be undertaken annually.

9 REFERENCES

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

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24. The Energy Act, 2019
25. The Constitution of Kenya, 2010
26. Turkana County Integrated Development Plan 2018-2022

10 APPENDICES

10.1 APPENDIX 1- Abbreviated Resettlement Action Plan (A-RAP)

APPENDICE 1

1. Naposimoru Sub-project Site

The Naposimoru sub-project site is located 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 portion of land identified for the mini-grid by the community is approximately 0.6 Hectares. The proposed site has some trees, shrubs and little to no grass while the western part is characterized by shrubs with intermittent and sparse trees, it 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 Naposimoru. *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 18,675 (approximately 983 households). The land acquisition-related impacts are loss of land, some trees/shrubs/grass. Enhancement 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 0.6 Hectares identified for the sub-project will be acquired compulsorily by the Land Commission (NLC). The proposed site will be valued and compensated in line with the provisions of the Resettlement Policy Framework (RPF) prepared under KOSAP. *Refer to section 2.2 of the ESIA for the sketch map of the site.*

3. Compensation Measures Agreed with the PAPs and other Resettlement Assistance to be Provided

The proponent requested the community identify three priority projects, whereby one out of the three would be provided as in-kind compensation for loss of land and pasture. The Napusmoru community proposed the provision and distribution of clean water as a first priority, the second priority project was the provision of better services in Naposimoru dispensary by constructing maternity wards and better reliable drugs and the third priority project was the provision of access to better education by constructing classes, dormitories and offering scholarships to students/pupils The value of the priority community project will be proportional to or higher than the value of land under acquisition. In addition, any loss or damage to crops, trees, structures, and community facilities will be compensated in line with the provisions of the RPF and as summarized in the entitlement matrix below.

3.1 Entitlement Matrix

Types of Impact	Person(s) Affected/Eligible for Compensation	Compensation/Entitlement/Benefits	Responsible organization
1. Loss of Land			
Loss of unregistered community land.	Community.	Compensation in-kind as prioritized by the community.	REREC
Loss of land in unregistered group ranches.	Group ranch members.	Compensation in-kind as prioritized by the community.	
Loss of land in registered group ranches.	Group ranch members.	Compensation in-kind as prioritized by the community.	
Loss of land owned by the National Police, county governments and the Ministry of Interior	Government agencies.	No compensation for public land allocated to another government body.	
Loss of land owned by the Kenya Forest Service (KFS) and Kenya Wildlife Service (KWS).	Government agencies.	No compensation for public land allocated to another government body. However, payment of conservation fees to KWS and KFS as stipulated under their respective regulations is foreseen.	
2. Loss of Use on Land			
Loss of use on public land (e.g., grazing, farming etc.).	Communities utilizing public land.	Communities do not own public land; however, they utilize public land with consent from the relevant agencies. The project will implement the infrastructure project prioritized by the community as compensation for the loss of public land use.	REREC
Loss of use on unregistered community land, unregistered group	Communities utilizing unregistered community land, unregistered group	Compensation in-kind as prioritized by the community.	

ranches and registered group ranches (e.g., grazing, farming etc.).	ranches, and registered group ranches.		
3. Loss of /Damage to Assets on Land			
Trees	Community members on unregistered community land; community members utilizing public land; members of registered and unregistered group ranches and government entities.	During detailed design for power distribution lines and construction of the mini grid and community project, any crops, structures, trees, and community facilities shall be avoided to the extent possible. However, loss or damage to the above will be compensated/restored at full replacement cost,[2] in line with the provisions of the RPF.	REREC
Crops			
Structures			
Community facilities e.g., water sources (earth pans, boreholes etc.).	Community members on unregistered community land, community members utilizing public land, and members of registered and unregistered group ranches.		

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

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

4.1 Engagement of Project -Affected Persons (PAPs)

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

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

segments (men, women, youth, elders, persons with disability, vulnerable and marginalized groups, etc.), NGOs, and local leaders were engaged through key informant interviews, community meetings, and focus-group discussions. The proponent and IA implemented appropriate measures to ensure PAPs effectively participated in the consultations. *Refer to Chapter 6 of the ESIA on Stakeholder Engagement.* Once the compensation award and Bill of Quantities (BoQs) are known, the Implementing Agency (IA) will engage the community and agree on the community project to be executed as in-kind compensation. During these consultations, the IA and the community will define the roles and responsibilities of the community in monitoring the implementation of in-kind compensation and maintenance once the IA hands it over to the community. Thus, the IA and the community will effect an agreement to be signed by the local leadership; representatives of the Grievance Redress Committees at the locational, county, and national levels; A-RAP Implementation Committee, and Implementing Agencies.

4.2 Identification of Community Representatives

The Naposimoru Locational Grievance Redress Committee (LGRC) constituting a chairperson, secretary, and three members, was formed through community consensus. The committee comprises representation from men, women, youth, persons with disabilities, and ethnic minorities. The LGRC is responsible for engaging PAPs and resolving complaints. *Refer to chapter 7 of the ESIA on the Grievance Redress Committees.* Further, the community will constitute the A-RAP Implementation Committee responsible for coordinating community engagements on the A-RAP and monitoring the implementation and closure of the A-RAP. The representation of the committee will consider gender, vulnerability, and intergenerational sensitivities.

4.3 Summary of Consultations on Land Acquisition and Compensation Options

Date	Objective	Implementing Entities	Land Acquisition and Compensation Aspects Discussed	Key Issues Raised	Responses Given
16/03/2021	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).	Implementation of the project needs a centre place in order to serve the required radius. In case the land given at the centre is not enough and other place might be far from the community, do the community still benefit from the project?	The team of surveyor will do the calculation to determine the amount of available and advice accordingly.
				In case the proposed site is within an individual land, will the person be moved?	The land needed is community land, it's the community to decide on the land issue. There is no compensation of land in this project hence individual land will not be allowed.
				Is there compensation of individual land?	No compensation.

				Engineer, land in Turkana County is normally a challenge but this is such a golden opportunity for us to enjoy development. We shall provide land. Please show us your surveyor after this meeting since we have been in darkness for far too long. Time is of essence, so we need to move fast as a community. This type of projects that benefit marginalized people like us do not come every day.	Thank you very much for the kind gesture. We shall show you the Surveyor.
				As a community, after we allocate land for the project, I will ask that we be wary of people who will come laying claim to the same land in future. As a community we shall see to it that does not happen.	Thank you. That is well noted and appreciated.
				Kindly give us 5 minutes please for us to agree on the best possible site location.	Much appreciated for agreeing well.
14th January 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 the following projects according to priority: 1) provision and distribution of clean water as a first priority 2) provision of better services in Naposimoru dispensary by constructing maternity wards and better reliable drugs as 3) provision of access to better education by constructing classes, dormitories and offering scholarships to students/pupils	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 7 of the ESIA for a detailed GRM.*

7. Implementation Timetable and Budget for the ARAP Implementation

7.1 Timelines

The proponent will commission the community project by May 25th, 2025, before operationalizing the mini-grid. The mini-grid contractor will implement the mini-grid and the community project

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

7.2 Budget

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

10.2 APPENDIX 2 –THE MEETING LEADING TO LAND IDENTIFICATION AND GRC CONSTITUTION

Minutes

Minutes of Community Engagement Meeting Held in Regard to Kenya off Grid Solar Access Project (KOSAP): Proposed Solar Mini-grid at Napusmoru Village.

Venue of meeting: Napusmoru Trading Centre/village.

Date: 16/03/2021

AGENDAS

1. Preliminaries
2. Project description
3. Positive Impacts of the project –solar mini-grid
4. Negative Impacts of the project and mitigations measures
5. Need for land for the project
6. Grievance redress mechanism for the project

Minute 1/KOSAP/2020: Preliminaries

The area chief- ***Charles ekarun*** called the meeting to order at 2.00pm. And opening prayer was done by area chief. The chief then welcomed the project team and also members of Napusmoru Market and thanked all for attending the meeting. He told them ''since the main project team is here, be keen on the information they have brought to us about the project and be free to participate through questions and comments in order to make the meeting fruitful. Chief mention that the main problem in the community is water.

Rep. MCA – Philip Kaaman (Lokichar Ward) welcome and appreaciated the visit with hopes that light will be

Slogan "watu wa turkana kayeni hivi" moi former president of kenya

Ward Administrator thanked the chief and the community members for turning up for the meeting. He explained that he had come with other officers to talk to the community on various issues in line with the proposed Mini-grid. He told the community that the visiting team would be given a chance to talk on specific areas in line with the project.

National Land Commission (NLC) – James. Appreciated the community for getting time to attend the meeting, he explained the reason of the visit to the community and emphasis on the importance of land for the project purpose.

KOSAP Team

No.	Name	Institution
1.	Dorothy Kagweria	Ministry of Energy
2.	Samuel Mbugua	Kenya Power

3.	Nicholas Muigia	REREC
4.	Consolata Hongo	REREC
5.	Jones Magige	Ministry of Energy
6.	Samwel Olela	REREC
7.	Jonathan Musau	REREC
8.	George Kosgei	REREC

Table 1.1 KOSAP Team – Turkana

Minute 2/KOSAP/2020: Project Description

Nicholas from REREC described the proposed project i.e. solar energy mini-grid under KOSAP as follows;

He informed the community that the project called - KOSAP is being implemented jointly by the Ministry of Energy, the Kenya Power and Lighting Company (KPLC) and the Rural Electrification and Renewable Energy Corporation (REREC) in partnership with the World Bank as a development partner, County Government and the communities in off-grid areas being the beneficiaries. Off-grid areas are those places where the national electricity grid has not reached, and whose electricity access has been very low. The current project is being implemented in fourteen (14) counties in Kenya.

The reason for choosing solar energy was because the area is far away from the national grid and the fact that the area is well endowed with natural sunlight on high temperatures. He explained that the government's target is to achieve universal access to electricity by 2022 using various sources and solar energy is one of the identified sources because it is also clean energy. He further explained that the proposed solar energy mini-grid will be put up and low voltage lines will also be constructed to enable connection of electricity to beneficiaries/customers.

The mini grids will entail the installation of solar PV, battery storage and thermal diesel units running with a capacity of 20-300 kilowatt (KW). He explained to them that once constructed the Solar mini-grid will be operated by the implementing agencies either KPLC or REREC and the community will be expected to pay for connection of electricity (one thousand shillings) and do wiring in their houses. He told them that once connected, the beneficiaries will be expected to pay for electricity consumed.

He told them that connection of power will be involving passing of electrical lines along the roads in order to reach their house and the route for passing the lines is called way leave. He noted that once the designs are done, the community will be notified of the exact routes during future consultations and that they will be required to give consent.

The number of mini-grid sites in Turkana County will be 23 sites with Napusmoru being one of the sites selected. The will also be 21no. of street lights installed in Napusmoru, the connectivity radius will be 3km and the community are requested to donate land for the process to go on.

Consolata (Wayleave Officer) then informed members that the proposed project requires land for its successful implementation. She added that where possible, focus would be on free land donation to help reduce the cost of project implementation. Additionally, the section donated shall be transferred to the implementing agency. She informed members that, it was their right to be sensitized about the project before seeking consent and implementing the same on their land. She informed members that if the land is voluntarily donated, then there shall be no compensation made to that effect. She also informed members that for purposes of connectivity they shall be required to allow for use of plot boundaries and road reserves as way-leave corridors to allow for location of poles and stringing of conductors.

Minute 3/KOSAP/2020: Positive Impacts of the project

Samuel – KPLC. Every project has both positive impacts and negative impacts. Our assignment is also to explain to you the impacts so that you understand how the project is likely to affect the community at large. The positive impacts are as follows:

- Better source of lighting - replacement of Kerosene lamp with electrical lighting which is clean;
- Benefits to education- provide source lighting for preps in homes and access to electronic educational materials;
- Business opportunities - opening new business (Barber shops and saloons and expanding existing businesses;
- Employment and wealth creation - provide non-skilled labour during construction;
- Local Material Supplies and other requirements - provide opportunities to supply some materials available locally like sand and gravel including cement and water supply.
- Up Scaling Electricity Access to the off-grid areas- no national grid in this areas hence solar will help connect locals;
- Impact on HIV/AIDS- improve access to information from different electronic media;
- Health benefits of the project- elimination of use fuel lamps which provide smoke which cause respiratory diseases;
- Improved standard of living- Living standards will improve e.g. TV, Fridges etc
- Security- improve security due to improve lighting up of the area;
- Communications- improve communication due to availability of electricity to charge phones.

Minute 4/KOSAP/2020: Negative impacts of the project

Samuel – KPLC. Projects also have negative impacts. The proposed solar mini grid will have the following negative impacts and I will present them alongside their Enhancement Measures.

Negative impact	**Enhancement Measures by contractor**
Vegetation clearance	Clear only the areas that are needed to put up the mini grid After construction, do landscaping with grass to areas that have no electrical installation as opposed to living areas bare
Air pollution dust from construction activities	Fence off construction site to reduce dust going to the public Use of masks for workers

Air pollution dust from construction vehicles	Limit vehicle speed to minimum possible when passing residential areas
Air pollution from vehicle emissions	Maintain vehicles/service vehicles No idling of vehicles
Solid waste	Clear all solid waste and dispose appropriately
Land take- voluntary land donation will limit access to the land by community for grazing	Compensation for land and or seek voluntary donation To allow animal grazing (farm and wildlife), the proponent will only fence the section of the land where the plant shall be located.
Occupation safety and health hazards e.g. accidents, fall from heights, pricks by sharp objects	Use of proper Personal protective equipment like gloves, overalls, helmet, safety shoes Allocating work according to skills Toolbox talks to workers to identify hazards and risky activities
Social Risks Related to Labour Influx - With an increase in the population of the area boosted by the project employees the social set up of the area will be affected. This change may be in the form of loose morality, an increase in school drop-out due to cheap labour, child labour, and increased incidences of HIV/AIDS and other communicable diseases.	Conduct periodic sensitization forums for employees on ethics, morals, general good behavior and the need for the project to co-exist with the neighbours; offer guidance and counseling on HIV/AIDS and other STDs to employees; provide condoms to employees; and ensure enforcement of REA's policy on sexual harassment and abuse of office.
HIV/AIDS, communicable and sexually transmitted diseases (STDs).	HIV/AIDs awareness to community
Gender-based violence These are potential impacts of a project related to labour influx or project workers	-Awareness to community -All cases should be reported to chief or the grievance redress committee members or to community elders -contractor to have code of conduct for the workers
Sexual exploitation and abuse by contractors and workers	-Awareness to community -Report any incidence of sexual exploitation to the grievance redress committee members or to community elders -contractor to have code of conduct for the workers contractor to have code of conduct for the workers
Unwanted pregnancies and school dropouts	Awareness on this impact to schools
Child abuse	Employment of children is illegal Report any case to the chief's office
Demand for Material/resources e.g water	Contractor to consult with elders before using the water resources in the community to avoid conflicts

Oil Spill Hazards	Contractor not to repair vehicles or equipment on site Maintain vehicles and equipment in good state
Storm water and erosion	Contractor to put measures to harvest rainwater and control erosion during construction
Wastewater/ effluent	Provide sanitation facilities for workers
Noise resulting from excavation machinery, vehicles and workers	Work only during the day In case of blasting contractor to give notice to community through the village elders and chiefs office
Visual and Aesthetic Landscape Impacts	The visual negative impacts can be mitigated through putting up a wall round the facility to keep off/screen the project stacks, poles, cables and transformers by the project proponent. Proper siting decisions can help to avoid aesthetic impacts to the landscape.
Hazardous materials from damaged Panels- Photovoltaic panels may contain hazardous materials, and although they are sealed under normal operating conditions, there is the potential for environmental contamination if they were damaged or improperly disposed upon decommissioning.	Proper planning and good maintenance practices can be used to minimize impacts from hazardous materials.
Fuel storage on site	Proper maintenance fuel storage tanks and dispensing system Budded wall 1.5 times the fuel storage tank

Table 1.2 Negative impacts of the project

Public safety in regards to electricity

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

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

Minute 5/KOSAP/2020: Land requirements for the project

When we (KOSAP team) arrived at Napusmoru Market, area Ward Admin, the village chairman, the chief and a couple of elders took us to a site (land) which you/community had identified a while ago for the purpose of setting up the solar mini-grid project. The village chairman explained that a consultant came to the village sent by the Ministry of Energy from Nairobi and together with the elders they identified a piece of land where the Solar Mini-grid could be set. On assessing the identified site, it was about 3km away from the targeted beneficiaries. The team discussed with the elders on the technical requirements for the project i.e. need to be near the beneficiaries. The elders said they also have land which is nearer to the target beneficiaries (businesses, public facilities and residential areas) and they were ready to offer it up for the project. The chairman said that the land belongs to the community and is in an area that had been set aside for public facilities. He noted that the community is free to decide on its use and said they had agreed to give land for the solar project. We visited the said land (site) and it met the technical, social, environmental requirements as explained in the screening report.

Consolata explained to the public forum that the proposed project will require an average of 3 acres of land. She asked them the nature of ownership of the land in the area and they answered that the ownership is communal where by the entire land belongs to the community and not individuals with individual title deeds. They also noted that the land is not formally sub divided (implying not adjudicated). She explained to them that based on the ownership of land they had explained, their land falls under the category of community land and its use and management is governed by the Community Land Act 2016.

She educated the community on the following issues;

- The various forms of acquiring interest in land such as; allocation by the owner, land adjudication process, compulsory acquisition, settlement programs, transfers, donation and long term leases.
- Importance of public participation by key stakeholders including community members during the planning and operation phase of the project.
- right of the community to present their views, opinions or fears on a proposed project;
- Right to accept or reject the project
- Right to compensation for ~~your~~ land under the Kenya law. The various options for compensation for land include land for land, cash or in-kind compensation
- If you donate land, the ownership of the land will be transferred to REREC and that the project will be managed by KPLC
- You have a right to choose whether to donate land or not to the project
- The community/beneficiaries of the project will pay Ksh 1000 for connection and also pay for consumption of power to KPLC

She noted that the government of Kenya had secured a loan from its development partners i.e. World Bank to implement the KOSAP project. The government through the

Ministry of Energy proposes to use World Bank guidelines on voluntary land donation for the project.

She informed them that for voluntary land donation, there is a criterion which need be fulfilled to allow for voluntary donation to be acceptable. She explained the criteria as follows;

- The impacts must be minor, that is, involve no more than 10 percent of the area of any holding and require no physical relocation.
- The land required to meet technical project criteria must be identified by the affected community, not by line agencies or project authorities (nonetheless, technical authorities can help ensure that the land is appropriate for project purposes and that the project will produce no health or environmental safety hazards).
- The land in question must be free of squatters, encroachers, or other claims or encumbrances.
- Verification (for example, notarized or witnessed statements) of the voluntary nature of land donations must be obtained from each person donating land.
- If any loss of income or physical displacement is envisaged, verification of voluntary acceptance of community-devised Enhancement Measures must be obtained from those expected to be adversely affected.
- 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. KOSAP project proposes to have the land donated to be registered under one of the implementing agencies of the project i.e. KPLC but be assured that public access to services is guaranteed to the community members.
- We need to set up a Grievance mechanisms to help in addressing any issues/grievances that may arise in the course of the project implementation.

Consolata asked the community to confirm one more time, if the land had been set aside for public use and their willingness to donate land for the Mini-grid. The community members unanimously confirmed that the land had been set aside for community projects and that they were willing to voluntarily donate the land for the solar Mini-grid.

Survey of the land and request for advance possession.

Consolata explained to the community that once agreed, the surveyor will need to pick exact GPS points of the agreed area so that the process of land acquisition may start leading to titling of the land. She noted that the process of land acquisition, land surveying and land transfers are long and requested the community for advance possession once the processes are at an advanced stage. The community agreed to the advance possession and as a sign of commitment, the community elders signed a land donation form on behalf of the community to indicate that they had agreed to donate the land voluntarily.

Consolata told the community that connection of power will involve passing of electrical lines along the roads in order to reach their houses, business premises and public facilities and the route for passing the lines is called way leave. She noted that once the designs are done, the community will be notified of the exact routes during future consultations and that they will be required to give way leave consent (allowing the service lines to pass through their land in the extreme cases). She noted that the project may seek

freeway leaves due to budget constraints and requested the community to consider this and make an informed decision when the time comes.

	WORLD BANK VOLUNTARY LAND DONATION CRITERIA	**ASSESSMENT ON FULFILMENT OF THIS CRITERIA**
1	Land donations can be voluntary only if the infrastructure is not location specific.	The proposed project is not site specific
2	The impacts must be minor, that is, involve no more than 10 percent of the area of any holding and require no physical relocation.	-The land proposed by the community is part of portion of land they have set aside for public facilities. -There was no house on the land and there were no assets on the land -the elders said that the land is set aside for community public facilities and so there is no individual rights of use and use is communal –anyone in the community can graze there but they know the area is for communal use
3	The land required to meet technical project criteria must be identified by the affected community, not by line agencies or project authorities. Nonetheless, technical authorities can help ensure that the land is appropriate for project purposes and that the project will produce no health or environmental safety hazards.	-The land was identified by community. -Screening of the sites show that the land is suitable for the project as long as the Enhancement Measures for the negative impacts are put in place
4	The land in question must be free of squatters, encroachers, or other claims or encumbrances.	There was no squatter or encroacher on site.
5	Verification (for example, notarized or witnessed statements) of the voluntary nature of land donations must be obtained from each person donating land.	Donation was verified in the public forum where by Consolata asked whether they agree to donate the land for the project. The community unanimously agreed and lifted their hands. The same question was posed in the focus group discussion with the women and the youth and they also agreed to the donation. They also signed list of attendance as proof that they were in the meeting where the matter of donation was discussed and agreed. The elders signed the land donation form on behalf of the community
6	If any loss of income or physical displacement is envisaged, verification of voluntary acceptance of community-devised migratory measures must be	No physical displacement is envisaged-no one was residing at the site. Land is open for anyone to graze.

	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.	It was explained that due to the nature of operation of the mini-grid the land will be transferred to ownership of either REREC or KPLC. The community did not object to the transfer of the site to the agencies. It was also explained that the process of transfer takes time and need for the community to give advance possession at the appropriate time. The community agreed to allow advance possession.
8	Grievance mechanisms must be available	The community deals with grievances through council of elders. The need to set up a grievance redress mechanism was explained to the community and they elected the persons who will form the project committee/grievance redress committee.

Table 1.3 Land Donation Criteria

Minute 6/KOSAP/2020: Grievance Redress Mechanism

Nicholas explained that in a project, grievances may arise and it important to have a grievance redress mechanism that is known to all the community members, accessible with no costs to the community members. Before explaining how to set the GRM, Nicholas asked the community to explain how they deal with grievances/issues at the village level.

Project GRM:

Nicholas explained to the community that it is important to put in place a project grievance redress mechanism (GRM). He noted that the GRM to be set should borrow heavily from the existing conflict resolution structures in the community. He explained that the need for a GRM is to provide the community and other stakeholder's opportunity to share project information and raise questions and grievances about the project. He told the community that they are free to raise any complain or request information about the project.

He explained further that members of the project/ grievance redress committee will be chosen by the community members themselves. The committee chosen will be in charge of giving project information to the community and be a focal point for reporting project related issues of concern or grievances. She added that the composition of the committee should have representatives from all groups in the community including men, women, youth and persons with disability.

Project Committee Members/grievance redress committee.

S/No	Name	Identification No.	Category
1	Moses Ewoi	22595835	Men
2	Tawoi Salvester	38514410	Youth

	Adung Lokadongoi	31909543	
3	Christine Nasike	8663950	Women
4	Charles Loyer Ekaran	12907715	Chief
5	Josphat Lopeyok	27440315	Disable

Table 1.4 *grievance redress committee*

Plenary session

Nicholas explained to the community that community engagement and consultations will continue even in future during preparatory phases and also during operation phase. He then summarized the agenda of the meeting and the proceedings and invited the community members to a plenary session to ask questions and or make any comments.

Name	Question/ Comment	Remark/Response
Merinyang Joseph	Members of the community has to be educated. In case of an accident, a child or any incident occur who will take the responsibility?	***Samuel*** – the project is insured. This will help for the purpose.
Jonshon Aleper	Implementation of the project needs a centre place inorder to serve the required radius. In case the land given at the centre is not enough and other place might be far from the community, do the community still benefit from the project?	(***Nicholas***) The team of surveyor will do the calculation to determine the amount of available and advice accordingly
Amoja Moses	In case the proposed site is within an individual land, will the person be moved?	(***Nicholas)*** The land needed is community land, it's the community to decide on the land issue. There is no compensation of land in this project hence individual land will not be allowed
David Kaaman	Is there compensation of individual land?	No compensation

Table 1.5 *Plenary*

Focus Group Discussion with the women

Naposmoru Solar Mini Grid

Dorothy started the meeting by recapping important points covered during the main meeting to help the women remember what was discussed earlier. She mentioned the many advantages of the project and also reminded them of the likely social problems as explained during the general meeting. She urged the women to take full advantage of the proposed project by preparing themselves early enough. She also encouraged the women to work in groups for better outcomes.

Dorothy reminded the women that the project is mainly to strengthen their lives and not weaken existing social systems. She reminded them again to be on the lookout for negative impacts and take early decisions in encountering them.

Plenary Session

Anna Namro – 'I am very happy with the project. We have been in darkness for a very long time. We did not know that electricity will one day reach this village. We are very happy. Thank you and God Bless you.'

Anna Alepere – 'I am very, very grateful for the project. We have been praying for power to improve security for our animals and ourselves. Our husbands cannot refuse to give land. We will ensure they do as required to have this project implemented'.

Rhoda Ekaru – 'I am extremely happy with the project. I am ready to sell food and other items to make money to help my family.'

- **Dorothy** added that–: 'You can do so as an individual. But if you get a few women who are also willing to join in the same food business, then you may come together to operate a bigger business'.

Jennifa Naskei – 'When a disabled mama is impregnated by the project workers, what can be done to help her?' **Dorothy** answered this as follows: -

- If this is a rape case, please report the matter to the elected women representative. Let the matter be taken to the GRM committee and discussed to conclusion. The decision made by the committee can then be implemented in favour of the victim.
- If the two consented, then let that too be investigated by the committee and decided accordingly.

Alice Kaaman – 'I am very happy with this project. Corona has taught us a big lesson. Our children could not attend class because we did not have electricity. We could not also afford to take them to town to learn using internet. So they were left behind academically'.

Anna Alepere – 'When will this project commence?'

- **Dorothy** responded as follows:- 'First, land for the project must be identified. If available and ideal for the purpose, then the remaining land acquisition processes will follow. At some advanced stage, the contractor may then come to site. This may take at least 6 months, if everything else moves smoothly.'

There being no other business, the members were allowed to break for refreshments.

Focus Group Discussion: MEN

Location: Naposimoru

No.:	Name:	Question or Comment asked:	Response:
1.	Mr. Joseph Merinya	Engineer, land in Turkana County is normally a challenge but this is such a golden opportunity for us to enjoy development. We shall provide land. Please	Muigai: Thank you very much for the kind gesture. We shall show you the Surveyor

		show us your surveyor after this meeting since we have been in darkness for far too long. Time is of essence so we need to move fast as a community. This type of projects that benefit marginalized people like us do not come every day.	
2.	Isokale James	As a community, after we allocate land for the project, I will ask that we be wary of people who will come laying claim to the same land in future. As a community we shall see to it that does not happen.	Muigai: Thank you. That is well noted and appreciated.
3.	Mr. Loperito Lotaka	I want to agree and say let the project start. You explained everything to us very well.	Muigai: Thank you for the sentiments.
4.	Lopeiyo Josephat	Kindly give us 5 minutes please for us to agree on the best possible site location. After ten minutes, the decision was unanimous and wanted the Surveyor to accompany them to site.	Muigai: Much appreciated for agreeing well.

The men did not have anything to ask as they were all in agreement to give land for the project and did not have any further questions or comments.

Focus Group Discussion: Youth

Focus Group Discussion: YOUTH

No.:	**Name:**	**Question or Comment asked:**	**Response:**
1.	Ms. Esther Lopeso	Are there job opportunities eg cooking?	Samwel: Thank you, yes there are opportunities for such kinds of jobs
2.	Ms. Ester Lopeso	What are the benefits of the project to the youth?.	Samwel: Thank you, As I mentioned during the plenary session with the entire community, there are so many benefits. Specifically for youth, they will be able to open and expand enterprises eg barber shops, welding businesses, storage of

			perishable food items, cooling of water and other soft drinks, cyber cafes for photocopying and printing services and employment opportunities to some youth who will be deemed qualified for some tasks in the project, Longer study hours for students etc
3.	Juma Josphate.	Iam a mason will there be such like opportinites?	Samwel: Thank you. And yes there will be a lot of builders' works so local qualified masons will get thejob opportunities.
4.	John Ejore	How will illiterate youth benefit?	Samwel: There certainly will be jobs even for illiterate youths, different categories of education will be recruited to fill diferrent positions.
5.	John Ejore	Thanked the team from ministry of energy and encouraged them to go ahead and implement the project.	Samwel: Thank you for your encouragement.
5.	John Ejore	What is the age for working?	Samwel: Only persons with National Identifications cards will be allowed to work. School going children are not allowed to workat all. It is against the law.
6.	Caroline Zinye	Are willing partners between locals and the team from the contractors allowed to marry?	Samwel: Certainy yes as long as they are two consenting adults of sound mind.

The youth were all in agreement to give land for the project and did not have any further questions.

Youth Leaders elected: Tawoi Salvester…… ID NO: 38514410

Adung Lokadongoi……ID NO: 31909543

Vulnerable and Marginalized Groups

The social screening involved identification of vulnerable groups in the project area. The main tribe in Turkana County is the Turkana. The community according to the O.P 4.10 on indigenous and the vulnerable and marginalized groups under Kenya law are recognized as indigenous/vulnerable groups. The main concern would be to identify the vulnerable households within the community based on the following criteria; poor female headed households, orphaned headed households, heads of households with special needs such as disabilities, the very old and very poor households.

During the visit, the team was not able to identify these vulnerable households and identification can be done during the environmental impact assessment through the office of the chief and the village elders.

Grievance Redress Mechanism

A grievances redress mechanism (GRM) will be put in place and operationalized to provide a forum and opportunity for the community to lodge complaints or concerns at the earliest time possible and with no cost. During the meeting, Nicholas explained that the community is allowed to raise any complaints or make requests for information ~~in~~ regarding the project. The first point of getting information or raise complaint will be the project committee which will act as the grievance redress committee. The community chose the project committee and training of the committee is important to enable operationalize the GRM. The project will have a three-tier grievance redress mechanism as follows.

1. Locational grievance redress committee. This is the community level/site specific/project committee whose members were chosen by the community during the community engagement meeting. The membership comprises; elders, representatives from women youth, special needs (persons with disability), religious leader-sheikh and the chief. This will be the first stop for receiving information and raising grievances. It is hoped that most of the grievances will be resolved at this level.
2. The second level of grievance redress will be the county working groups committee. This committee is at the county level and will resolve complains or issues that could not be resolved at the locational/project level. The chief will forward issues/ complains to the county renewable energy officers (CREO) who sits at the county working group committee and will also be responsible for giving feed back to the local committee.
3. The third level will be the KOSAP project implementation Unit at the ministry of energy. Matters that could not be resolved at the county level will be brought to the KOSAP PIU.
4. The last level of the GRM for the community or project affected persons will be the opportunity to seek legal redress.

Site specific Environmental and social Aspects

The various observations and Comments on the site with emphasis to Environmental and Social Aspects are enumerated in the table below.

Environmental and social aspects, observations and recommendations for Naposmoru Mini-grid site

ENVIRONMENTAL AND SOCIAL ASPECTS			
	ASPECT	**OBSERVATIONS**	**RECOMMENDATIONS/ REMARKS**
GENERAL			
1	Project technology	Area will be supplied through Mini-grids comprising of solar photovoltaic generation plant.	Proper installation of solar system to ensure maximum protection to the public
2	List of Materials to	Batteries, Panels, Transformers,	The locally available materials

ENVIRONMENTAL AND SOCIAL ASPECTS			
	ASPECT	**OBSERVATIONS**	**RECOMMENDATIONS/ REMARKS**
	be used during construction/ operation	sand, stones, gravel, conductors, poles, cements etc	should be sourced from the local community hence benefiting the community.
SOCIAL ASPECTS			
3	Land uses	There are few residential houses adjacent the site. Naposmoru primary school about 700M from site and Naposmoru dispensary about 400M from site and the Naposmoru village 800M from site	Project to ensure that Enhancement Measures are incorporated from the design stages to ensure the project does not adversely affect the existing land uses but instead coexists and enhance service delivery.
4	Land uses on or near the project likely to be negatively affected	The site is currently not in use but the site close few residential houses	Contractor to sprinkle water and work during the day to mitigate against noise and dust.
5	Sensitive areas/ community facilities	No sensitive areas were observed in or near the proposed project area	None will be affected
6	Site Ownership use, and land take	Currently the site is community owned	Once all the conditions are met, KPLC will engage in the transfer of the proposed parcel of land to ensure ownership as construction of the Solar Mini-grid continues
7	Population Density	The area adjacent the site is sparsely populated with few f residential houses and the village about 700Metres from site is moderately populated	Create clear buffer zone to avoid people settling within the proposed site.
8	Job opportunities	It was noted that job opportunities will be there during the construction and operation, of the proposed Mini-grid. The jobs will be both direct and indirect to the community members. Indirect jobs include barber shops, saloon, phone charging, welding, eateries/hotels and IT businesses.	Local population should have the priority in accessing job opportunities, – i.e. men, women and youth including PLWD During consultation it was agreed that the contractor can consider the locals with specialized knowledge for skilled jobs like masonry, drivers, wielding and

ENVIRONMENTAL AND SOCIAL ASPECTS			
	ASPECT	**OBSERVATIONS**	**RECOMMENDATIONS/ REMARKS**
			wiring among others
9	Effect of project on people's access to land and natural resources	There will be no effect on peoples access to land and natural resources and the land s currently not in use	None will be affected
10	Compensation to property damage	The proposed project site is vacant, and Naposmoru community did not demand any form of compensation and they voluntarily donated it for the project	Land acquisition is implemented in line with the provisions in the KOSAP RPF and the WB guidelines on Voluntary land Donation as well as KOSAP Land Acquisition strategy
11	Effects of project on incomes, land value and economic activities	Increase in incomes due to business that will be set up and existing ones will be enhanced due to access to electricity. Land value will increase Economic activities will be enhanced due to long hours of business	Educate the public on economic activities diversification due to availability of electricity
12	Public Exposure to diseases	There will be likelihood of spread of communicable diseases due to labor influx, as well as the risk of GBV/SEA and Sexual Harassment.	Sensitization and awareness creation of the public and contractor workers on impacts of labor influx including spread of communicable diseases; focus on local employment to minimize impacts of labor influx etc.
13	Occupational Health and Safety	It was observed that the project site is relatively in a rural settlement area. The site has no existing power line network. Public awareness on safety is key and hence need to be cautious when working at heights and consider recommended standards It was observed that there will be	The site will need to be condoned during construction; the appropriate use of PPE's will need to be observed. The Sentry house and its utilities should be secluded from the Main Substation. Sensitization and awareness on HIV/AIDs will be required for the contractors' personnel, the public and other Staff especially during

ENVIRONMENTAL AND SOCIAL ASPECTS			
	ASPECT	**OBSERVATIONS**	**RECOMMENDATIONS/ REMARKS**
		potential risk of occupational accidents and hazards during the construction and operation phases of the proposed project	the construction phase.
14	Public engagement and roles of the community/ beneficiaries	• Land donation • Participation in meeting / awareness forums • Wiring of premises • Payment of electricity connection fees • Payment of power bills • Signing of way leave consents	Continuous engagement of the public and awareness creation on roles and responsibilities of the communities.
15	Community expectations	It was observed that there is need to engage and consult stakeholder at all phases of the project, to disclose information and manage community expectations. E.g. jobs, Engagement was done during screening	Public engagement be part of the project cycle because it will minimize grievances that might arise from the construction and operation of the proposed Mini Grid and improve on ownership mentality of the project.
16	Public risks to shocks and electrocution	It is possible especially during operation stage of the project	Safety awareness on the safe use of electricity
17	Public awareness on use of the service (electricity) and Public risk to shocks and electrocution	It was observed that the community has not had much interaction with electricity and they requested further education and awareness once electricity is installed.	The community and all beneficiaries of this project need awareness and training on the safe use of electricity to avoid electrocution incidents
ENVIRONMENTAL ASPECTS			
Physical Features			
18	Topography and Landscape	The topography of the site is relatively flat	Proper civil works will be necessary to avoid any flooding issues on site or soil erosion to the lower part as water is drained from the site. Barricading the site during excavation need to be done to

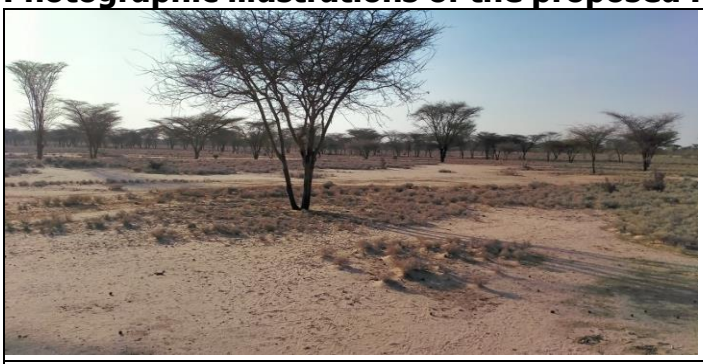
ENVIRONMENTAL AND SOCIAL ASPECTS			
	ASPECT	**OBSERVATIONS**	**RECOMMENDATIONS/ REMARKS**
			ensure public safety
19	Soils	Soils on proposed site are sandy soils with moderate water retention capacity and good drainage. The soil are mixed with small rocks making water percolate easily hence no flooding anticipated	Excavated soils during foundation setting would be used in backfilling, leveling and landscaping and any excess will be disposed in NEMA approved dump sites. Proper soil and geotechnical analysis should be carried out to determine the civil works to be involved and electrical characteristics of the soil.
20	Hydrology (Surface, subsurface and Ground water)	No streams or water channels observed to be passing through site.	The proposed development should have proper landscaping to ensure no flooding issues are encountered in case of excess storms. Water Contamination should be avoided by ensuring no oil/fuel spillages throughout all the phases of the project. ESIA will elaborate on Enhancement Measures
21	Air quality (any Pollution issue	No environmental and air pollution noted on site except mild dust during windy periods. Some sections of the proposed site is bare hence may experience dusty conditions due to lose soils.	Watering of site during construction will be recommended since the site is close to residential houses
22	Drainage	The proposed site is relatively flat and civil works should be designed in a way to ensure proper drainage	Proper drainage and landscaping will need to be done. Storm water will need to be harvested while excess and surface runoff will be directed into a soak pit to allow for infiltration into the ground. Any water leaving the project site has to pass through a well-done drainage system

ENVIRONMENTAL AND SOCIAL ASPECTS			
	ASPECT	**OBSERVATIONS**	**RECOMMENDATIONS/ REMARKS**
23	Proximity to Public institutions	Public institution was observed within the vicinity of the proposed Naposmoru Primary shool and Naposmoru Dispensary.	ESIA study will establish any other institutions and advice on the Enhancement Measures if necessary, for harmonized co-existence.
24	Accessibility	The access road is not marked and needs to be created before the project commences	There is no marked public road bordering the proposed parcel of land. Acquisition of the proposed parcel of land need to take consideration availability of an access before construction of the proposed Solar mini grid
Biological features			
25	Flora (vegetation including trees and shrubs)	The project site is dotted with few acacia trees and shrubs. 	During Ground preparation the trees will be cut off and removed especially along the access road Any Open grounds of the constructed Solar Mini-grid can be planted with suitable grass and ornamental vegetation to minimize soil erosion and promote green cover.
26	Wetlands and Fish and fish habitat	No wetlands of aquatic ecosystems were observed on and or close to the proposed site	ESIA to investigate further
27	Fauna (mammals)	No wild animals were observed at the site. The area and its environs is not a known breeding site for any endangered species. The site is mainly grazing land with no natural ecosystem for wildlife habitation.	ESIA will interrogated further the existence of any wildlife in the area
28	Avifauna / Birds	No migratory birds were observed on the site. The area and its environs are not a known breeding site for any endangered bird species	Monitoring of any affected wild migratory birds will be in progress throughout the project life.

ENVIRONMENTAL AND SOCIAL ASPECTS			
	ASPECT	**OBSERVATIONS**	**RECOMMENDATIONS/ REMARKS**
		Small birds were noted in the area including weaver and doves	ESIA study will interrogated further the existence of any wild migratory or endangered species in the area
29	Sensitive habitats	There are no special and sensitive habitat within and around the proposed site that were observed.	ESIA process will determine if any exists
30	Visibility and site intrusion	The area is relatively flat. The site is adjacent to few residential houses. There will be Visual intrusion occasioned by the project.	Install proper perimeter wall fencing to minimize visual and safety impacts of the Solar mini-grid. Plant some short trees a lot the perimeter to reduce the reflective action of the solar panels
31	Protected Area	The area and its surrounding vicinity are not within a protected area under international, national or local legislation for their ecological, Landscape, cultural or other value which will be affected by the project	The EIA process will help to identify if there is any protected area during consultation with Key stakeholders. There is no known or gazetted habitat for endangered, rare, protected or special species within the site for the mini grids.
32	Features of historic or cultural importance	No historic features or archeological articles were observed on site because the place is	In case of any chance finding of the features and articles the national museum should be contacted immediately.
33	General environmental conditions	The area relatively Flat. It has hot climatic conditions almost throughout the year. The area has stable soils and ground and thus almost no chances of landslides, but this will be conclusively determined upon soil and geotechnical surveys The vicinity of the proposed site is characterized by scant vegetation	As a precautionary measure the proponent should put in place appropriate Enhancement Measures to eliminate or minimize any adverse impacts on the environment.

ENVIRONMENTAL AND SOCIAL ASPECTS			
	ASPECT	**OBSERVATIONS**	**RECOMMENDATIONS/ REMARKS**
		cover of acacia trees.	

Photographic illustrations of the proposed KOSAP site



Project site dotted with Acacia Tree

Residential houses adjacent project site

Naposmoru village 700Metres from site

Public Consultation and engagement for proposed sites

Public Consultation and engagement for proposed sites

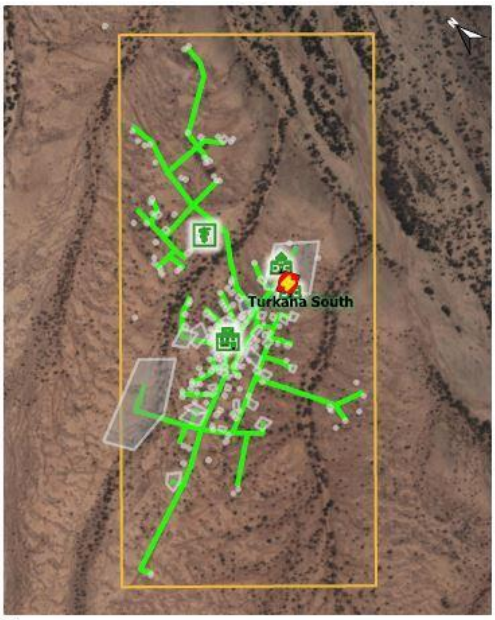
10.3 APPENDIX 3 – DESIGN/LAYOUT OF NAPOSIMORU MINIGRID

PROPOSED PROJECT SITE & PROXIMITY TO CONSUMER SITES

Naposmoru
Turkana - Turkana South

Commercial & public facility consumers			
School	2	Security	0
Religious	0	Commercial	1
Industrial	0	Medical	1
Mixed	0	Other Public Facilities	0
Commercial & public facility consumers list: Maize Milling, General Clinic, Education Center, Primary Education			
Consumers			
Total Residential	399	Total Nonresidential	4
Average consumption in kWh/month			
AVG Residential (North West kWh/Month)	19.9	AVG Nonresidential (kWh/Month)	164.6
Monthly kWh			
Total Residential (kWh/month)	7,940	Total Nonresidential (kWh/month)	658.5
Mini-grid design characteristics			
LV circuit (km)	6.85	Demand (kVA)	37
PV Array (DC-kW)	80	Battery (kWh)	160
Generator (kVA)	0		

ID:	Turkana-09	Lat:	2.66263	Lon:	35.84734



Mixed Commercial/Residential
Religious
Security
School
Public Facility (Other)
Medical
Industrial
Commercial
Customer(s) Polygon
Circuits
Generator Site

0 700 1400 m

Ministry of Energy and Petroleum

REREC
RURAL ELECTRIFICATION & RENEWABLE ENERGY CORPORATION

MINUTES OF EIA CONSULTATION FOR THE PROPOSED KENYA SOLAR MINIGRID PROJECT IN TURKANA COUNTY

Date: 14/01/2022 Venue: Napusmoru	Time: 1420hr

PRESENT

List of members present is appended herein

AGENDA

1. Introduction
2. Opening Remarks
3. Remarks by the consultant
4. Concerns/Issues from participants
5. Responses to the issues raised
6. Acceptance/rejection of the proposed project
7. Adjournment

Item No	Description	Action by
Min 1/22	**Introduction**	
1.1	The meeting was started with a word of prayer from one of the participants	
1.2	The ward admin welcomed all the villagers to Napusmoru village Ward admin led in the introductions of the consultants and the other counterparts.	Ward Admin

Page 1 of 6

CHARLES LOYEN EKARAN
ASSISTANT CHIEF
14 JAN 2022
NAPUSMORU SUB LOCATION
LOCHWAA LOCATION

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Min 2/22	**Opening Remarks**	
2.1	The ward admin explained the purpose of the meeting was public participation which was a follow up of the land acquisition process. He explained that the process will be followed with getting a licence from NEMA then the construction will begin.	Ward Admin
Min 3/22	**Remarks by the consultant**	
3.1	Loice thanked the members of the community for attending the meeting. She explained the project is KOSAP and in full is Kenya Off Grid Access Project and The project will be implemented by Ministry of Energy together with REREC. The project will be in 14 underserved counties. She explained the project targets underserved counties. She explained that the project has 4 components and currently the project is on component 1. She explained the purpose of the meeting was for the ESIA process which involves both the environment and social aspects. A report is submitted to NEMA upon completion of the ESIA process.	Loice Kidko.
3.2	Mr Ebei explained the project components. He explained that the mini-grid is used to get solar energy. The mini grid comprises of solar panels, batteries, [illegible]	Mr Ebei Samuel Tabrane Energy Dept

CHARLES LOTEN EKARAN
ASSISTANT CHIEF
1[illegible] JAN 2022
NAPUSMORU SUB LOCATION
LOCHWAA LOCATION
[illegible]

Some of the mini-grids also have a generator.
He explained how the solar panels transform the sun-rays to electricity.

3.3 Patrick explained that every project has negative and positive impacts. The impacts can be classified as environmental and social impacts. The contractor will mitigate the negative impacts. Some of the negative impacts are Occupational Health and Safety, Solid waste generation, Vegetation clearance, spillage of oil, dust generation, Spread of sexual diseases. The area of the project site will also be fenced off to prevent interference from external forces. The goods to be used for construction will be sourced locally until depleted. Job opportunities will be given to the locals. Other social impacts include child labour (children not employed) effect on GBV, SEA, etc. Patrick Ngoni

3.4 The ward admin explained that a token of appreciation would be given for the land donated. The project will be in 3 sectors between water, health and education. He explained that the community should settle on one project in the 3 sectors. Ward Admin

3.5 Mr Eber explained that the cost of the compensatory project will be 1 million. Mr Eber Turkana County Director

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ASSISTANT CHIEF
NAPUNYAKOU SUB-LOCATION
LOCHWAA LOCATION

3.6	The ward admin welcomed the question and answer project and explained after that the participants will break to the Focus Group Discussion session.	
Min 4/22	**Concerns / Issues/Recommendations from participants**	
4.1	Lunet suggested that the compensatory project be to fence the school an build a dormitory at the school.	Lunet
4.2	Paul explained that there is a borehole that is 3km from the village, he suggested retriculation of the water to the village	Paul Ejong'
4.3	Micah suggested water project for the compensating project since there is no water in the village.	Micah Eludi
4.4	Eunice thanked the visitors for the compensatory project. She explained that the current way	Eunice Eudi

CHARLES LOYEN EKARAN
ASSISTANT CHIEF
NAMUSENGU SUB-LOCATION
LOCHWAA LOCATION

of water was shallow hand dug wells.
She requested that the project should begin soon.

4.5 He explained that he was happy about the project. He cited Stakeholder dialogue. Ewoi
He also suggested reticulation of water from the borehole.

4.6 He explained that the village has no electricity and they are forced to use Mkepa. The community cannot charge their phones. Sylvester Awoi
He asked if after the compensation project the proponent will continue helping them in other projects.

4.7 He requested that the job opportunities should be given priority to the locals since most of the locals are unemployed. Joseph Nakadi

4.8

CHARLES LOYEN EKARAN
ASSISTANT CHIEF
NAPUSMORU SUB LOCATION
LOCHWAA LOCATION

4.9.	He asked what the capacity building aspect the project will bring to the community. He requested training of a few people on how to operate the mini grid. He also asked what the rates of the power will be. He also asked the percentage of local employment in the community. He also asked if there will be an operation and maintenance module.	
Min 5/22	**Responses to concerns/issues raised**	
5.1	Lake explained that currently the proponent might not have any project after the compensatory project hence they might reconsider.	Lake Kakro
5.2	Lake stated that the GRC together with the chiefs help will determine	

CHARLES LOYEN EKARAN
ASSISTANT CHIEF
11 JAN 2022
NAPUSIMOPU SUB-LOCATION
LOCHWAA LOCATION

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	the number of locals to be employed	
5.3	The lifespan of the minigrid will be maintained for 10 years	Mr. Ebai
5.4.	Lowe explained that the project will bring electricity up to the minigrid but the connection will be on of the beneficiaries bill. The inner wiring should also be done by a licensed electrician certified by EPRA. The connection fee will be Kshs 1000. After the connection the payment of the electricity will be through tokens	Lowe
5.5	Patrick explained that in Kenya there is the WIBA Act which states that incase one is hurt and if is not on one's own negligence, the contractor will offer First Aid then take them to hospital and they will not lose their job. In case they are hurt and cannot work they should be paid according to the WIBA Act	Patrick
5.6.	He explained that REREC is working hard to dispose the batteries waste.	Samuel Oleko REREC

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Min 6/22	**Acceptance/Rejection of the project**	
6.1	The community accepted the project wholly. The community also agreed on water project for the compensatory prejoct	X11.
Min 7/22	**Adjournment**	
7.1	The meeting was adjourned by the village admin at 4pm and the members proceded to focus group discussions.	

Minutes Prepared By:

Name: NGUGI SHARON GATHIRI Date: 14/1/2023

Position: Environmentalist Signature: [signature]

Minutes Confirmed By:

Name: CHARLES LOYEN EKARAN Date: 14/01/2022

Position: ASST CHIEF Signature: [signature]

CHARLES LOYEN EKARAN
ASSISTANT CHIEF
11 JAN 20
NAPUSIMORU SUB-LOCATION
LOCHWAA LOCATION

10.5 APPENDIX 5– ATTENDANCE LIST

Ministry of Energy and Petroleum — REREC — Kenya Power

Barara

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

Venue: Napusimoru Sale Yard

Date: 14/01/2022

Time: 1426hrs

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	IRUT LOSIKIRON	NAPUSIMORU	F		[signature]
2.	LORADEN LOSEBEH	NAPUSIMORU	F	28994024	[signature]
3.	IEREM INAL	NAPUSIMORU	F	24114292	[signature]
4.	LORAR LOTABWE	NAPUSIMORU	F	0727741289	[signature]
5.	EKUT NGIKUSWE	NAPUSIMORU	F	0799459699	[signature]
6.	DORIS MORU	NAPUSIMORU	F	0707784168	[signature]
7.	FIGHTER HELLEM	NAPUSIMORU	F	31909364	[signature]
8.	LINEY KURICHAN	NAPUSIMORU	F	0776102012	[signature]
9.	CHRISTINE NASIKE	NAPUSIMORU	F	26659550	[signature]
10.	ELIZABETH LOKELIBAN	NAPUSIMORU	F	0729005392	[signature]
11.	EKALE ITARRA	NAPUSIMORU	F	24107654	[signature]
12.	MARGRET LOPUNGA	NAPUSIMORU	F		[signature]
13.	ALICE KRAMAT	NAPUSIMORU	F		[signature]
14.	MERCY ARANGI	NARUSIMORU	F	0706920781	[signature]

CHARLES LOYEN EKARAN
ASSISTANT CHIEF
NAPUSIMORU SUB-LOCATION
LOCHWAA LOCATION

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Ministry of Energy and Petroleum

REREC

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

Venue: Napusimoru Side Yard

Date: 14/10/2023

Time: 1426hrs

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	Ichoe Itaaba	Nakipi	F		[signature]
2.	Grace Atabo	Napusimoru	F		[signature]
3.	Rechila Eyangan	Napusimoru	F		[signature]
4.	Agnes Moru	Napusimoru	F		[signature]
5.	Amerunu Akai	Napusimoru	F		[signature]
6.	Kodono Ekitela	Napusimoru	F	2588138	[signature]
7.	Imali Lokori	Napusimoru	F		[signature]
8.	Nasike Kanyokan	Napusimoru	F	2441000 21	[signature]
9.	Jelina Aicoran	Napusimoru	F	33574764	[signature]
10.	Esther Arat	Napusimoru	F		[signature]
11.	Nakerabe Ekato	Napusimoru	F	29068674	[signature]
12.	Lomukono Ekato	Napusimoru	F		[signature]
13.	Emukote Lokorongo	Napusimoru	F		[signature]
14.	Atanae Lopwate	Napusimoru	F	0…32	[signature]

CHARLES LOTAN EKARAN ASSISTANT CHIEF
NAPUSIMORU SUB-LOCATION
LOCHWAA LOCATION

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Ministry of Energy and Petroleum

REREC Baraza

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

Venue: Napusimoru Sale Yard

Date: 14/01/2022

Time: 1426hr

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	ACEPER JAMES	NAPUSIMORU	M	0715704594	[signature]
2.	NGIRIKE LONGELOM	NAPUSIMORU	M	0740505697	[signature]
3.	SELINA NAPUMO	NAPUSIMORU	F	0704919862	[signature]
4.	JAMES ABALEM	NAPUSIMORU	M	0717596524	[signature]
5.	TANUI SARVESTER	NAPUSIMORU	M	0114682379	[signature]
6.	EKIRU PAUL	NAPUSIMORU	M	0795930762	[signature]
7.	ETIIR NAKALI	NAPUSIMORU	M	0714856166	[signature]
8.	JAMES CHAPMAN	NAPUSIMORU	M	24077076	[signature]
9.	TUWAN LOKAWI	NAPUSIMORU	M F	0748115603	[signature]
10.	LOTANIKE EWOI	NAPUSIMORU	M F	21208971	[signature]
11.	ETHER EKANAE	NAPUSIMORU	F	0713281902	[signature]
12.	ECHWUKUN EBEI	NAPUSIMORU	M	0710183911	[signature]
13.	LOKAALA ERUSE	NAPUSIMORU	F	8593921	[signature]
14.	ESTER ANAAR	NAPUSIMORU	[illegible]	[illegible]5778061	[signature]

CHARLES [illegible] ASSISTANT CHIEF

Norken International Ltd

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Ministry of Energy and Petroleum

REREC Boroza

Kenya Power

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

Venue: Napusimoru Sale Yard

Date: 14/01/2022

Time: 1436hrs

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	Sammy Lodua	Napusimoru	M	4557555	[signature]
2.	Annah Nangiro	Napusimoru	F	0712103490	[signature]
3.	Esther Ichareit Lokal	Napusimoru	F	[illegible]	[signature]
4.	Lokaai Ebotea	Napusimoru	M	21171421	[signature]
5.	Ipalale Lotatoe	Napusimoru	F	0722631940	[signature]
6.	Abenyo Ambt	Napusimoru	F	4798 [illegible]	[signature]
7.	Catherine Ekot	Napusimoru	F	0778891619	[signature]
8.	Emily Abapa	Napusimoru	F	075 [illegible]	[signature]
9.	Ikanyanan Namugae	Napusimoru	M	26776271	[signature]
10.	Ariau Nasiet	Napusimoru	M		[signature]
11.	Mary Etoro	Napusimoru	F	0790194180	[signature]
12.	Margret Lotieo	Napusimoru	F		[signature]
13.	Aiilun Nuamsa	Napusimoru	F		[signature]
14.	Ichom Lobipu	Napusimoru			[signature]

CHARLES LOCHU EKARAN
ASSISTANT CHIEF
NAPUSIMORU SUB-LOCATION
LODWAR LOCATION

Nodken International Ltd

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Ministry of Energy and Petroleum REREC Bonza

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

Venue: Napartmon Sale Yard

Date: 14/01/2022

Time: 1426hrs

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	JOSEPHINE LOPEZAE	NAPUSIMORU	M		
2.	LOUNYAN AKUCU	NAPUSIMORU	M	0714231386	
3.	LUCAS EYANAE	NAPUSIMORU	M		
4.	EKITELA NANNWAR	NAPUSIMORU	M	0716126865	
5.	KURICHAN LONGERIMOE	NAPUSIMORU	M		
6.	KAPELO LOKWANI	NATORUBE	M	24359565	
7.	JACKSON EREGAE	KAKUKO	M	0711491368	
8.	EUPAN LOKURIET	RATUKO	M	24096325	
9.	LOWAKAN JOSEPH	NAPUSIMORU	M	34051193	
10.	NGICO NAPEGOT	NAPUSIMOR	M	0747878890	
11.	ERION KARAN	NAPUSIMORU	M	0782523454	
12.	EKUNIA AKUJA	NATORUBE	M	0700404456	
13.	LOMORU JAMES	NAPUSIMORU	M	24114323	
14.	SAMMY EKAI	NAPUSIMORU	M	0748735406	

CHARLES ... ASSISTANT CHIEF
NAPUSIMORU SUB LOCATION
LOCHWAA LOCATION

0798901512

Norken International Ltd CENTRIC AFRICA

Ministry of Energy and Petroleum — REREC — Barasa

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

Venue: Napusimoru Sale Yard

Date: 14/01/2023

Time: 1426hr

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	NGUGI SHARON WATIRI	Norken (I) Ltd	F	0724124848	
2.	NGARI PATRICK MUIGAI	Centric Africa	M	0716449493	
3.	Samuel Elele	REREC - NAE	M	0734494552	
4.	Lokwayen Samuel Ebei	Energy Directorate	M	0716680835	
5.	Mani Gage	Norken I Ltd	M	0719379946	
6.	Loise Kioko	Norken International Ltd	F	0719335653	
7.	Charles Ekaran	Chief Napusimoru	M	0715051838	
8.	Paul Lotokan	Area Admin	M	0729005155	
9.	DAVID SIMON	NAKAPI	M	0711909110	
10.	DANIEL EJIKUT	HIS ... NAPUSIMORU	M	0798891617	
11.	AMODOI AMODOY	NAPUSIMORU	M	0719107869	
12.	AJEKEN EWANIMAN	NAPUSIMORU	M	0729082007	
13.	AJOKON ANOTI	NAPUSIMERU	M	0797748967	
14.	LOGONG ANGITA	BMAICHAN	M	0716856918	

CHARLES LOTEN EKARAN
ASSISTANT CHIEF
14 JAN 2023
NAPUSIMORU SUB LOCATION
LOCHWAA LOCATION

Norken International Ltd — CENTRIC AFRICA

Ministry of Energy and Petroleum   REREC   Baraza

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

Venue: Napusimoru

Date: 14/01/2022

Time: 1426hrs

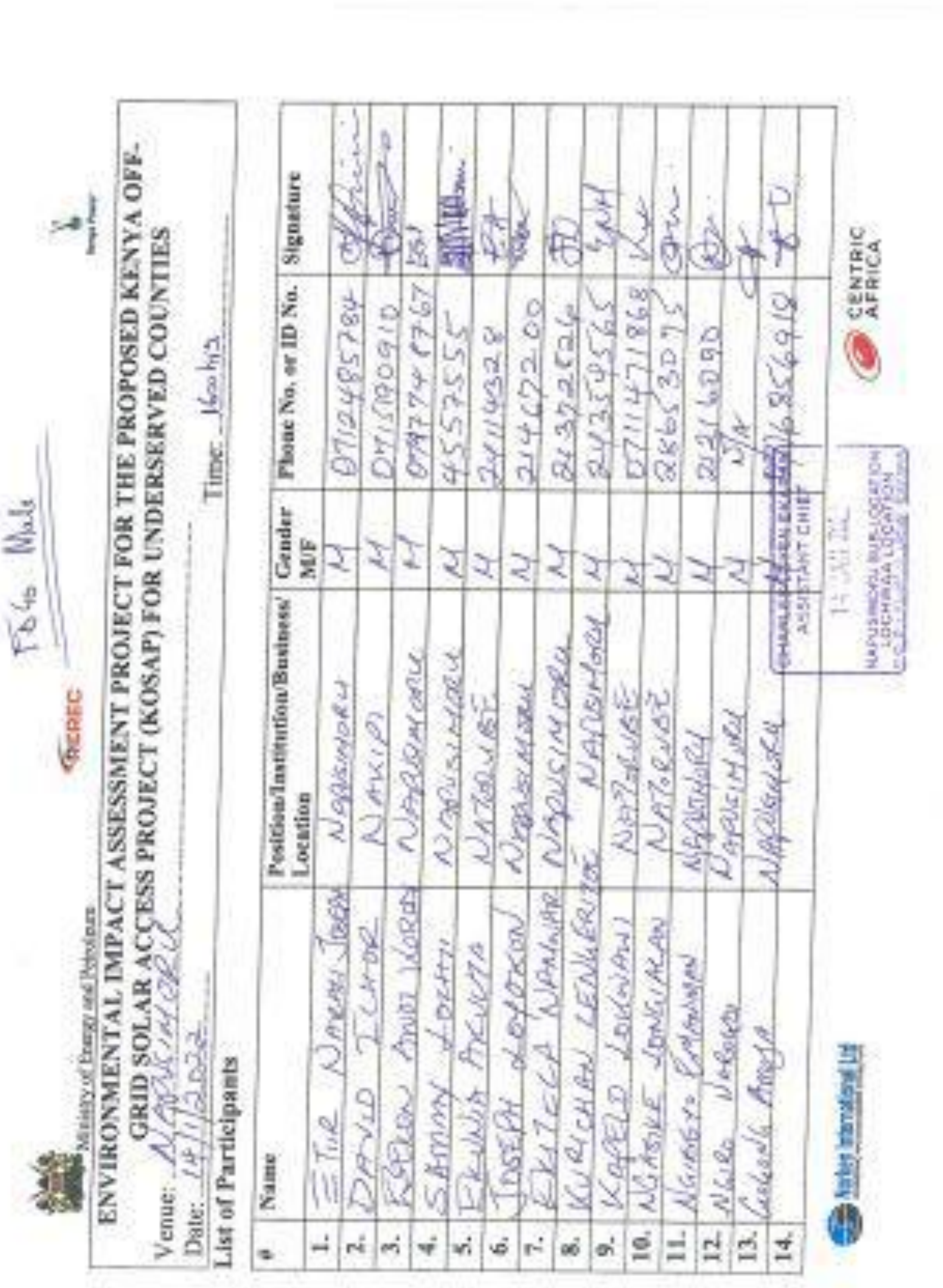
List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	Apaie Achilla	Napusimoru	F		
2.	Akitela Lopeipia	Napusimoru	F	26271924	
3.	Tukukol Ameri	Napusimoru	F		
4.	Ekitan Akai	Napusimoru	F		
5.	Rebecca Ananao	Napusimoru	F		
6.	Ainyon Lorengat	Napusimoru	F		
7.	Nasot Ekiet	Napusimoru	F		
8.	Akien Ewuria	Napusimoru	F		
9.	Roda Ikaru	Napusimoru	F		
10.	Ekiru Chief Nakeli	Napusimoru	M		
11.	Sammy Loriko	Boat operator	M	20868853	
12.	Hosea Angeruni	Napusimoru	M		
13.	Paul Loyoka	Admin	M	0701168880	
14.	Sylvester Lokolonkai	Napusimoru	M	0729005185	

CHARLES ... ASSISTANT CHIEF ... LOCATION

Norken International Ltd   CENTRIC AFRICA

MEN FGD LIST



FGD Male

Ministry of Energy and Petroleum

REREC

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

Venue: NAPUSIMORU

Date: 14/11/2022

Time: 1600hrs

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	ETUR NAKALI JOSEPH	NAPUSIMORU	M	0712485784	[signature]
2.	DAVID ICHOR	NAKIPI	M	0715190910	[signature]
3.	[illegible] ANOI NORA	NAPUSIMORU	M	0797748767	[signature]
4.	SAMMY LOKITI	NAPUSIMORU	M	4557555	[signature]
5.	EKUNIA AKIUTA	NATORUBE	M	24114328	[signature]
6.	JOSEPH LOYOKON	NAPUSIMORU	M	21467200	[signature]
7.	EKITELA NANWAR	NAPUSIMORU	M	21372526	[signature]
8.	KURICHAN LENGERITOE	NAPUSIMORU	M	24354565	[signature]
9.	KAPELO LOKWANI	NATORUBE	M	0711471868	[signature]
10.	NGASIKE LONGIALAN	NATORUBE	M	28653075	[signature]
11.	NGIBOTO EMANMAN	NAPUSIMORU	M	21216090	[signature]
12.	NGIRO NAROKOI	NAPUSIMORU	M	N/A	[signature]
13.	[illegible] AMOJA	NAPUSIMORU	M	[illegible]6856910	[signature]
14.					

CHARLES [illegible] ASSISTANT CHIEF

NAPUSIMORU SUB-LOCATION LOCHIRAA LOCATION

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WOMEN FGD LIST

FGD women

Ministry of Energy and Petroleum

REREC

Kenya Power

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

Venue: Napusimoru Sale Yard

Date: 14/1/2022

Time: 1600hrs

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	Lorna [illegible]				
2.	Nasike [illegible]				
3.	[illegible] Elem				
4.	[illegible]				
5.	[illegible]				
6.	[illegible]				
7.	[illegible]				
8.	[illegible] Esta				
9.	[illegible]				
10.	[illegible]				
11.	[illegible]				
12.	[illegible]				
13.	[illegible]				
14.	[illegible] Ekaito				

CHARLES [illegible] ASSISTANT CHIEF [illegible] NAPUSIMORU SUB LOCATION [illegible] LOCATION

Norken International Ltd

CENTRIC AFRICA

FGD Women

Ministry of Energy and Petroleum

REREC

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

Venue: Napusimoru Sale Yard

Date: 18/1/2022

Time: 1600hrs

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	Christine Amsike				
2.	Regina Ewoi Tomei				
3.	Ekai Ewoi				
4.	Anret Riot				
5.	Lopese Natir				
6.	Lopuse Lipon				
7.	Akutsi Ethabo			CHARLES LOYEN EKARAN ASSISTANT CHIEF	
8.	Ichaneot Lokol				
9.	Areno Nangiro				
10.	Akuwaton Ekai			NAPUSIMORU SUB-LOCATION	
11.	Imal Ebei				
12.	Ilot Loyamae				
13.	Lokolin Emeri				
14.	Ewoi Riso				

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FGD women

Ministry of Energy and Petroleum

REREC

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

Venue: Napusimoru Gate Yard

Date: 14/01/2028

Time: 4.00pm

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	Adupal Lokele				
2.	Nawiay Ekhotu				
3.	Napeyon Ekiru				
4.	Selina Lomaru				
5.	Nasiyen Ekeron				
6.	Ekiru Emuria				
7.	Lokodon Losekon				
8.	Natoroe Selina				
9.	Ukone Chapman				
10.	Nawar Lodio				
11.	Tukui Lokal				
12.	Lochila Echaruit				
13.	Rebecca Amodoi				
14.	Lokamwa Lokadogoi				

CHARLES LOKEN EKARAN ASSISTANT CHIEF 14 JAN [illegible] NAPUSIMORU SUB LOCATION LOCHWAA LOCATION [illegible]

Norken International Ltd

CENTRIC AFRICA

FGD women

Ministry of Energy and Petroleum

REREC

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

Venue: Napusimoru Side Yard

Date: 14/01/2022

Time: 1600hr

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	Agnes Mary				
2.	Kobeno Lokale				
3.	Nanyuomwa Namuwan				
4.	Lotura Ekomele				
5.	Ekhom Kooli				
6.	Lievet Kurithany				
7.	Achokono Ebei	Napusimoru	F	0716101012 ID NO. 19863698	[signature]
8.					
9.					
10.					
11.					
12.					
13.					
14.					

CHARLES LOYEN EKARAN
ASSISTANT CHIEF
NAPUSIMORU SUB-LOCATION
LOGURAA LOCATION

Norken International Ltd

CENTRIC AFRICA

YOUTH FGD LIST

Ministry of Energy and Petroleum — REREC — FGD Youth — Kenya Power

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

Venue: Napusimoru Sale Yard

Date: 14/1/2022

Time: 4:05 hrs

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	MICAH EKODII	NAPUSIMORU	M	0717596524	[signature]
2.	LOMORU JAMES	NAPUSIMORU	M	0748735406	[signature]
3.	SAMMY EKAI	NAPOSIMORU	M	0793701812	[signature]
4.	MERCY ARANGI	NAPUSIMORU	F	0706920781	[signature]
5.	NAKAEI JACOB	NADUIMORU	M	0714856166	[signature]
6.	Tabloi SALVATOR	NAPUSIMORU	M	0111960378	[signature]
7.	Sammy Losike	Plant operator Napusimoru bcr	M	0708[illegible]95 / [illegible]882	[signature]
8.	Jackson Ereng	Napusimoru	N	0115171069	[signature]
9.	Amodoi Loretok	Napusimoru	M	0791407889	[signature]
10.	Ekuon Lomonko	Napusimoru	M	0757421899	[signature]
11.	Namae Eliaw	Napusimoru	N	32051198	[signature]
12.	Asekon Emanimar	Napusimoru	M	0799082007	[signature]
13.	ACEPER JAMES	NAPUSIMORU	M	0715704374	[signature]
14.	Daniel Esekut	NAPUSIMORU J		0798851619	[signature]

CHARLES LOTENGAMARAN ASSISTANT CHIEF
NAPUSIMORU SUB-LOCATION
LOCHWAA LOCATION

Norken International Ltd — CENTRIC AFRICA

10.6 APPENDIX 6- FIRM AND LEAD EXPERT PRACTICING LICENCE

FORM 7 (r.15(2))

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY(NEMA)

THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT

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

License No : NEMA/EIA/ERPL/18279

Application Reference No: NEMA/EIA/EL/23951

M/S **Isaiah Kegora**
(individual or firm) of address
P.O. Box 860 - 20200 Kericho

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

registration number **1893**

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

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

Signature.....

(Seal)
Director General
The National Environment Management Authority

P.T.O.

ISO 9001:2015 Certified

FORM 7 (r.15(2))

nema
mazingira yetu | uhai wetu | wajibu wetu

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY(NEMA)

THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT

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

License No : NEMA/EIA/ERPL/18263

Application Reference No: NEMA/EIA/EL/23929

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

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

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

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

Signature.....

(Seal)
Director General
The National Environment Management Authority

P.T.O.

ISO 9001:2015 Certified