



**MINISTRY OF ENERGY**  
Republic of Kenya

**ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT REPORT FOR THE PROPOSED  
KIBISH OFF-GRID SOLAR PROJECT IN KIBISH LOCATION, TURKANA COUNTY**

**PROJECT: KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP)**

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





**REPORT: 2023**

## CERTIFICATION

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

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#### Disclaimer:

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

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## Abbreviations

ACRONYM	DEFINITION
<b>ADR</b>	Alternative Dispute Resolution
<b>AIDS</b>	Acquired Immunodeficiency Syndrome
<b>AoI</b>	Area of Influence
<b>AP</b>	Administration Police
<b>BD</b>	Biological Diversity
<b>BP</b>	Bank Procedures
<b>CBOs</b>	Community Based Organizations
<b>CoK</b>	Constitution of Kenya
<b>CDI</b>	County Development Index
<b>CDF</b>	Constituencies Development Fund
<b>CEMP</b>	Construction Environmental Management Plan
<b>CGRCs</b>	County Grievance Redress Committees
<b>CRA</b>	Commission on Revenue Allocation
<b>CSR</b>	Customer Social Responsibility
<b>CIDP</b>	County Integrated Development Plan
<b>CPS</b>	Country Partnerships Strategy
<b>DOSHS</b>	Directorate of Occupational Safety and Health Services
<b>ECD</b>	Early Childhood Development
<b>EHS</b>	Environment Health and Safety
<b>EIA</b>	Environmental Impact Assessment
<b>EPRA</b>	Energy Petroleum Regulatory Authority
<b>EPT</b>	Energy and Petroleum Tribunal
<b>EPRA</b>	Energy and Petroleum Regulatory Authority
<b>ESI</b>	Electrical Supply Industry
<b>ESIA</b>	Environmental and Social Impact Assessment
<b>ESMS</b>	Environmental and Social Management System
<b>ESMF</b>	Environmental and Social Management Framework
<b>ESMP</b>	Environmental and Social Management Plan
<b>ESMMP</b>	Environmental and Social Management and Monitoring Plan
<b>EMCA</b>	Environmental Management and Coordination Act
<b>EMF</b>	Electromagnetic Field
<b>FGD</b>	Focus Group Discussions
<b>GBV</b>	Gender Based Violence
<b>GDC</b>	Geothermal Development Company
<b>GoK</b>	Government of Kenya

<b>GRC</b>	Grievance Redress committee
<b>GM</b>	Grievance Management
<b>GRM</b>	Grievance Redress Management
<b>GSU</b>	General Service Unit
<b>Ha</b>	Hectare
<b>HDPE</b>	High Density Poly Ethylene
<b>IAs</b>	Implementing Agencies
<b>IPPs</b>	Independent Power Procedures
<b>IPs</b>	Indigenous Peoples
<b>JV</b>	Joint Venture
<b>KETRACO</b>	Kenya Electricity Transmission Company
<b>KeNHA</b>	Kenya National Highway Authority
<b>KII</b>	Key Informant Interviews
<b>KOSAP</b>	Kenya Off-Grid Solar Access Project
<b>KPLC</b>	Kenya Power Company
<b>LEP</b>	Labour and Employment Plan
<b>LGRCs</b>	Local Grievance Redress committee
<b>MGs</b>	Mini Grids
<b>MoE</b>	Ministry of Energy
<b>MSDS</b>	Material Safety Datasheet
<b>NEMA</b>	National Environmental Management Authority
<b>NGOs</b>	Non-Governmental Organizations
<b>NLC</b>	National Land Commission
<b>NTSA</b>	National Transport and Safety Authority
<b>OHS</b>	Occupational Health and Safety
<b>OM</b>	Operation and Maintenance
<b>OP</b>	Operational Policies
<b>PAD</b>	Project Appraisal Document
<b>PAPs</b>	Project Affected Persons
<b>PCU</b>	Project Co-ordination Unit
<b>PPAs</b>	Power Purchase Agreements
<b>PPEs</b>	Personal Protective Equipment
<b>PV</b>	Photo-voltaic
<b>REREC</b>	Rural Electrification and Renewable Energy Corporation
<b>RPF</b>	Resettlement Policy Framework
<b>SA</b>	Social Assessment
<b>SEA</b>	Strategic Environmental Assessment
<b>SERC</b>	Standards and Enforcement Review Committee
<b>SHS</b>	Solar Home Systems
<b>SIA</b>	Social Impact Assessment
<b>SOP</b>	Safe Operation Procedure
<b>STDs</b>	Sexually Transmitted Diseases
<b>STI</b>	Science, technology and innovation
<b>SMMP</b>	Social Management and Monitoring Plan
<b>ToR</b>	Terms of Reference

<b>TSC</b>	Teachers Service Commission
<b>VMGF</b>	Vulnerable and Marginalised Groups Framework
<b>VMGs</b>	Vulnerable and marginalized groups
<b>VMGP</b>	Vulnerable and Marginalised Group Plan
<b>WB</b>	World Bank
<b>WIBA</b>	Work Injury Benefit Act
<b>WMP</b>	Waste Management Plan
<b>WRA</b>	Water Resources Authority
<b>UTI</b>	Urinary tract infection
<b>URTI</b>	Upper respiratory tract infection

## EXECUTIVE SUMMARY

### E-1- Introduction and Project Brief

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

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

In Turkana County, one of the target counties, the Proponent is proposing to develop 20 No. mini grid facilities including Kibish 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 Kibish 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 Kibish site as a solar power facility, it falls within the medium risk project category as per the Kenyan legislative framework.

### **E-3 Approach and Methodology**

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

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

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

### **E-4 Legislative Regulatory Framework**

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

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

formulated a national Environmental Policy with the goal of promoting sustainable management and use of the environment.

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

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

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

## **E-5 Environmental Setting**

The project area in Kibish 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 site is generally flat with mild undulations. The elevation difference of about 2.4m is observed within the project site. The site slopes gently to the east towards Nakwaa seasonal river.. 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 Kibish Mini Grid project aims to provide electricity to approximately 336 residential and 11 nonresidential consumers in Kibish Village, Kibish Ward 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 project utilizes solar panels with a total capacity of 122 kWp to harness solar energy. Solar power is a clean and renewable energy source that will provide a significant portion of the electricity needed for the project. A 336 kWh Battery Energy Storage System is incorporated to store excess solar energy during the day, ensuring a consistent power supply even during cloudy or nighttime conditions. A 87 kVA diesel generator is included to serve as a backup power source for periods of low solar generation or in case of battery depletion. It provides reliability and backup in the event of extended periods of cloudy weather or high demand. A 2,000-liter fuel tank is provided to store diesel fuel for the generator, ensuring continuous operation during extended periods of low solar or high demand. Additionally, PV Inverter: A 72 kW solar PV inverter is used to convert the direct current (DC) electricity generated by the solar panels into alternating current (AC) electricity suitable for consumer use. The estimated cost of the project is around USD 426,739, 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 Kibish Mini Grid approximately 1.219 hectares of land will be acquired from the community in line with the national laws and World Bank provisions. In accordance with the World Bank's Operation Policy (OP) 4.12 on Involuntary Resettlement, an abbreviated Resettlement Action Plan (A-RAP) was prepared, outlining the principles and procedures for land acquisition and compensation. This plan is annexed to this ESIA.

## **E-7 Project Alternatives**

Solar energy is identified as a non-polluting and site-specific option, and the proposed site for Kibish MG is chosen as the most suitable location for the mini grid based on factors such as sunlight availability and the community's lack of grid connectivity. The use of wind power, thermal power, fossil fuels, and power import from neighboring countries are considered as alternative methods of power generation but are found to have limitations or environmental concerns. Solar energy is favored due to its low production costs, versatility, clean nature, and economic savings.

The "No Project" alternative is deemed unfavorable as it would maintain the current lack of electricity access and hinder socio-economic development. The project will be constructed using modern materials and technology, with a focus on public health, safety, security, and environmental requirements. The technology will involve a Battery Energy Storage System.

## **E-8 Stakeholder Engagement**

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

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

During the ESIA stakeholder engagement public meeting, which took place on January 18, 2022, a total of 150 stakeholders attended. The meeting provided an opportunity to discuss project details, including the preliminary design, positive and negative impacts, and mitigation measures. Stakeholders were encouraged to share their views and provide feedback on the project.

Some of the concerns raised by stakeholders included;

- a) Project timelines
- b) Availability of GRC during project implementation
- c) Connection fee per household and if VMG will have free/subsidised connection fee.

The responses given by the project team include;

- a) Public participation is part of Environmental impacts assessment that ESIA is the last process before a project is implemented. Proponent will set project timelines upon receiving NEMA License. This might take 6 months or so.
- b) The community members were reminded of GRC which was formed in March 2021 and informed that the committee will be active during the project implementation period.
- c) Connection fee will be 1000Ksh per drop which is quite affordable compared to the normal KPLC connection charges

## **E-9 – Impacts and Mitigation Measures**

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

Similarly, the decommissioning phase offers positive impacts such as local employment and sourcing.

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

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

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

*Table 0-1: Summary of Pre-construction Impacts*

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

*Table 0-2: Summary of Construction and Decommissioning Phases Impacts*

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

*Table 0-3: Summary of Operation Phase Impacts*

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

## **E-10 Environmental and Social Management and Monitoring Plan**

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

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

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

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

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

## **E- 11 Conclusion**

Based on the assessment findings, the consultant concludes that there are no substantial reasons to hinder the proposed project from progressing to the next stage of planning and development. However, this progression is conditional upon the implementation of the recommended

mitigations and the monitoring of potential environmental and socio-economic impacts as outlined in the ESMMP.

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

## **1 INTRODUCTION**

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

KOSAP directly promotes the achievement of these objectives by supporting the use of solar 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. They present profound infrastructure deficits, including lack of access to roads, electricity, water, and social services. There is also significant insecurity in certain areas, giving rise to substantial numbers of displaced persons and livelihood adaptations that further undermine economic prosperity.

### **1.1 CONTEXT**

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

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

Due to the remoteness and sometimes dispersed nature of the target populations and considering the lifestyles and socio-economic status of those residing in underserved Counties, the Project is designed to address low affordability of the potential users, and sustainability of service provision. Therefore, sustainability of the proposed approach to energy access expansion beyond the Nationally owned power network is predicated on two primary factors - public funding, local

community participation; and institutional capacity of Kenya Power and, Rural Electrification and Renewable Energy Corporation (REREC) and the Ministry of Energy (MOE) as the implementing agencies.

The project components are:

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

## 1.2 PROJECT JUSTIFICATION

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

## 1.3 PROJECT OVERVIEW

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The project site is located near Kibish trading centre, Kibish ward in Turkana County at latitude 5°17'12.87"N and longitude 35°49'25.87"E .The proposed solar mini grid will be located on a 1.219hectare piece of land near Kibish Shopping Centre. The solar mini grid will comprise Solar panels, batteries, invertors, perimeter fence and 8.7 kilometers distribution line to cover a radius of approximately 1.5km.The project is expected to serve 375 consumers of which 364 are

residential and 11 are non-residential. None residential consumers of the project are business people and civil servants e.g teachers, health workers and military personnel.

### **1.3.1 Objectives of the Study**

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The main objective of this ESIA was to examine both positive and negative effects of the proposed solar Mini-grid on the people, their property and the environment and proposed measures to mitigate the negative impacts and enhance positive impacts during the construction, operation and decommissioning phases of the project.

Specific objectives of the study included;

- Present an outline of the project background,
- Establish the environmental baseline conditions of the project area and review all available information and data related to the project,
- Identify key areas for environmental, social, health and safety concerns as well as the anticipated impacts associated with the proposed project implementation and commissioning,
- Undertake public consultations with the potentially affected peoples and other interested parties
- Establish a comprehensive environmental management plan covering the construction, operation and decommissioning phases of the project,
- Preparation of a comprehensive Project Report in accordance with the local environmental legislation and submission to NEMA for further instructions and/or approval.

## **1.4 PURPOSE AND SCOPE OF WORK**

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

## **1.5 ESIA METHODOLOGY**

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### **1.5.1 Kick-off Meeting**

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The Consultant had a brief kick-off meeting with the Proponent on 12th July 2021 followed by subsequent online meetings and discussion on various aspects of the project up to 5th August, 2021. The meetings addressed varied deliverables and thresholds to be achieved and maintained during this assessment in terms of scope of work, deliverables, timeline and the methodology. All communication and meetings were done online.

### **1.5.2 Screening and Scoping**

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Evaluation of ESIA procedure has been undertaken as a fundamental procedure to

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

### **1.5.3 Desk based review and baseline assessment**

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

Other documents that were reviewed included Turkana County Integrated Development Plan 2018-2022, various Kenyan legal legislations, World Bank safeguard policies, topographical maps, google earth/maps, and Kenyan government publications among others.

### **1.5.4 Project Description**

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

### **1.5.5 Baseline Condition**

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This entails description and collection of relevant primary data within the project site's bio-physical, socio-economic and cultural profile with respect to the biodiversity profile, land use types, cultural heritage and practices, social and economic issues likely to be affected, expected project activities to be involved during the design, construction and operation of the proposed facility.

The information also includes description of the community social structure, employment and labour market, sources and distribution of income, cultural/religious sites and properties, vulnerable groups and indigenous populations. This also covers description of the sites' physical environment including their topography, land cover, geology, climate and meteorology, air quality and hydrology. This entailed use of secondary data sources and for some specific environmental parameters the deployment of specialized equipment to measure and record the environmental readings as primary data for analysis and inclusion in the ESIA report. The ecological and

biophysical environment will focus on describing the flora and fauna resident in the Turkana County and at the mini-grid site level.

This was based on observation of flora and fauna, KPIs on local indigenous knowledge on historical and current status of rare, endemic and endangered plant and animal species known to occur in the project area. Vegetation assessment was done to gain an understanding of the mini-grid sites habitat type. This has provided for an in-depth description of existing land use type and their linked socio-economic activities. Interviews, discussions, photography, observations and check lists are some of the methods employed in gathering the data.

### **1.5.6 Impact Assessment (IA) Prediction**

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

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

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

### **1.5.7 Public Consultations**

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

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

#### **1.5.7.1 Stakeholder Identification and Mapping**

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

- PAPs of the proposed project who largely are the community members living within 1.5km radius of the proposed project.
- Interested parties include;
  - County government of Turkana various department including the office of the governor, land and environment, survey and public administration such as ward and village administrators. In addition is the county commissioner and officers under his administration such as chiefs.
  - Members of parliament and members of county assembly

#### **1.5.7.2 Mobilization for the Community Meeting**

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

#### **1.5.7.3 Public Forum/Meeting**

The project team undertook community engagement forums with the target PAPs and the communities where the solar Mini-grids will be set. The main objective was to explain the project details including need for land identification and solicit broad community support and acceptability

of the project. One open meeting with all the community members was held. The (KOSAP team) explained to the community members about the project and other related information as discussed in the minutes. The meeting was then opened up for a plenary session.

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

#### **1.5.7.4 Focus Group Discussions**

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

#### **1.5.7.5 Key Informant Interviews**

Key Informants were identified both at the county and locational levels and they were interviewed to obtain baseline information in regard to the proposed project. The key informant interviewed was from the local administration, education and health sectors.

#### **1.5.7.6 Stakeholder Engagement Schedule**

The ESIA team identified four categories of stakeholders namely; government officials, opinion leaders at local level, elders and the general community. Stakeholder engagement began early in the planning phases of the project. The stakeholder consultations were undertaken on the 18<sup>th</sup> January 2022. During these meetings, project information in terms of preliminary design, positive impacts, negative impacts, mitigation measures among others were discussed with various stakeholders. The stakeholders gave their views in to the project.

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

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

### **1.5.8 Sampling**

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#### **1.5.8.1 Soil Sampling and Analysis**

Soil sampling and testing was done for purpose of soil quality control and identifying sources and effects of contamination of soil. Sampling was done manually within the boundaries of the proposed project site taking into consideration these guidelines:

- Remove superfluous soil covering/s (i.e., dense vegetation, gravel, concrete etc.), if present and place to one side.
- Use a clean implement (i.e., spade/shovel) and manually excavate a hole to a targeted depth of approximately 50 centimetres below ground level.
- Obtain a representative soil sample (500g) and transfer it in a well labelled air tight zip lock bag
- Record the GPS coordinates of the excavation.
- Backfill the excavation with the remaining recovered arisings and reinstate the surface as close as practicable to initial conditions.
- The soil sample was then transferred to Polucon Services (K) Limited for chemical analysis that comprised of Benzene, toluene, ethylbenzene and xylene (BTEX) and Polycyclic Aromatic Hydrocarbons (PAH).

### **1.5.9 Environmental and Social Management and Monitoring Plan (ESMMP)**

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

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

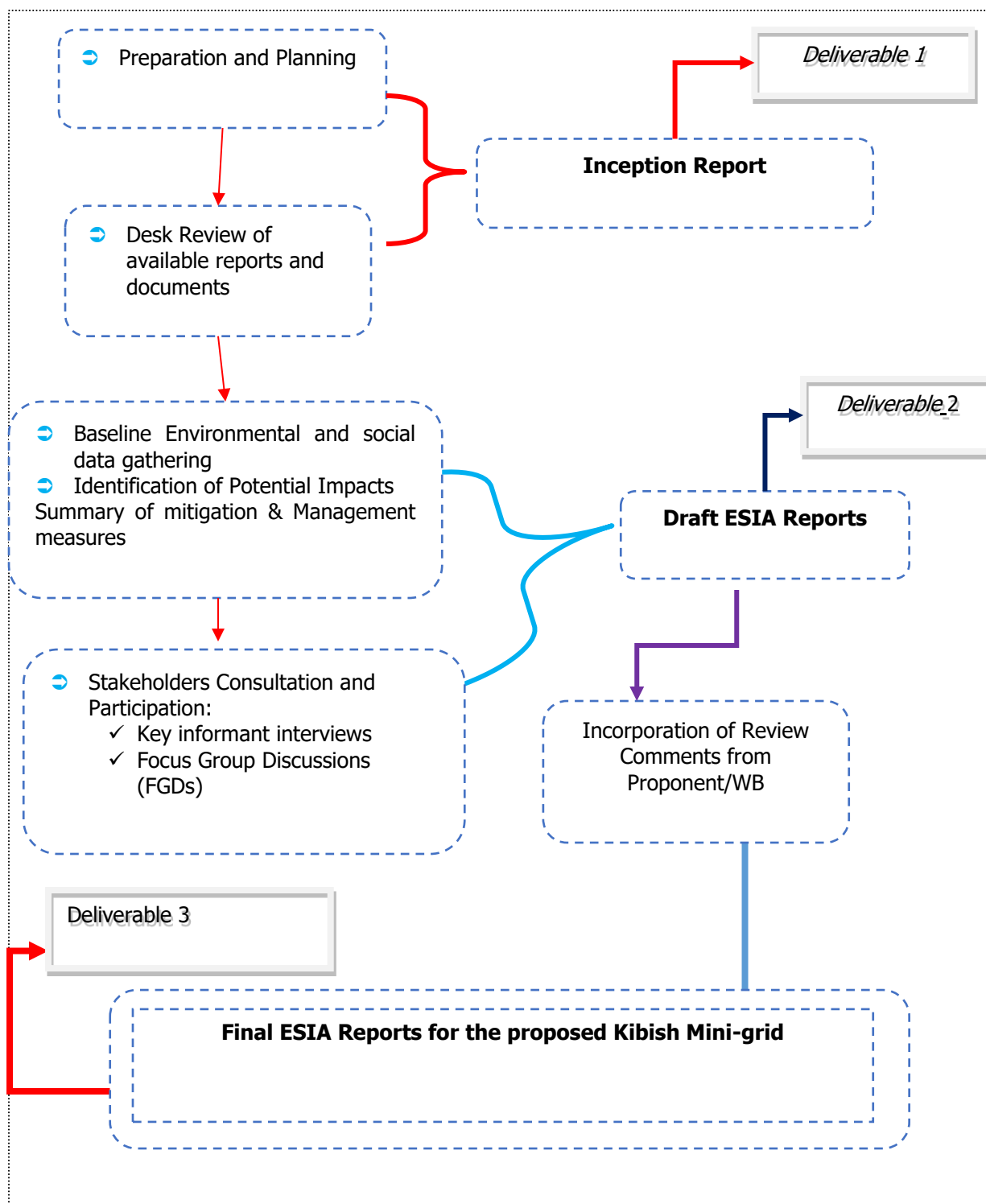
The ESMMP include an implementation schedule and budget cost estimates for the mitigation measures. It also describes institutional arrangements with regard to the implementation of the ESMMP among the implementing agencies, and the contractor(s). This has specific responsibilities, procedures and resources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

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

encountered during subproject implementation.

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

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



**Figure 1-1: Summary of ESIA Methodology**

**Table 1-1 Structure of the ESIA Report**

SECTION	TITLE	DESCRIPTION
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<b>Section 1</b>	Introduction	Introduction to the Project and ESIA scope and methodology adopted.
<b>Section 2</b>	Project Description and analysis of project alternatives	Technical description of the Project & related infrastructure and activities.
<b>Section 3</b>	Applicable Legal and Regulatory Framework	Discusses the applicable environmental and social regulatory framework and its relevance for the Project.
<b>Section 4</b>	Baseline Settings	Outlines Environmental and Social Baseline status in the study area of the Project
<b>Section 5</b>	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
<b>Section 6</b>	Impact Assessment and Mitigation Measures	This section includes details of identified environmental impacts and associated risks due to Project activities, assessment of significance of impacts and presents mitigation measures for minimizing and /or offsetting adverse impacts identified.
<b>Section 7</b>	Environmental and Social Management and Monitoring Plan	Outline of the ESMMP taking into account identified impacts and planned mitigation measures and monitoring requirements.
<b>Section 8</b>	Impact Summary and Conclusion	Summary of impacts identified for the Project and conclusion of the study.
<b>Section 9</b>	References	List of references
<b>Section 10</b>	Appendices	This section includes all attachments including NEMA licences, layout plan, Minute of the meeting, list of participants and Baseline measurements.

## 1.7 STUDY TEAM

This ESIA study was conducted on 18<sup>th</sup> January 2022 by the following team of experts;

No	Names	Institution	Position
1	Kennedy Shisoka	MoE	Senior Superintending Engineer
2	Samuel Olela	REREC	Senior Environmentalist
3	Caleb Ewoi	Turkana County	CREO
4	Allan Owino	Norken International Ltd/ Centric Africa Limited	EIA/EA Expert
5	Umulkheir Abdi	Norken International Ltd Centric Africa Limited	EIA/EA Expert
6	Lydia Komen	Norken International Ltd/ Centric Africa Limited	EIA/EA Expert
7	Japheth Bor	Norken International Ltd/ Centric Africa Limited	EIA/EA Expert

## 1.8 STUDY LIMITATIONS

The limitation experienced during the study are illustrated below;

- ✓ Some data which the consultants sought from the community could not be ascertained eg. the number of the VMG's, orphans, rate of HIV infections, number of cases of GBV, population of the location etc.
- ✓ Limited information on some environmental aspects e.g. aquifers, rivers etc.
- ✓ The communication barrier. It was mitigated through having a translator on the team
- ✓ 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 members were engaged in looking for water and pasture thus delaying in attending public participation meetings. This was mitigated by starting the meeting early enough.

## 2 PROJECT DESCRIPTION AND ALTERNATIVES

### 2.1 INTRODUCTION

This section provides a description of Kibish Project in terms of location, facilities and associated Project infrastructure, activities during the Project lifecycle and project alternatives. It borrows largely from preliminary project designs, field observations, interviews and documentations availed by MOE and REREC.

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

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

S. NO.	PARTICULARS	DESCRIPTION
1.	Project location	The project is located in Kibish village near Kibish Shopping Centre at Kibish ward in Turkana County. Geographically, the site is located on latitude 5°17'12.87"N and longitude 35°49'25.87"E at altitude of 1420 fts above the sea level.
2.	Proponent	Ministry of Energy
3.	Land Size/Tenure	The proposed solar mini grid will be located on a 1.219 hectare piece of land next to Kibish Shopping Centre on a community land-Unregistered.
4.	Mini-grid Capacity	PV Array (DC-kW) of 120kw; 300kWh Battery
5.	Mini-grid Power	LV Circuit of 9 km
6.	Distribution line	Approximately 1.5km radius
7.	Target Consumers	375 (364 Residential and 11 Non-Residential)
8.	Climatic condition	Turkana has a hot, dry climate with temperatures ranging between 20°C and 41°C and with a mean of 30.5°C. Rainfall in the area is bimodal and highly variable. The long rains occur between April and July and the short rains between October and November. Annual rainfall is low, ranging between 52 mm and 480 mm with a mean of 200 mm (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 very arid

S. NO.	PARTICULARS	DESCRIPTION
9.	Site Conditions	The side is generally in open area with minimal fauna and flora.
10.	Road Accessibility	Murram road.
11.	Nearest Airport	Kakuma Airport at about 163km
12.	River/canal/nallah/pond present in project footprint	Nakwaa <i>Lagha</i> /Seasonal River 2km from Kibish site
13.	Protected areas (National Park/ Sanctuary)/ Forest land within 10 kms	None
14	Estimated Project cost	USD 426,739.12

## 2.2 PROJECT LOCATION

The project site is located in Kibish village at Kibish Location, Kibish ward in Turkana County. Geographically, the site is located on latitude 5°17'12.57"N and longitude 35°49'25.87"E. The proposed power MG will be constructed on approximately 1.219hectare of land near Kibish Shopping Centre. The proposed project is situated about 300 metres to the west of Kenya-Ethiopia boarder and about 128km from Lokitaung Town. The site is neighbouring Kibish shopping centre to the south west. The site soil is primarily sandy-loam within the area.

Figure 2-1 and Plate 2 below present the location of the proposed project site.



## **Figure 2-1: Project Location Description of Project Facilities and Components.**

### **2.2.1 Description of the Proposed Solar Mini-grid**

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Based on an aerial survey done in 2019, Kibish has a potential customer base approximated at 375 households, and a 122KWp solar Mini-grid to supply power to the community will be installed. This will entail generation of electricity from solar, distribution of power within a 1.5-kilometer radius using wooden or concrete poles and retailing the same to the community. The total length of LV distribution network will be 9 Km. The community members will pay a connection fee of KES. 1000 once they apply for electricity.

#### **2.3.1.1 Nature of the Project**

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

##### **PV Hybrid Mini-Grid Sizing**

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

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

The system will be modular, so that it can be upgraded easily to meet future demand needs. The proposed power plant will be configured as AC coupled due to the significant portion of daytime loads that can be fed directly from the solar PV generator without intermediate battery storage.

This will include:

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

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

### **1.3.1.2 Architecture and Basic Design Specifications**

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This hybrid power generation site is projected to generate 120 (kWp) and is meant to serve between 300-400 households (customers). The proposed mini-grid installations will be built to comply the International Electro technical Commission (IEC) standards. It will have an installation of solar panels of with a capacity of 120 (kWp) and battery house with 300 kWh. The solar panels will have a connection to the batteries through underground cables.

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

The PV plant and the battery capacity have been sized accordingly to the daily demand and the solar resources. In addition to this Design architecture, the project site shall have a site office that shall also have a Control Room adjacent as well as a guard house. The guard house shall be constructed using concrete and masonry works whereas the control room and office can also be a containerized facility.

The Solar PV hybrid system is based on a centralized photovoltaic plant connected to a 3-phase 415V AC busbar line, where the multi-mode battery inverter and the diesel generator are also connected.

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

*Figure 2: The preliminary Data for Kibish Solar Mini-grid*

Name	Residential	Nonresidential	Circuit(km)	Peak demand (kw)	Daily demand (KW)	Monthly demand (kWh)	PV( DC-KWp )	Generator fuel Tank	Batteries	Generator (kva)	Cost (USD)
Kibish	364	11	9	72	389	11,680	122	2000	300	82	426,739.12

### **Key Components of the Project:**

#### **Power Generation Sources:**

**Solar Photovoltaic Panels:** The project utilizes solar panels with a total capacity of 120kWp to harness solar energy. Solar power is a clean and renewable energy source that will provide a significant portion of the electricity needed for the project.

**Battery Energy Storage System:** A 300kWh Battery Energy Storage System is incorporated to store excess solar energy during the day, ensuring a consistent power supply even during cloudy or nighttime conditions.

**Diesel Generator:** A 82 kVA diesel generator is included to serve as a backup power source for periods of low solar generation or in case of battery depletion. It provides reliability and backup in the event of extended periods of cloudy weather or high demand.

**Fuel Tank for Diesel Generator:** A 2,000-liter fuel tank is provided to store diesel fuel for the generator, ensuring continuous operation during extended periods of low solar or high demand.

#### **Inverters and Chargers:**

**PV Inverter:** A 120kW solar PV inverter is used to convert the direct current (DC) electricity generated by the solar panels into alternating current (AC) electricity suitable for consumer use.

**Battery Inverter Charger:** A 82 kW battery inverter charger is employed to manage the energy flow to and from the battery storage system. It ensures efficient charging and discharging of the battery, maximizing the system's overall performance.

#### **Low Voltage Power Distribution Network:**

A 9-kilometer Low Voltage (LV) power distribution network is established to distribute the generated electricity to the residential and nonresidential consumers. The LV network is designed to efficiently transmit power while minimizing losses, ensuring a stable supply to the customers.

#### **Project Metrics:**

**Monthly Energy Demand:** The project is expected to meet a total monthly energy demand of 11,680 kWh.

**Daily Energy Demand:** The average daily energy demand is approximately 389 kWh, ensuring a consistent supply for the consumers.

**Peak Demand:** The peak demand of the system is 72 kW, which is the maximum power requirement during any given moment.

**PV Capacity:** The solar photovoltaic panels have a total capacity of 120kWp.

**Battery Capacity:** The Battery Energy Storage System has a capacity of 300 kWh, providing energy storage and ensuring a continuous power supply.

**Generator Capacity:** The diesel generator has a capacity of 82 kVA, serving as a backup power source.

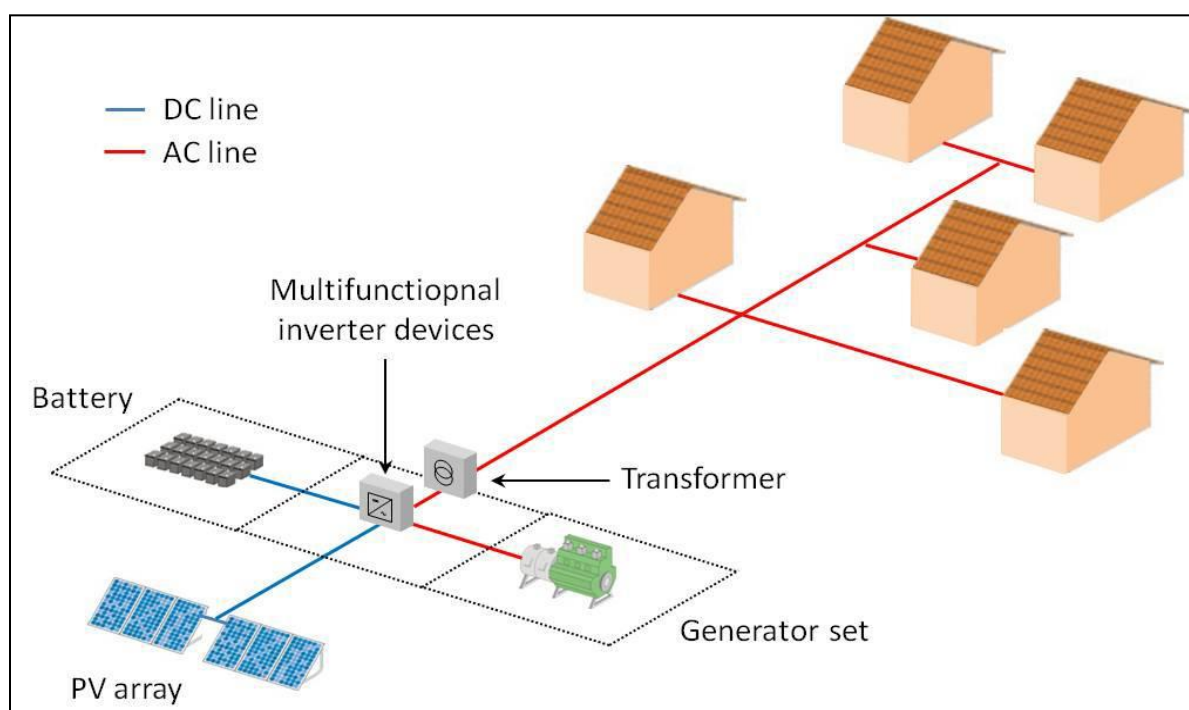
**Fuel Tank Capacity:** The fuel tank for the diesel generator can hold up to 2,000 liters of diesel fuel.

**LV Network Length:** The low voltage distribution network spans a length of 9 kilometers, connecting consumers to the power source.

### **Estimated Project Cost:**

The estimated cost of the Kibish Mini Grid project is approximately USD 426,739.12. It's important to note that this cost may be subject to change as more detailed plans and implementation phases are developed. The investment is expected to provide long-term benefits to the local community, improving their quality of life, economic opportunities, and access to modern amenities.

*Figure 3: Illustration sketch of the proposed design of the proposed project*



### **2.2.2 The PV Generator**

The PV generator consists of Silicon Crystalline Photovoltaic modules of capacity at STC of 250 Wp or more. The PV modules should comply with the norms IEC 61215 and IEC 61730. The outside junction box with the positive and negative terminals shall incorporate bypass diodes that have the function of preventing any possibility of the electrical circuit inside the module being broken due to the partial shading of a cell and shall be at least IP 65 and UV resistant.

The module support structure shall be ground-mounted on arid soil with a base made of concrete. The support shall have a tilt angle between 10° - 15° from the horizontal. No soil tests have been

performed, at this stage of the proposed project design, but from the site inspection during the pre-feasibility study, ramming or screw foundations could be used. The support frame shall be of either lightweight aluminum or galvanized steel and it shall be easy for installation, maintenance and disassembly at the end-of-life cycle. These materials will be possibly sourced locally or from abroad and shipped to Mombasa port and transported via road to the site town.

Cables used within the PV generator shall have a voltage rating of at least 1,2 VOC; have a temperature rating higher than 40°C above ambient temperature; they will be UV-resistant; water resistant and it is recommended that they be flexible (multithreaded) to allow for thermal/wind movement of modules. The PV inverter shall be of type current source grid-tied to convert DC to an AC Sinusoidal current. String inverters shall be installed indoors or outdoors with a cover and suitable for desert conditions with high ambient temperatures and dust.

### **2.2.3 Powerhouse**

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

### **2.2.4 Inverter**

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

### **2.2.5 Battery Energy Storage System**

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

OPzS stands for:

O = Ortsfest (stationary)

Pz = Panzerplatte (tubular plate)

S = Flüssig (flooded).

Other batteries can be considered:

1. OPzV type, "gel" lead-acid batteries are "maintenance less" but the unit weight is higher and the lifetime is sensitive to high temperatures.

2. Li-ion batteries, have longer lifetime, are lighter and smaller. But they have a higher investment cost and are not adapted to high air temperature so that an additional active cooling system is needed.

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

#### **2.3.6.1 Battery Rating**

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

#### **2.3.6.2 Battery Performance**

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

#### **2.3.6.3 Lifetime**

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

#### **2.3.6.4 Battery Cabling and Protections**

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

### **2.2.6 Diesel Generator**

A standby generator will also be connected to the system as a backup. The rated consumption will follow a 0.25 L/h/kW curve at stand-by power. It should include a highly corrosion resistant enclosure, control panel and monitoring, fuel tank and circuit breaker protections. The Diesel Genset shall be suitable for indoor or outdoor installation and shall perform accordingly with Multi-mode Inverter and the mentioned architecture model. The Diesel Genset shall be working in a fully automatic manner with the above stated components. The diesel gensets will have base mounted fuel tanks that will be factory tested for leaks. There will also be an external reserve fuel tank with a capacity of not less than 2000 liters. The proponent, through the operating entity

will have regular inspection by the manufacturer. The noise rating for the generator set will be 75dBA @ 1 meter at 75% load under free field conditions. The generator sets will have a high-quality noise absorbent and fire-retardant grade acoustic insulation material complying to IS 8183.

### **2.2.7 Distribution Line and Energy Meters**

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Kibish site will have a distribution line circuit of 9 km in total. The electricity distribution from the generation plant to the end consumers will be done by means of a distribution line formed by low voltage (LV) line at 415V for three phase and 240V for single phase. All lines shall be over-head mounted on concrete poles or eco poles. The project implementing agency and REREC will seek way leaves for the LV lines which will run along road reserves and boundaries within the supply area.

### **2.2.8 Cable Requirements**

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The cables used in the site shall fulfil these requirements:

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

## **2.3 PROJECT ACTIVITIES**

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The final design and construction of the Solar Mini-grid will be undertaken by a contractor selected through a competitive bidding process. Construction will be supervised by REREC to ensure works are undertaken in accordance to specifications. This is to ensure quality work is achieved.

It is anticipated that the proposed site will undergo alteration during construction to install the Solar Mini-grid and associated structures. Some of the activities envisaged in this project include:

### **2.3.1 Pre-Construction Phase Activities**

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The main activities during the pre-construction phase will be land acquisition for generation assets, wayleaves, contractor facilities and workers' camps.

### **2.3.2 Construction Phase activities**

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The project will be constructed based on applicable standards of Kenya, environmental guidelines and health and safety measures in line with OSHA Act 2007. All construction activities including ground preparation, earth moving, materials delivery, building, walling, roofing and the installation of amenities (power, water, communication equipment, etc.), fittings (doors, windows, safety provisions, etc.) will be carried out by competent personnel obtained through respectable contractors to ensure consistent high standard of finish and providing superb value for money.

#### **2.3.2.1 Construction Activities Outline**

Construction activities will involve the following:

- The contractor shall perform site investigations in good time to ensure appropriate designs and construction is done on a sound engineering basis.
- Site preparation (groundbreaking, clearance of vegetation, preparation of a site office and stores, fencing to avoid intrusion),
- Disposal of any soil that could be not required, excavations/earth moving, filling and foundation laying,
- Procurement of construction materials and delivery of the same to the site,
- Storage and utilization of materials,
- Civil, mechanical, and electrical works,
- Building works, trampling and removal of construction wastes,
- Construction of fuel storage tank
- Installing of containerized generators
- Piping of fuel lines
- Cabling
- Installation of the Mini-grid
- Completion of the plant
- Post construction clean-up, restoration and landscaping of site
- Load testing
- Remedying of defects after functional tests
- Solid waste collection and commissioning of the plant.

During construction, the contractor shall observe safety and shall erect warning signs to warn on any potential hazards, ensure proper and efficient use of Personal Protective equipment (PPE) for all on site and observe safe work procedures.

### **2.3.3 Operation Phase Activities**

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The Solar Mini-grid will be operated and maintained by the contractor for the first 7 years and then handed over to KPLC engineers and operators. During operation phase of the project, no unauthorized person shall access the Solar Mini-grid site. This is in line with company policy to ensure safety of staff and the public. Routine maintenance is to be done under supervision by authorized staff.

Throughout the project life, the REREC shall adhere to all requirements of National Environmental Management Authority (NEMA) and any other applicable legislation regarding environmental and socio – economic impacts.

### **2.3.4 Project's Decommissioning Activities**

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Kenya Power shall submit a decommissioning plan to NEMA in good time prior to decommissioning. The decommissioning plan should include a restoration plan.

At the decommissioning/demolition phase, the following activities will take place;

- Removal of Solar Mini-grid panels and Diesel Generator and their associated switching equipment's
- Removal of electrical fittings, bus bars and steel poles/structures
- Demolish and carefully handle components that contain oil and fuels like the Diesel generators
- Ensure proper handling of the demolished materials and have an authorized and guided transportation and disposal away from human settlement, water bodies and wildlife conservation area in line with NEMA requirements for safe disposal
- Demolish and remove all the concrete works

The host environment should be rehabilitated and restored to its former state through:

- Approved and appropriate landscaping methodology.
- Planting of vegetation.
- Removal of any soils that may have been impacted by oils or fuels for offsite (away from the project area) remediation.

## **2.4 CONSTRUCTION MATERIALS, EQUIPMENT AND SERVICES**

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All materials that will be used in construction of this project shall be of high quality in line with the Kenya Bureau of Standards. Sufficient materials and equipment shall be purchased and stored on site to avoid wastage. Most of the materials are locally available and the contractor should source from within the project area.

### **2.4.1 Input Materials and Equipment & Machinery**

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Works and construction activities are expected to use quality construction materials and procedures to ensure quality work, occupational and public safety and environmental protection. The following inputs and equipment will be required for construction:

- Lorries
- Plumbing equipment

- Concrete mixers
- Welding machines, wheelbarrows
- Electrical equipment
- Excavators
- Raw construction materials (Sand, cement, natural building stone blocks, hard core, gravel, concrete among others).
- Timber (e.g., doors and frames, fixed furniture, etc.),
- Paints, solvents, whitewash, etc.,
- Labor force (of both skilled and unskilled workers).
- Generator Sets,
- Bus bars, Switch gears, Circuit breakers
- Lightning arrestors and Steel structure members
- Water
- Solar panels
- Conductors
- Poles
- Meters
- Fuels (Diesel)
- Sand
- Hardcore
- Building stones
- Glass

#### **2.4.2 Land Tenure**

The proposed works will be carried out on a 1.219 Ha proposed unregistered community land which the community identified for setting up the project. Stakeholder engagement with the community on this matter has been conducted. The proposed site land falls on a land owned by the Kibish community. The sub-project site will be acquired by NLC compulsorily and affected communities compensated in-kind through their community project of choice.

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.

#### **2.4.3 Compensation Details**

Compensation for the land acquired for the proposed project will be in kind. NLC will acquire the 1.219Ha land in Kibish compulsorily, The MOE will pay compensation in kind through implementation of projects in water, education and health sectors. Compensation in kind project will cost 1,000,000 Ksh. Kibish community requested for the following projects in order of priority.

- a) Reticulation of water from Tuk-tuk borehole located 100m from the site to the local community.
- b) Construction of a maternity wing at Kibish GOK dispensary located 600m from the site.



*Plate 2: Tuk-tuk borehole / Kibish Dispensary*

Further, A-RAPs has been prepared for the sub project. The A-RAP stipulates procedures and actions for acquiring land and compensating affected communities. 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 this sub project, there is no physical displacement of affected persons, and the foreseen impacts on livelihoods such as grazing occasioned by min-grid construction, way leaves acquisition and implementation of community projects are considered minor. An A-RAP outlining the principles and procedures for land acquisition and compensation is annexed in this report. (See annex 6)

#### **2.4.4 Access to the Site**

It is proposed that the Kibish Solar Mini-grid will have one access road, which will be designed according to REREC's standards, taking into account the Ministry of Road's requirements. The Solar Mini-grid will be accessed via Lokitaung-Kokuro-Kibish road. The road is well maintained murram road, this is advantageous because no new road will be required. However, a proper access to the site and drainage will be constructed to safely access the Mini -grid site and to avoid flooding.

### **2.5 RESOURCE REQUIREMENT**

#### **2.5.1 Workforce Requirement**

Construction activities of the mini-grid will include ground preparation, earth moving, materials delivery, building, walling, roofing and the installation of amenities and fittings. These activities will be carried out by skilled, semi skilled and un-skilled competent personnel. The number of workers will be dictated by the contractor based on the work load. The Solar Mini-grid will be operated and maintained by the O&M contractor for the first 7 years and then handed over to the KP engineers and operators.

## **2.5.2 Water Requirement and Source**

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### **2.5.2.1 Construction Phase**

Water is key in the construction of this project. Water will be required for potable use and in the construction of the foundations for the control room, guard house and any other works. The contractor will source water from elsewhere rather than the community boreholes because water may not be enough for the community for use during construction and operation. Alternative water sources will be from Nakwaa ephemeral stream located approximately 2km from the project site.

### **2.5.2.2 Operation Phase**

The water required during operation phase of the project will be mainly for washing the face of the solar modules, minimal water will be used for this purpose. The quantity of Water requirement during operational phase of the project is not known at this stage of the project. As noted previously, employees (direct and contractual) will be working during operation phase.

## **2.5.3 Raw Material Requirement**

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### **2.5.3.1 Construction Phase**

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

### **2.5.3.2 Operation Phase**

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

## **2.5.4 Power Requirement**

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Power will be essential for the proposed project both during construction and operation. The contractor will have to have a portable generator during construction for fabrication and welding where necessary but Kenya Power will provide electricity for operations from its constructed Solar Mini-grid electrical network in the area since the area will be well served with power after completion of the Solar Mini-grid.

The contractor should ensure that all material sourcing does not trigger any environmental or social impacts. All hazardous materials should be handled according to the NEMA regulations on hazardous waste. All new unidentified impacts should be mitigated and managed in a responsible manner throughout the project cycle by the contractor and the project operator.

### **2.5.5 Products, By-Products and Waste**

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The sections below provide an overview of the products, by-products and wastes to be generated by the project. No by product will be envisaged during construction period. During construction the proposed project is anticipated to generate different waste which shall include:

- Remains of concrete from demolition of Mini-grid foundation
- Dusts and fumes;
- Scrap metals;
- Solar Panels
- Batteries
- Generator

Considerable amount of dust and other particulates will be released into the atmosphere due to the activities that will occur particularly during the demolition process. The demolition machinery, equipment and trucks used are expected to generate smoke emissions. The concentration of emissions will depend on the maintenance levels of the equipment, machinery and trucks used by the contractor.

As is with other projects, the proposed project is prone to both natural and man-made disasters. However, it is difficult to prevent the occurrence of natural disasters, but the consequences could be reduced by engineering measures. Man-made disasters on the other are preventable. The following safety concerns will be addressed in the proposed project.

The proposed project will be designed according to acceptable standards and code and shall be able to reasonably withstand any impacts which may arise as a result of the worst credible seismic event.

The proposed project could be prone to malicious damage such as terrorist attack or theft. To prevent the occurrence of such events, the following measures will be taken:

- Regular monitoring and inspection of the project and its associated infrastructure.
- 24-hour guard of the premises/office block.

### **2.5.6 Fire Safety and Security**

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#### **2.5.6.1 Construction Phase**

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

#### **2.5.6.2 Operation Phase**

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

The systems and equipment's will align to the Kenyan Fire Reduction Rules of 2007. The Fire protection and fighting systems will be maintained and serviced after every 6 months. The team

managing the site will be trained on Fire safety as per the requirement on Fire Risk reduction rules. Further the proponent will be required to undertake Annual OSH Audits, Fire audits and Risk assessment as per the requirement of OSHA 2007 and the relevant subsidiary legislation.

### **2.5.7 Electrical Safety**

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

### **2.5.8 Fencing And Security**

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

### **2.5.9 Vegetation Undergrowth**

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

## **2.6 ANALYSIS OF ALTERNATIVES AND PROJECT JUSTIFICATION**

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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.

### **2.6.1 Present Power Supply Position**

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According to the Turkana County Integrated Development Plan (2018-2022), Electricity from Kenya Power and Lighting Company (KPLC) is available in the major towns of Lodwar, Lokichoggio, Lorugum, Turkwel Lokitaung and Lokori, and is powered predominantly by diesel or solar hybrid mini-grids. Lokichar, Kalemgorok and Kakong'u are powered by the main grid. Lokori, Lokitaung and Lokichoggio power generation projects are approximately 80% complete. Most of the other upcoming urban centres including Kibish still lack access to electricity, which is inhibiting economic growth and, consequently, the county's ability to engage in economic activities.

Turkana County receives between 4 and 6 kWh/m<sup>2</sup> of daily solar radiation based on the national atlas and therefore has a vast potential for solar energy production (Turkana County Government 2015). There is need to tap this source of energy in Kibish location to promote economic growth in the area.

In Kibish, majority of the households use solar solutions (including Sun-king and D-light), torch and firewood for lighting and mobile phone charging purposes and fuel wood for cooking and heating water. During the Focus Group Discussions with both men and women, it was reported that they face challenges accessing power. The main challenge being lack of money to pay for accessible sources of power in the area.

If the project does not go on, it will involve several losses both to Kibish village and Kibish Location 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 thus leading to:

- The economic status of the local people remaining unchanged.
- Employment opportunities not created.
- Unchanged poverty in the area.

## **2.6.2 Land identification criteria**

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Minigrid Sites under KOSAP were selected based on a number of factors.

1. Geophysical Factors-Proximity to Hills-Shade effect, Soil erosion, Drainage of the area, Flooding etc.

2. Land identified is free from any dispute on ownership or any other encumbrances

3. Proximity to public utilities-Schools, Dispensaries, Places of worship and community settlements

4. No squatters, encroachers or other claims to the land

5. The Size of the Minigrid to be constructed and the optimal coverage of a Minigrid in terms of the number of people to be reached.

6. The Land identified should be on spaces set aside for public use within the community centres. The land was identified by the beneficiary communities and confirmed by technical staff to be suitable for the sub-project and free from any environmental or health risks. The impacts on the Community will be marginal and will not result in displacement of households or cause loss of household's incomes and livelihood.

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

## **2.6.3 Alternate Location for Project Site**

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

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

Kibish was identified as the most suitable area for the establishment of the proposed mini-grid based on the following factors:

**Primary Resource:** Kibish village receives sunlight up to 8 hours a day, the availability of sun makes it suitable for a solar mini grid. The community is further marginalised with no electricity grid connectivity compared to other regions in the country.

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

#### **2.6.4 Alternate Method of Power Generation**

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

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

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

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

Solar energy was a desirable option because:

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

#### **2.6.5 Zero or No Project Alternative**

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The No Project option in respect to the proposed project implies that the status quo is maintained. This option is the most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions. This option will however, involve several losses to Kibish village, Kibish Location 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.

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

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

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

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

*It is thereby concluded that the 'do-nothing' option is not a good option economically and should therefore be discouraged and rejected. It is therefore imperative for REREC to establish a new solar mini-grid in the area and supply the community with clean energy.*

## **2.7 ALTERNATIVE SOURCES OF ENERGY**

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### **2.7.1 Thermal Power Generation**

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Thermal power through installation of Diesel Gen Sets is an option which can be considered to provide power to Kibish. This would need more than 250-300litres of Industrial Diesel Oil (IDO) is burnt daily to generate targeted 50kWp of electricity at Kibish. Thermal generation can also be fueled using alternative fuels such as natural gas, bio diesel, industrial kerosene, heavy vehicle fuel, coal and unleaded petrol. Thermal power generation has serious negative environmental impacts including generation hence the need for the REREC to install the proposed solar power plant.

### **2.7.2 Hydro Electric Power – HEP**

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This would mean exploring the possibility of extending the existing national grid to Kibish since there are no hydro facilities within the region to facilitate HEP generation. The proposed project is quite far from the national grid hence this is a costly venture and may take time before the residents need power for their livelihood.

### **2.7.3 Other Sources of Energy:**

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Wood fuel is the greatest source of Energy contributing to 80% of energy requirements in Africa. Over reliance on wood has led to deforestation, desertification, global warming and climatic change among other socio – economic demerits. The Government of Kenya should look into the possibility of using nuclear energy to generate electricity. This is a long-term consideration and also has several deleterious effects to the environment and human health. Nuclear Waste disposal will also create a huge environmental challenge.

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

### **2.7.4 Analysis of Alternative Construction Materials and Technology**

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

### **2.7.5 Conclusion**

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Based on the above-mentioned project alternatives suitability criteria and technical requirements, the proposed project is the most desirable option considering the community needs, location and cost of the project.

### 3 POLICY, LEGAL AND REGULATORY FRAMEWORK

#### 3.1 INTRODUCTION

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

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

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

#### 3.2 KENYA ELECTRICITY SUPPLY INDUSTRY (ESI)

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

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

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

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

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

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

### **3.3 ENVIRONMENTAL POLICY FRAMEWORK**

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The Kenya government formulated a national Environmental policy in 2013 whose goal is better quality of life for present and future generations through sustainable management and use of the environment and natural resources.

According to the said policy Kenya has a wide variety of ecosystems namely mountains, forests, arid and semi-arid areas (ASALs), freshwater, wetlands, coastal and marine all offering many opportunities for sustainable human, social and economic development. These ecosystems are natural capitals which provide important services such as; regulatory services, provision services, cultural services and supporting services implying that the survival and socio-economic wellbeing of Kenyans is ultimately intertwined with the environment.

The policy comes in handy as it provides a framework to guide the country's efforts in addressing the ever-growing environmental issues and challenges such as: Environmental governance, Loss of biodiversity, valuation of environmental and natural resources, rehabilitation and restoration of environmentally degraded areas, urbanization, waste management and pollution, climate change, energy, security and disaster management, public participation, environmental education and awareness, data and information, poverty, chemicals management

One of the principles of the policy which this project must adhere to is that the right to development should be exercised taking into consideration sustainability, resource efficiency and economic, social and environmental needs.

### **3.4 INSTITUTIONAL, REGULATORY AND LEGAL FRAMEWORK**

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The multi-faceted nature of the environment and the need to integrate environmental considerations in all development planning and activities calls for cooperation and consultation among responsible government agencies and stakeholders at all levels. At present there are several institutions and departments which deal with environmental issues in Kenya. Some of the key institutions include:

#### **National Environment Management Authority (NEMA)**

The objective and purpose for which NEMA was established is to exercise general supervision and co-ordinate over all matters relating to the environment and to be the principal instrument of the government in the implementation of all policies relating to the environment. However, NEMA's mandate is designated to the following committees:

#### **County Environment Committees**

According to EMCA (Amendment), 2015, every governor shall, by notice in the Gazette, constitute a County Environment Committee (CEC) of the County. The County Environment Committees are responsible for the proper management of the environment, development of county strategic environmental action plan, every five years including implementation of the plans among others.

#### **National Environmental Complaints Committee**

The Committee performs the following functions:

Investigate any allegations or complaints against any person or against the authority in relation to the condition of the environment in Kenya and on its own motion, any suspected case of environmental degradation and to make a report of its findings together with its recommendations thereon to the Council.

- ✓ Prepare and submit to the Council periodic reports of its activities which shall form part of the annual report on the state of the environment under section 9 (3) and
- ✓ To perform such other functions and exercise such powers as may be assigned to it by the Council.

### **National Environment Action Plan Committee**

This Committee is responsible for the development of a 5-year Environment Action Plan among other things. The National Environment Action Plan shall:

- Contain an analysis of the Natural Resources of Kenya with an indication as to any pattern of change in their distribution and quantity over time.
- Contain an analytical profile of the various uses and value of the natural resources incorporating considerations of intergenerational and intra-generational equity.
- Recommend appropriate legal and fiscal incentives that may be used to encourage the business community to incorporate environmental requirements into their planning and operational processes.
- Recommend methods for building national awareness through environmental education on the importance of sustainable use of the environment and natural resources for national development.
- Set out operational guidelines for the planning and management of the environment and natural resources.
- Identify actual or likely problems as may affect the natural resources and the broader environment context in which they exist.
- Identify and appraise trends in the development of urban and rural settlements, their impact on the environment, and strategies for the amelioration of their negative impacts.
- Propose guidelines for the integration of standards of environmental protection into development planning and management.
- Identify and recommend policy and legislative approaches for preventing, controlling or mitigating specific as well as general diverse impacts on the environment.
- Prioritize areas of environmental research and outline methods of using such research findings.
- prejudice to the foregoing, be reviewed and modified from time to time to incorporate emerging knowledge and realities and;
- Be binding on all persons and all government departments, agencies, States Corporation or other organ of government upon adoption by the national assembly.

### **Standards and Enforcement Review Committee**

This is a technical Committee responsible for environmental standards formulation methods of analysis, inspection, monitoring and technical advice on necessary mitigation measures.

### **National Environment Tribunal**

This tribunal guides the handling of causes related to environmental offences in the Republic of Kenya.

### **National Environment Council (NEC)**

EMCA 1999 No. 8 part III section 4 outlines the establishment of the National Environment Council (NEC). NEC is responsible for policy formulation and directions for purposes of EMCA; set national goals and objectives and determines policies and priorities for the protection of the environment and promote co-operation among public departments, local authorities, private sector, non-governmental organizations and such other organizations engaged in environmental protection programmes.

*The project proponent will adhere to any directive issued by the above institutions that are relevant to the project.*

## **3.5 NATIONAL POLICY AND LEGAL FRAMEWORK REVIEW**

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The applicable policy and legal framework are illustrated in table 3-1 below

**Table 3-1: Policy and National Laws**

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

		social development. The integration process was to be achieved through multi-sectoral approach to develop a comprehensive framework to ensure that environmental management and the conservation of natural resources forms an integral part of societal decision-making.	is in line with the requirements of the NEAP. The project will be reviewed by NEMA for approval before implementation.
4	Environmental and Development Policy (Session Paper No.6 1999)	As a follow-up to the foregoing, the goal of this policy is to harmonize environmental and developmental goals to ensure sustainability. The paper provides comprehensive guidelines and strategies for government action regarding environment and development.	<p>The proponent:</p> <ul style="list-style-type: none"> <li>• Is undertaking an Environmental Impact Assessment, Social Impact Assessment and Public participation as part of the planning and approval of infrastructural projects.</li> <li>• Will ensure that periodic Environmental Audits are carried out for the project</li> </ul>
5	The Gender and Development Policy (Sessional paper no.2 2019)	The overall goal of this policy is to achieve gender equality by creating a just society where women, men, boys, and girls have equal access to opportunities in the political, economic, cultural, and social spheres of life.	<p>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:</p> <ul style="list-style-type: none"> <li>• Ensure gender inclusivity in decision making, employment opportunity and access to the energy generated from the Mini-Grid</li> <li>• Mitigate social risks including sexual and gender-based violence, and any form of discriminations</li> </ul>
6	The HIV/ AIDS Policy 2009	In summary, the policy aims at: i. Establishing and promoting programmes to ensure non-discrimination and non-stigmatization of the infected.	The proposed project is to be implemented in the rural setting at Kibish 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

		<p>ii. Contributing to national efforts to minimize the spread and mitigate against the impact of HIV and AIDS.</p> <p>iii. Ensuring adequate allocation of resources to HIV and AIDS interventions;</p>	issues related to HIV/AIDS during the entire project phase.
<b>National Laws</b>			
1	The Constitution of Kenya, 2010	The Constitution of Kenya promulgated in 2010 is the supreme law of the republic and binds all persons and all State organs at all levels of government. The Constitution provides the broad framework regulating all existence and development aspects of interest to the people of Kenya, and along which all national and sectoral legislative documents are drawn.	The proposed project complies with the Constitution by proposing a structure in its ESIA on how to deal with Social, Health, safety and environmental issues for sustainable development.
2	Environmental Management and Coordination Act, 1999 (And the Amendments Of 2015)	The EMCA is a framework environmental law in Kenya. This Act (assented to on January 14, 2000) provides a structured approach to environmental management in Kenya. With the EMCA coming into effect, the environmental provisions within the sectoral laws were not superseded; instead, the environmental provisions within those laws were reinforced to better manage Kenya's ailing environment.	The proposed project will be undertaken in accordance with relevant sections of the EMCA, specifically Clauses 58 – 63. These sections of the Act are operationalized by subsidiary legislation promulgated under the Act and specifically Legal Notice (L.N.) 101: Environment (Impact Assessment and Audit) Regulations, 2003.
3	L.N. 101: EIA/EA Regulations, 2003 And 2016 Amendments	These regulations provide the framework for undertaking EIAs and EAs in Kenya by NEMA licensed Lead Experts and Firms of Experts. An EIA or EA Study in Kenya is to be undertaken by a firm duly licensed by the NEMA. The EIA/EA Regulations also provide information to	The proposed project is subject to relevant provisions of these regulations and subsequently, the ESIA has been undertaken in accordance with the requirements.

		project proponents on the requirements of either an EIA or EA as required by the EMCA.	
4	L.N. 120: Water Quality Regulations, 2006	This regulation provides for the sustainable management of water used for various purposes in Kenya. The regulation contains discharge limits for various environmental parameters into public sewers and the environment.	The contractor will be required to properly manage the effluent from construction activities in accordance with the above regulations prior to discharge into the environment.
5	L.N. 121: Waste Management Regulations, 2006	Generally, it is a requirement under the regulations that a waste generator segregates waste (hazardous and non-hazardous) by type and then disposes them in an environmentally acceptable manner.	Waste to be disposed in accordance with these regulations.
6	L.N. 61: Noise and Excessive Vibration Control Regulations, 2009	The general prohibition of these regulations states that no person shall make or cause to be made any loud, unreasonable, unnecessary, or unusual noise which annoys, disturbs, injures, or endangers the comfort, repose, health, or safety of others and the environment.	Rules 13 and 14 of the regulations define the permissible noise levels for construction sites. These noise limits will be applicable to the proposed project.
7	Environmental Management and Coordination, (Conservation of Biological Diversity) (BD) Regulations 2006	These regulations are described in Legal Notice No. 160 of the Kenya Gazette Supplement No. 84, December 2006. These regulations apply to conservation of biodiversity which includes conservation of threatened species, inventory and monitoring of BD and protection of environmentally significant areas, access to genetic resources, benefit sharing and offences and penalties.	The proposed project will impact biodiversity through clearance of vegetation on the proposed site. This will be done in strict adherence to ESMMP and revegetation of degraded site will be done as spelt out in the ESMMP.

		Additionally, this regulation provides for the local enforcement of the International Convention on Biological Diversity (CBD).	
8	Environmental Management and Coordination, (Fossil Fuel Emission Control) Regulations 2006	These regulations are described in Legal Notice No. 131 of the Kenya Gazette Supplement No. 74, October 2006. These regulations include internal combustion engine emission standards, emission inspections, the power of emission inspectors, fuel catalysts, licensing to treat fuel, cost of clearing pollution and partnership to control fossil fuel emissions. The proposed project will generate fuel emissions linked to the back-up generator. This will only happen when the sun rays are poor.	This legislation gives caution to proponent on proper handling and management of fuels. The REREC will adhere to the ESMMP while handling and managing the fuels.
9	Licenses and Permits Required Under The EMCA	The subsidiary legislations under the EMCA are partially monitored using permits and licenses. Subsequently all licenses and permits required during the construction phase shall be the responsibility of the individual contractors and their agents. During the operational phase, all permits, and licenses required to operate the project will be the responsibility of the proponent.	The following permits to be available for inspection during the construction and operational phases of the project: <ul style="list-style-type: none"> <li>✓ EIA License under Environmental Management and Coordination Act, 1999;</li> <li>✓ Workplace Registration under Occupational Safety and Health Act, 2007;</li> <li>✓ Construction Permit by the County Government; and</li> <li>✓ Noise Permit under Legal Notice 61: The Environment Management and Coordination (Noise and Excessive Vibration Control) Regulations, 2009.</li> </ul>
10	Occupational Health and Safety Act, 2007	The Occupational Safety and Health Act (OSHA) was enacted to provide for the health, safety and welfare of persons employed in workplaces,	The contractors will be required to fully comply with Legal Notice 40 titled: Building Operations and Works of Engineering Construction Rules, 1984 (BOWEC).

		and for matters incidental thereto and connected therewith.	Each contractor will develop and implement a formal construction health and safety plan.
11	L.N. 31: The Safety and Health Committee Rules, 2004	These rules came into effect on April 28, 2004, and require that an Occupier formalize a S&H Committee if there is a minimum of 20 persons employed in the workplace. The size of the S&H Committee will depend on the number of workers employed at the place of work	The contractor will be required to constitute Health and Safety Committee to oversee safety and health at the construction site.
12	L.N. 24: Medical Examination Rules, 2005	These rules provide for Occupiers to mandatorily undertake pre-employment, periodic, and termination medical evaluations of workers whose occupations are stipulated in the Eighth Schedule to the OSHA and the First Schedule to this Rules. Workers that fall under the above two schedules are required to undergo medical evaluations by a registered medical health practitioner duly registered by the DOSHS.	The contractor should ensure that workers exposed to hazards and/or accidents undergo requisite medical examinations as required by these rules
13	L.N. 25: Noise Prevention and Control Rules, 2005	<p>The rules set the permissible level for occupational noise in any workplace (which includes construction sites)</p> <p>The Proponent is to ensure that</p> <ul style="list-style-type: none"> <li>•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).</li> <li>•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</li> </ul>	The contractor to ensure that equipment is serviced properly and/or use equipment that complies with the threshold noise values provided in the act. Alternatively, each contractor will be required to develop and implement a written hearing conservation programme during the construction phase.

		loss to the worker will be compensated as an occupational disease.	
14	L.N. 59: Fire Risk Reduction Rules, 2007	<p>Several sections of the rules apply to the proposed project as enumerated below.</p> <ul style="list-style-type: none"> <li>- 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.</li> <li>- Regulation 22 provides a description of the functions of a fire-fighting team.</li> <li>- Regulation 23 requires Proponents to mandatorily undertake fire drills at least once a year.</li> <li>- Regulation 34 requires Proponents to develop and implement a comprehensive written Fire Safety Policy</li> <li>- Regulation 35 requires a Proponent to notify the nearest Occupational S&amp;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.</li> </ul>	<p>The proponent is expected to comply with the requirements of L.N. 59: Fire Risk Reduction Rules, 2007 by</p> <ul style="list-style-type: none"> <li>i. Carrying out, and record, a fire risk assessment identifying any possible dangers and risks.</li> <li>ii. Reducing, or where possible remove, the risk of fire and take precautions to deal with the remaining risks.</li> <li>iii. Developing an emergency plan should a fire occur which includes evacuation procedures etc.</li> </ul>
15	The Energy Act, 2019	The Energy Act of 2019 deals with all matters relating to all forms of energy including the generation, transmission, distribution, supply and use of electrical energy as well as the legal basis for establishing the systems associated	<p>The proponent is in line with the Energy act regulations in the following ways.</p> <ul style="list-style-type: none"> <li>• The proponent has identified an available site</li> </ul>

		with these purposes. The Act also established the Energy and Petroleum Regulatory Authority (EPRA).	<ul style="list-style-type: none"> <li>• Alignment of the Mini-Grid Project to County development plans.</li> <li>• The Mini-Grid proponent has the technical and financial capability to conduct the project.</li> <li>• The proponent has conducted the necessary engagement with the community.</li> </ul>
16	Water Act, 2016	<p>Part 2 section one of the Act notes that every water resource is vested in and held by the national government in trust for the people of Kenya.</p> <p>Section 143 (1) notes that; A person shall not, without authority conferred under this Act-</p> <p>(a) Wilfully obstruct, interfere with, divert or obstruct water from any watercourse or any water resource, or negligently allow any such obstruction, interference, diversion or abstraction; or</p> <p>(b) Throw, convey, cause or permit to be thrown or conveyed, any rubbish, dirt, refuse, effluent, trade waste or other offensive matter or thing into or near to any water resource in such manner as to cause, or be likely to cause, pollution of the water resource.</p>	All construction, operation and decommissioning phases will take caution to refrain from polluting any water resource and will endeavour to prevent pollution in line with the ESMMP.
17	The Energy (Solar Photovoltaic Systems) Regulations, 2012	These regulations shall apply to a solar PV system manufacturer, importer, vendor, technician, contractor, system owner, a solar PV system installation and consumer devices. The Regulations prohibits any person from	The Regulations regulates the design and installation of PV systems. The persons engaged in the designing and installation of the Mini-Grid shall be licensed by EPRA.

		designing or installing any solar PV system unless he/she is licensed by EPRA.	
18	The Public Health Act (Cap. 242)	The Act prohibits the proponents from engaging in activities that cause environmental nuisance or those that cause danger, discomfort or annoyance to inhabitants or is hazardous to human and environmental health and safety.	The proponent will be in line with the regulations of this act and will ensure suppression of infectious diseases and maintain proper sanitation during all the phases of the project.
19	The Standards Act Cap 496	The Act is meant to promote the standardization of the specification of commodities, and code of practice; to establish a Kenya Bureau of Standards, to define its functions and provide for its management and control. The REREC will ensure that commodities and codes of practice utilized in the proposed project adhere to the provisions of this Act.	All materials and spares used to construct the project will comply with the standardized specifications and certification.
20	Penal Code Act (Cap.63)	Section 191 of the penal code states that if any person or institution that voluntarily corrupts or foils water for public springs or reservoirs, rendering it less fit for its ordinary use is guilty of an offence. Section 192 of the same Act says a person who makes or vitiates the atmosphere in any place to make it noxious to health of persons /institution, dwelling or business premises in the neighbourhood or those passing along public way, commits an offence.	The REREC shall observe the guidelines as set out in the environmental management and monitoring plan laid out in this report as well as the recommendation provided for mitigation/minimization/avoidance of adverse impacts arising from the project activities.
21	The Land Act, 2012	An Act of Parliament to give effect to Article 68 of the Constitution, to revise, consolidate and rationalize land laws; to provide for the	Land in Kibish is community land whose tenure falls under customary land rights. REREC will observe all the relevant provisions of the Act including conversion from

		<p>sustainable administration and management of land and land- based resources, and for connected purposes</p> <p>Forms of Tenure. 5. (1) There shall be the following forms of land tenure- (a) freehold; (b) leasehold; (c) such forms of partial interest as may be defined under this Act and other law, including but not limited to easements; and (d) customary land rights, where consistent with the Constitution.</p> <p>Methods of acquisition of title to land. 7. Title to land may be acquired through— (a) allocation; (b) land adjudication process; (c) compulsory acquisition; (d) prescription; (e) settlement programs; (f) transmissions; (g) transfers; (h) long term leases exceeding twenty-one years created out of private land; or (i) any other manner prescribed in an Act of Parliament.</p> <p>Conversion of land. 9. (1) Any land may be converted from one category to another in accordance with the provisions of this Act or any other written law.</p> <p>(d) Community land may be converted to either private or public land in accordance with the law relating to community land enacted pursuant to Article 63(5) of the Constitution.</p>	community land to public land as will be deemed appropriate
22	Community Land Act, 2016	This Act is critical for the proposed project is within community land. Section 6(1) of the Act	The proposed project site falls on Kibish community land which is owned by the Kibish community. The

	<p>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'.</p> <p>Section 30(1) states that 'Every member of the community has a right to equal benefit from community land'. Section 26(1) provides that 'a community may set aside part of the registered community land for public purposes and Sub-section (2) holds that 'where land is set aside for public purposes under Sub-section (1), the (Land) Commission shall gazette such parcel of land as public land'. These provisions offer a window for the proposed project to acquire land for project works legally for communities as necessary and to convert the same into public land. This is useful for the project as once done powerful groups will not have opportunity to exclude them on account of their socio - economic statuses. In any event, Section 35 holds that, 'subject to any other law, natural resources found in community land shall be used and managed-</p> <p>(a) Sustainably and productively.</p>	<p>community has since offered the land in kind for project use. The establishment of the mini-grid will convert communal land to generation and distribution of electric energy for long term. Further, based on community need assessment the proponent will undertake in kind development project by Reticulation of water from Tuk-tuk borehole located 100m from the site to the local community or Construction of a maternity wing at Kibish GOK dispensary located 600m from the site.</p> <p>-</p>
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		<p>(b) For the benefit of the whole community including future generations.</p> <p>(c) With transparency and accountability; and</p> <p>(d) On the basis of equitable sharing of accruing benefits.</p> <p>The concept of community land has been defined broadly enough to include VMGs. Women, children, old people, and future generations have been thought of as PAPs and thus their rights secured in this Act</p>	
23	Land Registration Act, 2012	Section 27 (2) provides that a transfer without valuable consideration shall have the same effect as a transfer for valuable consideration when registered.	Once the KOSAP PIU finalizes stakeholder engagements in all the identified counties, the transfer process shall be commenced to ensure that the land rights are secured. This gives the project the required land security to allow project implementation, which is in compliance with this legal requirement.
24	Land value amendment Act 2019	<p>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.</p> <p>It introduces Section 107A into the Land Act, which provides the criteria for the valuation of freehold and community land that is the subject of compulsory acquisition. Community Land, like freehold land, shall be valued based on the criteria outlined in Section 107A and the Land Value Index which will be jointly developed by the national government and county</p>	Land in Kibish is community land. The 1.219 Ha allocated by the community for the proposed mini-grid will be acquired for the project. The MOE will pay compensation in kind through implementation of projects in water, education and health sectors. The community chose a project in either water or health sector.

		government. Section 5 introduces a list of the forms in which compensation can be made.	
25	The Environment and Land Court Act 2011	This is an Act of Parliament intended to give effect of article 162(2) b of the constitution; to establish a superior Court to hear and determine disputes relating to the environment and the use and occupation of, and title to, land and to make provision for its Jurisdiction functions and powers, and for connected purposes. The principal objective of this Act is to enable the Court to facilitate the just and expeditious, proportionate and accessible resolution of disputes governed by this Act.	The project will have a grievance redress mechanism with a committee. The work of the committee will be to receive and respond to all the grievances raised. As explained in chapter five of this report, an aggrieved party will turn to the legal system after exhausting the GRM levels of resolution set. In the event any disputes on land and environment are not resolved through the project GRM, this court will provide a forum for timely resolution of such grievances.
26	The Physical and Land Use Planning Act, 2019	This Act of Parliament makes provision for the planning, use, regulation, and development of land and for connected purposes.	The proposed site is not in contravention of any Zoning regulations. The project site is within unregistered community land; necessary county approvals will be sought by the proponent e.g., Project design approval and change of use. The approvals shall be issued by the Physical planner in the department of Lands, Housing and Urban Development – Turkana County.
27	The Employment Act No 11 of 2007	This Act is important since it provides for employer – employee relationship that is important for the activities that would promote management of the environment within the energy sector.	With the Contractor and the Project Proponent being primary employers during the construction and operational phases of the Project, respectively, they are bound by this law to abide to its stipulations on employee management and relations.
28	The Work Injury Benefit Act, 2007	This is an Act of Parliament to provide for compensation to employees for work related injuries and diseases contracted in the course of their employment	The Proponent and Contractor will maintain an insurance policy cover for its employees, record of accident, carryout proper accident investigations; organize for pre-employment and regular medical examinations for staff.

29	Air Quality Regulations (2014)	Regulation 3 stipulates that the objective of these Regulations is to provide for the prevention, control, and abatement of air pollution to ensure clean and healthy ambient air.	The Proponent and contractor will implement mitigation during construction to ensure neighbouring properties are not impacted by nuisance dust.
30	The Traffic Act Chapter 295 Laws of Kenya	<p>This Act consolidates the law relating to traffic on all public roads. Key sections include registration and licensing of vehicles; driving licenses; driving and other offences relating to the use of vehicles on roads; regulation of traffic; accidents; offences by drivers other than motor vehicles and other road users.</p> <p>Many types of equipment and materials shall be transported through the roads to the proposed site. Their registration and licensing will be required to follow the stipulated road regulations.</p> <p>The Act also prohibits encroachment on and damage to roads including land reserved for roads.</p>	The project will observe the provisions of the Act including management of traffic of construction vehicles as guided by the ESMMP.
31	National Museums and Heritage Act, 2006	The Act seeks to consolidate the law relating to national museums and heritage; to provide for the establishment, control, management and development of national museums and the identification, protection, conservation and transmission of the cultural and natural heritage of Kenya; to repeal the Antiquities and Monuments Act and the National Museums Act.	During implementation of the project, the Act will be followed in the event of case of chance find of cultural heritage on the proposed site.

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

		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.	behaviour can occur not only between project-related staff and those living in and around the project site, but also within the homes of those affected by the project.
35	The Children Act, 2012	Part 2 of the Act denotes the rights of the children and their welfare shall be protected from child labour and armed conflict i.e. Every child shall be protected from economic exploitation and any work that is likely to be hazardous or to interfere with the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral or social development.  The Act also notes that a shall be protected from sexual exploitation and use in prostitution, inducement or coercion to engage in any sexual activity, and exposure to obscene materials.	Sensitization to the community on the need to ensure the protection of children has been done and will continue throughout the project cycle. In addition, the contractor will sensitize workers against abuse and exploitation of children.
36	Persons with Disability Act, Chapter 133	This Act provides for the protection of the rights of people with disabilities ensuring they are not marginalized and that they enjoy all the necessities of life without discrimination. The Act guarantees that (1) No person shall deny a	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

		<p>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.</p>	<p>and exposed to negative impact from the project that could adversely affect them.</p>
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### 3.6 WORLD BANK ENVIRONMENTAL AND SOCIAL SAFEGUARDS POLICIES

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.

The table 3-2 below shows the applicability of World Bank Operational OPs to the proposed project in Kibish site;

**Table 3-2: World Bank Operational Ops**

S.No.	Safeguard Policy	Objective	Applicability
1.	Environmental Assessment (Operational Policy, OP/BP 4.01)	The objective of this policy is to ensure that Bank-financed projects are environmentally sound and sustainable, and that decision-making is improved through appropriate analysis of actions and of their likely environmental impacts. This policy is considered to be the umbrella policy for the Bank's environmental 'safeguard policies.	The policy is applicable to this project because there are environmental and social concerns associated with the construction and operation of the proposed project. In response, the REREC has commissioned and Environmental impact assessment in order to identify and address the potential impacts to a level that is acceptable.
2.	Natural Habitats (Operational Policy, OP/BP 4.04)	This policy recognizes that the conservation of natural habitats is essential to safeguard their unique biodiversity and to maintain environmental services and products for human society and for long-term sustainable development. The Bank therefore supports the protection, management, and restoration of natural habitats in its project financing, as well as	The proposed project will not significantly affect natural habitats due to its area of influence. Additionally, caution will be taken to ensure minimum disruptions to habitats as guided by the ESMMP.

		<p>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.</p>	
3.	Indigenous Peoples (Operational Policy 4.10)	<p>The objective of this policy is to (i) ensure that the development process fosters full respect for the dignity, human rights, and cultural uniqueness of indigenous peoples; (ii) ensure that adverse effects during the development process are avoided, or if not feasible, ensure that these are minimized, mitigated or compensated; and (iii) ensure that indigenous peoples receive culturally appropriate, gender and inter-generationally inclusive social and economic benefits.</p>	<p>The policy is applicable because the inhabitants of Kibish who are Turkana are classified as a marginalized group in Kenya. The Somalis, Nyagaton (Ethiopia), Toposa (South Sudan), Maasai, Kikuyu communities are also present in Kibish and they will all be PAPs of the proposed solar mini-grid. 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.</p>
4.	Involuntary Resettlement (Operational Policy, OP/BP 4.12)	<p>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</p>	<p>The policy is applicable to the entire project because there is land acquisition for the Mini-grid, Wayleaves, contractor facilities and worker's camps.</p>

		planning and implementing resettlement; and (iv) provide assistance to affected people regardless of the legality of land tenure.	
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### **3.7 ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK (ESMF) FOR KOSAP**

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

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

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

### **3.8 RESETTLEMENT POLICY FRAMEWORK (RPF) FOR KOSAP**

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

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

*The Ministry of Energy has partnered with the community who are the owners of the land and the County government of Turkana in identifying land for the proposed project. The sub-project site will be acquired compulsorily by NLC, and in-kind compensation in form of priority community projects provided to affected communities. Further, A-RAPs has been prepared and implemented in sub-project sites on community land (unregistered and registered) and private land. The A-RAP stipulates procedures and actions for acquiring land and compensating affected communities. The A-RAP also documents the land acquisition consultations undertaken with affected communities. This document is appended in appendix 6 of this report.*

### **3.9 VULNERABLE AND MARGINALIZED GROUPS FRAMEWORK (VMGF) FOR KOSAP**

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As noted above the KOSAP project triggered 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 REREC and KPLC and other stakeholders. The framework was prepared then because it 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 VMGF is applicable because the main inhabitants of Kibish are the Turkana community who are classified as VMGs in Kenya. The Somalis, Nyagaton (Ethiopia), Toposa (South Sudan), Maasai, Kikuyu communities are also present in Kibish and they will all be PAPs of the proposed solar mini-grid. The Nyagaton, Toposa, Kikuyu, Somali and maasai do not qualify for OP 4.10 because their population is low and their livelihood is from businesses. The ESIA did not identify any adverse impact on the communities therefore, a separate Indigenous Peoples Plan will not be required but the proponent will continue to engage the PAPs in a free, prior and informed. The ESIA did not identify any adverse impact on the communities therefore, a Vulnerable and Marginalized Group Plan (VMGP) will not be required however, elements of the VMGP such as inclusion of Somali in the stakeholder engagement process as well as representation on the locational grievance redress committee will be incorporated in the ESMP, to ensure that all the communities access culturally appropriate project benefits and opportunities, in a gender sensitive and intergenerationally inclusive manner.*

### **3.10 SOCIAL ASSESSMENT (SA)**

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

The OP 4.10 contributes to the Bank's mission of poverty reduction and sustainable development by guaranteeing that the development process fully takes due regard to the dignity, human rights and cultures of indigenous people. The Bank requires that the Borrower engages the IPs/VMGs in a process of Free, Prior and Informed Consultations and this is the basis of the public participation in the Counties with the objective obtaining broad community support for the project by the affected IPs/VMGs. In case of any adverse impacts, these should be avoided or reduced where possible and where not feasible, they should be mitigated or compensated.

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

### 3.11 COMPARISON BETWEEN THE WORLD BANK AND KENYAN LAWS TO THIS PROJECT

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

**Table 3-3: Comparison between the WB safeguard policies and the Kenya Legislation**

<b>World Bank safeguard Policies</b>	<b>Kenyan laws</b>	<b>Comparison</b>	<b>Recommendation</b>
O.P 4.01 requires screening to determine level of environmental and social assessment to be done.  An ESIA is prepared before project implementation.	EMCA requires screening of project to determine level of environmental and social assessment to be done.  An ESIA is required once determination is done.	Similar both require screening	Screening has been done and the project is established as medium risk which requires and ESIA.
ESIA is needed once determination had been established and should be prepared identifying all environmental and social impacts and mitigation measures proposed to address the impacts.	ESIA is needed once determination had been established and should be prepared identifying all environmental and social impacts and mitigation measures proposed to address the impacts.	Similar- both require ESIA depending on the project impacts.	ESIA is prepared in line with EMCA /EIA regulations and makes reference to WB safeguard policies.
O.P 4.04 Natural Habitats- conservation of natural habitats is essential to safeguard their unique biodiversity and to maintain environmental services and products for human society and for long-	Environmental Management and Coordination, (Conservation of Biological Diversity) (BD) Regulations 2006 – requires conservation of biodiversity which includes conservation of threatened species,	Similar- both require conservation of natural habitats	This policy and law will not be applicable to the project because the proposed site has minimal vegetation that will be disturbed during project implementation.

term sustainable development.	inventory and monitoring of BD and protection of environmentally significant areas, access to genetic resources, benefit sharing and offences and penalties.		
O.P 4.12 Land Acquisition and Involuntary resettlement should be avoided wherever possible or minimized and exploring all alternatives.	The Government and any other organization, shall prevent internal displacement linked to development projects to the extent possible by exploring other alternatives.	Similar- displacement in projects should be avoided to the extent possible by exploring alternatives.	WB policy is more elaborate than the Kenyan Law.
O.P 4.10 on indigenous people seeks to promote the inclusion of these group in development project and especially through consultation to ensure they also share in the project benefits and ensure negative impacts do not disproportionately fall on them.  The policy requires these groups to be consulted separately to enhance their participation.	The COK 20.10 article 56 provides for the right of marginalized communities and the importance of their input in decision making that regards them. National Gender and Equality Act and the Children's Act and Persons with disability Act seeks to promote the inclusion of these persons in all issues as they are often overlooked and left out. Emphasis is also on consulting with them.	Similar- both seek to promote inclusion of these group so that they do can share the projects benefits and ensure that negative impacts of the project do not fall on them disproportionately WB needs a social assessment to be conducted.	WB policy more elaborate and the two are being used to compliment.
Project affected persons should be meaningfully consulted and be given opportunities to participate in planning and implementing of projects and especially where there is	EMCA requires that the project owner seeks the views of the people who are affected and explain the project information to them and especially the impacts f project and also obtain their opinions	Both are similar	Consultation has been done and will be progressed in line with the two WB policy and Kenya legislation.

resettlement.	or comments.		
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## **4 BASELINE SETTINGS – PHYSICAL AND SOCIO-ECONOMIC ENVIRONMENT**

### **4.1 INTRODUCTION**

This chapter describes the existing bio physical and socio-economic context of the proposed project area which acts as the basis for the identification and assessment of the potential environmental and social impacts of the proposed project. It provides both the project specific information of the project's area of influence as well as the regional baseline information that puts the project into context.

### **4.2 AREA OF INFLUENCE**

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

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

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

#### **Air Quality**

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

#### **Noise**

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

#### **Water**

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

#### **Flora and Fauna**

- The direct footprint of the project comprising the project site
- The areas immediately adjacent to the project footprint within which a zone of ecological disturbance is created through increased dust, human presence and

project related activities (e.g., trampling, water intake/outfall, transportation). This kind of disturbance has been estimated to occur within the project footprint and surrounding areas of about 500 m to 1 km from the activity areas. Based on the above the AoI for environmental studies was limited to 5 km from the project site.

### **Socio-economic/Social**

The AoI for social receptors was fixed to include 1.5 km radial zone which has been developed based on the reconnaissance site visits and stakeholder consultations with the local community. The AoI for development of the social baseline is within Kibish Village which according to the administrative structure falls within Kibish Location. The socio-economic information presented in this report has drawn from primary socio-economic survey and the Population and housing census 2019, Kenya Bureau of Statistics (KBS).

#### **4.2.1 Project Footprint Area**

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The project falls in Kibish Village, Kibish ward in Turkana County. The area has some indigenous forest mainly composed of shrubs. The site is generally flat of average estimated slope of 0.8%-0.1%. Apart from shrubs, the area is largely semi-arid with some scattered shrubs. The site is located at a close proximity to Kibish shopping centre that is at about 150m. Land is largely communal within the area.

#### **4.2.2 Study Area**

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The project site is located in Kibish Village, Kibish Sub County in Turkana County. Based on the secondary information of the region, the monitoring locations were identified to obtain the representative baseline information. A Soil sample location was selected at the study area. Locations of ecological and social surveys were also selected based on receptor locations; in addition, special emphasis is given to areas within 1.5 km radius of the project site and distribution lines.

### **4.3 PHYSICAL ENVIRONMENT**

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#### **4.3.1 Topography**

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The topography of the project site is generally flat with mild undulations. The elevation difference of about 2.4m is observed within the project site. The site slopes gently to the east towards Nakwaa seasonal river. There is no rock outgrowth on the proposed parcel of land and no scenic features of value were observed within the project vicinity. The slightly slopy can make the drainage very good, avoiding flash floods during heavy rains. There are no lakes, swamps or dams but Nakwaa seasonal river 2km from the project area.

#### **4.3.2 Flora and fauna**

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##### **4.3.2.1 Project area Flora**

Plant species identified at Kibish location during ESIA study were; *Balanites pedicellaris* (Elamash), *Borcia coriacea* (Edung), *Dobera glabra* (Edapal), *Ficus* sp. (Echoke), *Grewia bicolor* (Epat), *Maerua subcordata* (eerut), *Acacia nubica* (Epelet), *Acacia*

senegal (Ekunoit), *Balanites orbicularis* (Ebei), *Cordia sinensis* (Edome), *Dobera glabra* (Edapal), *Ficus* sp. (Echoke), *Grewia bicolor* (Epat), *Grewia tenax* (eng'omo), *Maerua subcordata* (eerut), *Salvadora persica* (esokon), *Tamarindus indica* (Epederu), *Zizyphus mauritiana* (Ekalale) and *Acacia tortilis* (Ewoi). The proposed site location has minimal vegetation of grass and countable shrubs. The soil in the project area is sandy, this explains the minimal vegetation cover in the project area.



*Plate 3: project area flora*

#### **4.3.2.2 Project area Fauna**

The main wildlife found in the county are lions, cheetahs, hyenas, elephants, gazelles, and dik-diks. These are mainly found in the game reserve in Turkana South. There are also hippos, crocodiles, and tilapia fish in addition to the various fish species in the lake. There exists various bird species, key among them the flamingos in Lake Turkana. Wildlife and birds identified during ESIA study includes; Dikdik, common ostrich (stuthio Camelus), African Cuckoo (*Cuculus Gularis*), lappet-faced vulture, isabelline wheatear among others.



*Plate 4: Two birds (Common Ostrich) at the background of the picture*

#### **4.3.3 Water Resources**

As per Kibish community members, the main current source of surface water in kibish sub location is Nakwaa *Lagha* (ephemeral stream) located in Ethiopia, approximately 2km from the project site. There are three boreholes in the location which were

however not functional at the time of visit; kibish Centre borehole which is currently dry and Kibish Mission borehole whose pump is out of order and the third one drilled by KeNHA and had no water pump. Water obtained from Nakwaa Lagha source is soft, clear and clean. We gathered from the community that this water source cannot be accessed by the community when there is Kenya-Ethiopia border conflicts. The water drawn from Nakwaa *Lagha* is considered clean by the locals and is used for drinking and other domestic uses. Water sample of the community borehole was collected for analysis. The analysis results are appended in annex 6.



*Plate 5: Tuk tuk borehole in kibish location (one of the three boreholes)*

#### **4.3.4 Ambient Air Quality**

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

#### **4.3.5 Ambient Noise Quality**

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In general, the project area is next to a trading centre setting where the main source of noise is from motorists and from machines such as maize milling machine. There were no major activities that produces excessive noise in Kibish area.

#### **4.3.6 Soil Type**

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The major soil types in the county are tertiary volcanic soils. They contain hard erosion resistant basalts and are usually softer. The soil in the project area is skeletal soil i.e., they are rocky, shallow and stony and contains gravel and sand. The high concentration of sand in the soil makes it to quickly drain excess water and cannot hold significant amounts of water or nutrients for plants. The soils in the project area are not suitable for crop farming.

A soil sample was collected from the site and submitted to a NEMA designated Laboratory for analysis of Petroleum Hydrocarbons. The results obtained shows that the pollutants of concern were not detected in the sample. It further indicates that the

site has not been impacted by petroleum hydrocarbons. Soil sample analysis results are appended in annex 6.

### **4.3.7 Climate and Meteorology**

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According to Turkana CIDP, Turkana has a hot, dry climate with temperatures ranging between 20°C and 41°C and with a mean of 30.5°C. Rainfall in the area is bimodal and highly variable (Opiyo et al., 2015). 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 very arid.

## **4.4 SOCIO-ECONOMIC ENVIRONMENT**

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### **4.4.1 Demographic Profile**

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According to Kenya Population and Housing Census (KPHC) 2019 Kibish location has an area of approximately 3204Km<sup>2</sup> and with a population estimate of about 16150 people and population density of about 5 people per square kilometre. The project area has an estimated population of 4591 people and 1816 households with an estimate of 6 persons per household. The average gender ration for the population within the project area is estimated to be 60% female and 40% male. Table 4-1 below presents a summary of demographic profile of Kibish.

Table 4-1 below presents a summary of demographic profile of Kibish.

*Table 4-1: Summary of demographic profile*

Attribute	Magnitude/Number
Approx. population (Kibish Location)	4591
Households	1816
Gender.	Male – 45% Female – 55%
Ave. No. per household	6 per household
Vulnerable classes	<ul style="list-style-type: none"> <li>• Poor Single mothers</li> <li>• Orphans</li> <li>• Persons Living with Disabilities</li> <li>• Poor elderly (60 years and above)</li> </ul>
Dominant ethnic group	Turkana
Primary religion	Christianity
Other groups	Somalis, Nyagaton (Ethiopia), Toposa (South Sudan), Maasai, Kikuyu Muslims and Traditionalists
Employment (formal/Informal)	Formal – 5% Informal – 95%

#### 4.4.2 Educational Infrastructure

As per the observation and information sought from Kibish location, the area has one primary school; Kibish primary school located at about 500m to the south western part of the project site. Boys and girls in Kibish community have equal opportunities on education and can generally read and write, however, men and women above 45 years cannot read and write. As per key Informant interview at Kibish Primary school, the project will improve learning and security of the area. The school has seven TSC employed teachers and 349 pupils (201 boys and 148 girls). School completion rates for boys is higher than girls due to early marriages and the Turkana cultural believes that girls should not be educated since they will end up getting married-'exchanged with cows. The main constraints to children accessing education in Kibish location are;

- Lack of uniform;
- Poverty/lack of finances by their parents;
- Lack of food hence malnutrition;
- Insecurity due to border conflicts.

According to the FGD with the youth, 60% have completed secondary school and 20% have completed colleges.

Other institutions near the project area are; General Service Unit (GSU), Administrative Police Service (APS) and Police station. These institutions help maintain peace and order in the community since Kibish is a border town and prone to inter-community clashes. The recent Intercommunity clashes was in 2021 which involved three pastoral communities; Turkana (Kenya), Topasa (South Sudan) and Nyan'gatom (Ethiopia) over pasture land and livestock. Kibish location is currently safe and peaceful.

### 4.4.3 Health Facilities

As per information sought from Kibish dispensary health worker, Kibish Sub-Location has two dispensaries namely; Kibish GSU dispensary and Kibish GOK Dispensary. The dispensaries open from 8.00 am to 5.00p-five days a week and offer free service delivery. They also respond to emergencies at night when need be. They serve Turkana Nyang'aton and Somali communities and offer the following services; Outpatient services, Immunization, nutrition, maternity, post-natal care, family planning Lab and diagnosis among others. Kibish dispensary expressed their dire need of electricity for lighting and to power their equipment which include; Fridge, Oxygen concentrator and sterilizer. Top three health problems facing Kibish community are listed below;

	Men	women	Children	Vulnerable
1	UTI	Delivery Complications	Pneumonia	Malnutrition
2	Pneumonia	UTI	URTI	Pneumonia
3	URTI	Malaria	Malaria	Malaria

Prevalence rate for malnutrition in Kibish sub location is very high due to food insecurity. The soil type in the area cannot sustain agriculture and its geographical location makes it difficult for the locals to access food from other towns. HIV/AIDs prevalence rate is very low, this is attributed to Turkana cultural practices and minimal rural-urban movement. The main gaps in the dispensaries are lack of electricity, maternity wing and emergency vehicles. Men and women in the community prefer going to the hospital for medication that traditional medicine, they however supplement hospital drugs with traditional herbs.

### 4.4.4 Religious Institutions

The community members confirmed that their culture is slowly fading away. This is due to community members converting to Christianity, Muslim and modern way of life in large numbers. There are two churches (Full Gospel Churches of Kenya and Catholic Church) and a Mosque in the project area. There are no sacred places/historical sites in/near the proposed Kibish Mini-Grid site. In this case, the days of worship are usually Sundays for the Christians therefore, the contractor is expected to put in to consideration the time of worship and the place to have the prayers.

### 4.4.5 Occupation and Livelihood Profile

As per FGD with men, women and youth of Kibish location, the main livelihood activities undertaken by people in Kibish village are pastoralism, small scale farming, and small-scale businesses. Men practice pastoralism by moving with their livestock in search of pasture and water to Naita, Soya and Natapar Hills located over 50 km away near South Sudan. Women practice small-scale subsistence farming of maize, millet, water melon and green grams and animal grazing in their home compounds.

Youths in Kibish community earn their living by engaging in small scale businesses, Motorcycle business (Boda-boda) and small-scale livestock herding. They engage in sporting and peace-making activities during their leisure time. Business activities are undertaken at Kibish shopping centre by some Somalis and Maasais. There are 4 general shops in Kibish shopping centre.

The main formal jobs at the area are teaching, nursing and other civil services which accounts to approximately 5% of the population. The other 95% of the population is involved in informal employment. According to FGD with the youth, 20% of the youth have completed higher education but lack employment.

#### **4.4.6 Transport and communication**

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According to Turkana CIDP(2018-2022), Turkana County has a total road network of approximately 9,000 km. Of these, 504.5 km are bitumen and the rest are dirt or gravel roads. A total of 5,100.2 km of roads in the county were reclassified by Kenya Roads Board in 2017. Three international roads link Turkana to Uganda, South Sudan and Ethiopia. A number of roads are rendered impassable during the rainy seasons. Kibish town is accessed through Lokitaung-Kokuro-Kibish road. There is no public means of transport in the area, the locals access the nearest town by foot or any vehicle eg lorries/canters transporting goods to the shopping centre.

There is only one commercial airport in Lokichogio and 22 airstrips across Turkana County. The Lodwar airstrip is tarmacked but the rest are levelled ground. There is no Airport in Kibish Area.

Safaricom is the main network service provider in the area. Network coverage is however unstable particularly during rainy season. There is one Safaricom kiosk within the shopping centre, powered by solar panels and has a community charging booth. Availability of network in the area has enabled the community to embrace mobile banking since there are no banks in the location. Men and women in the community receive information on local issues through public meetings and directly from their local leaders. There is no operational post office in Kibish location.

#### **4.4.7 Energy Access**

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According to the Turkana County Integrated Development Plan (2018-2022), Electricity from Kenya Power and Lighting Company (KPLC) is available in the major towns of Lodwar, Lokichogio, Loruogum, Turkwel Lokitaung and Lokori, and is powered predominantly by diesel or solar hybrid mini-grids. Lokichar, Kalemgorok and Kakong'u are powered by the main grid. Lokori, Lokitaung and Lokichogio power generation projects are approximately 80% complete. Most of the other upcoming urban centres including Kibish still lack access to electricity, which is inhibiting economic growth and, consequently, the county's ability to engage in economic activities.

Turkana County receives between 4 and 6 kWh/m<sup>2</sup> of daily solar radiation based on the national atlas and therefore has a vast potential for solar energy production (Turkana County Government 2015). There is need to tap this source of energy in Kibish location to promote economic growth in the area.

In Kibish, majority of the households use solar solutions (including Sun-king and D-light), torch and firewood for lighting and mobile phone charging purposes and fuel wood for cooking and heating water. During the Focus Group Discussions with both men and women, it was reported that they face challenges accessing power. The main challenge being lack of money to pay for accessible sources of power in the area.

#### **4.4.8 Land Use**

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Land in Kibish is under un-registered community land and is considered as communal land where every member of the community has the right to use it. As per FGD with men and women, Men in the community control the use of the land, women on the other hand have no control over the use of land, they get instructions on land use from men i.e land to be used for grazing or crop farming. Most of the land in Turkana County are non-functional and lack policies to guide on land use, this has resulted to unplanned human settlement in Kibish area. The project land has minimal vegetation cover. Land in Kibish area is used for small scale subsistence farming and Livestock grazing. Animals kept in the area are Sheep, goats, cows, donkeys and camels. Men practice pastoralism by moving with their livestock from Kibish to Naita, Soya and Natapar Hills located over 50 km away near South Sudan. Turkana men obtain herbs and traditional medicine from Nakwaa Lagha in Ethiopia while the women source water and firewood from the same place. The herbs include; Aloe Vera (Ekaye), Neem Tree (Euthugu), etc.

#### **4.4.9 Housing Types**

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The statistics on dwelling structures in Turkana County indicate poor housing conditions with no water or sanitation facilities. 80% of houses in Kibish location are semi permanent with walls being made of mud, floor-earth and roofed with iron sheets. 10% are *manyattas* and 10% permanent housing. Most houses do not have piped water or water closets. The National Government targets to deliver affordable housing by 2022 as one of the Big Four Agenda items. The County government will work closely with the national government, to ensure the local population have decent homes. This will in turn create jobs, provide market for manufacturers and suppliers and raise the contribution of real estate and construction sector to GDP. The County government is in the process of developing a proper county spatial planning framework. Most of the houses in Kibish are built of mud walls while the schools and dispensary, are built of stone walls and iron sheet. All these types of houses can be connected to the electricity with proper wiring done.

#### **4.4.10 Social and Physical Infrastructure**

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Public institutions found in the project area include: schools, health facilities, GSU, AP camps and a police station. The institutions observed in the area during the field visit include Kibish primary school 500m from the site. There are two health facilities available near the project area, they include; Kibish Dispensary located 1km from the site and GSU dispensary which is approximately 500m from the project area. There are two Churches at the project area; Full gospel Churches of Kenya and Catholic church and One Mosque. The area has no active community-based organisation. Active

NGOs at the project area are Worldwide Concern, Save the Children and Mercy corps Kenya. They help maintain peace between Turkana, Toposa and Nyagaton communities, empower women, donate nutrition supplements to children and cash transfers.

Water used in the areas is obtained from boreholes and a *lagha*. The main source of surface water is Nakwaa *Lagha* which is located 2km from the project site in Ethiopia. There are three boreholes in the location; kibish Centre borehole which is currently dry and Kibish Mission borehole whose pump is out of order and was not functional during the field visit and the third one drilled by KeNHA which has no pump. Water obtained from Nakwaa Lagha source is soft, clear and clean. Kibish area is connected to other locations by access dirt roads.

#### **4.4.11 Vulnerable groups**

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

- a) Poor female headed households;
- b) Child headed households;
- c) Persons Living with Disabilities;
- d) The Poor elderly.

The vulnerable households can hardly access the basic needs and most of them really on well-wisher within the community. According to Kibish Dispensary, the most vulnerable people in the community and women and children under 5 years due to their low immunity.

#### **4.4.12 Gender Based vulnerability**

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The society in the project area is characterized by a patriarchal family structure. Women continue to be rooted in traditional norms of social behavior which include early marriages and minimal participation in household or economic decision making, lesser economic freedom and limited opportunity to socialize with other females in the village. During the Focus Group Discussion with women, it was reported that men have more control over household resources such as land, assets and equipment. In a typical household, the head of the household is the eldest male members, while the decision-making authority is the man. In addition to this, men are responsible for ensuring the financial security of the family. The women on the other hand are responsible for household activities such as fetching water, cooking, cleaning, taking care of the children. Female literacy was reported to be low among women over the age of 18 and higher among the younger girls.

#### **4.4.13 Gender Based Violence**

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Based on the Focus Group Discussion with women at Kibish, the most common form of GBV in Kibish area is intimate partner violence and mainly affects married people and is mostly attributed to male chauvinism and Turkana cultural believes. Early

marriages among girls are also practised in the area. This has led to low school attendance rates and very low completion rates. Sexual exploitation and abuse are not common in the area. GBV cases are normally reported to village elders and the chiefs.

#### **4.4.14 Culture and heritage**

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No cultural site of significance was reported/observed within the project area. Kibish is made up of Turkana, Somali, Nyagaton, Toposa, Maasai and Kikuyu communities. Turkana community is made up of 95% of the total population. Turkana community values keeping of cattle, sheep and goats while the other communities are settlers and are involved in businesses and others are civil servants employed in Kibish. The community in the project area are a patriarchal society; men typically speak for women and make decisions in the family. The Turkana community members still practice polygamy and encourages early marriages for young girls.

#### **4.4.15 HIV/AIDS prevalence**

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Turkana County has a population of 1,045,579, comprising of 542,658 males (52%) and 502,921 females (48%). HIV prevalence in Turkana (4.0%) is lower than the national prevalence at 5.9% (Kenya HIV Estimates 2015). The county contributed 1.4% and 0.6% to the total new HIV infections in Kenya among children and adults respectively.

## **5 STAKEHOLDER ENGAGEMENT**

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

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

### **5.1 LEGAL REQUIREMENT FOR STAKEHOLDER ENGAGEMENT**

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Timely stakeholder analysis and engagement is key as it provides opportunities for stakeholders to make significant contribution to the project design and implementation which results in enhanced project acceptance among other benefits.

The overall objective and the spirit of the Kenya constitution is to involve citizens in project formulation and implementation at the local level. This is enshrined in our constitution in Article 35 which provides that 'every citizen has the right of access to information held by the state; and information held by another person and required for the exercise or protection of any right or fundamental freedom'.

Further public participation is an essential and legislative requirement for environmental authorization. The ESIA team undertook the stakeholder consultation (SC) for the proposed project in accordance with the requirements for as stipulated in the EMCA, 1999 and its 2015 amendments and ESIA/EA Regulations 2003. The main purpose of public participation is to provide project information to stakeholders and allow them the opportunity to provide input and comment on the project, including issues and alternatives that are to be investigated, thereby facilitating informed decision-making.

Therefore, public participation was a key component of the ESIA of the proposed solar Mini-grid in Kibish. Project information was shared with different stakeholders mainly government officers and also community/project affected persons. The positive and negative views of the stakeholders on the project were sought. The exercise was conducted through a public meeting/baraza, key informant interviews. In addition, gender and intergenerational dimensions of the community members were considered and three separate focus group discussions sessions were held with the men, women and the youth.

### **5.2 OBJECTIVES OF PUBLIC PARTICIPATION**

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- a) To assess the level of stakeholder interest and support for the project;
- b) To enable stakeholder's views to be considered in project design and implementation;

- c) To establish and maintain constructive relationships and means for effective and inclusive engagement with project affected parties on issues that could affect them;
- d) To ensure appropriate project information on environmental and social risks and impacts is disclosed to stakeholders in a timely and accessible matter.

The purpose of stakeholder engagement/participation is to identify stakeholders and to allow such parties the opportunity to provide input and comment on the project, including issues and alternatives that are to be investigated, thereby facilitating informed decision-making. Stakeholder participation involves both disseminating information about the project as well as gathering primary data from stakeholders regarding the project. Therefore, data collection was a key component of the ESIA of the proposed project. The first source of information was literature review of project documents, site visit coupled with observations and discussion with the project engineers and other project officers. Further information and views on the project were also sought from other government officers at the county and from the target community.

Part of the key project information that was shared with the stakeholders to enable them to understand the project included; positive and negative impacts of the project including potential opportunities. The information specifically focused on; the objective, nature and scale of the project, potential risks and impacts of the project on local communities, mitigation measures to the negative impacts, need for future consultations and means of raising and addressing impacts.

### **5.3 STAKEHOLDER CONSULTATION AND DISCLOSURE REQUIREMENT FOR THE PROJECT**

The World Bank OP 4.01 Environmental Assessment - Stakeholder Engagement and Information Disclosure emphasises on engagement in meaningful consultations with all stakeholders. The stakeholders should be provided with timely, relevant, understandable, and accessible information, and consult with them in a culturally appropriate manner, which is free of manipulation, interference, coercion, discrimination, and intimidation.

The summaries of ESIA findings will be disseminated to the affected persons in a language that they can understand using baraza and focus group discussions. Disclosure process will also consider any mobility, disability and literacy challenges affected persons may have. ESIA report will also be made available in public places that are accessible to project-affected groups and local NGOs (NEMA website and Respective NEMA County offices).

A documented record of stakeholder engagement, including a description of the stakeholders consulted, a summary of the feedback received, and a brief explanation of how the feedback was collected, has been presented below. The consultations were conducted in form of:

- Meeting with the client;

- Consultation with the county commissioner and the county officials;
- Key stakeholder interviews with the county officials;
- Public meeting in Kibish;
- Focus Group Discussions;
- Key Informant Interviews within the community.

## 5.4 STAKEHOLDER CHARACTERISATION AND IDENTIFICATION

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

### 5.4.1 Stakeholder Mapping

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

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

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

Table 5-1: Identified Stakeholders

Stakeholder Category	Stakeholder Group	Connection to the KOSAP	Consultation tool
Project Affected Persons	Local Community	<ul style="list-style-type: none"> <li>➔ Local communities to be affected either directly or indirectly by the project.</li> <li>➔ Vulnerable Individuals and Households.</li> <li>➔ Health institutions.</li> <li>➔ Education institutions.</li> </ul>	<p><b>Public Meeting</b></p> <ul style="list-style-type: none"> <li>✓ 2 public meetings were held in Kibish shopping Centre on 16/3/2021 and 18/01/2022.</li> <li>✓ The EIA meeting was held with attendance of 150 people.</li> </ul> <p><b>Focus Group Discussions (FGD)</b></p> <ul style="list-style-type: none"> <li>✓ The FGDs were conducted with the men, women, youth.</li> </ul> <p><b>Key Informant Interviews (KII)</b></p> <ul style="list-style-type: none"> <li>✓ The KIIs for Kibish Primary school.</li> </ul>

			The chief was also interviewed on the Community Profile of Kibish.
Interested parties	National Government and county government Entities	<ul style="list-style-type: none"> <li>➔ National Government are of primary importance in terms of establishing policy</li> <li>➔ County government are also of primary importance in county energy requirements and proposed interventions</li> <li>➔ They will play an important role in implementation and sustainability of the project</li> </ul>	<b>Meeting</b> During the first consultation a meeting was held with the County Governor and county officials

The significance of a stakeholder group is categorized considering the magnitude of impact (type, extent, duration, scale and frequency) or degree of influence (power and proximity) of a stakeholder group and urgency/likelihood of the impact/influence associated with the particular stakeholder group in the project context. The magnitude of stakeholder impact/influence is assessed taking the power/responsibility and proximity of the stakeholder group and the group is consequently categorized as negligible, small, medium or large. The urgency or likelihood of the impact on/influence by the stakeholder is assessed in a scale of low, medium and high. The overall significance of the stakeholder group is assessed as per the matrix provided in Table 5-2 below.

*Table 5-2: Stakeholder Significance and Engagement Requirement*

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

## 5.5 STAKEHOLDER ANALYSIS

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

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

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

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

**Table 5-3: Summary of Stakeholder Influence**

<b>Stakeholder Category</b>	<b>Category</b>	<b>Sub Category</b>	<b>Magnitude of Influence</b>	<b>Urgency/Likelihood of Influence</b>	<b>Overall rating of stakeholder rating</b>
Interested parties	Government	National Government County Government	Large	High	Major
	National regulatory bodies	NEMA	Large	Medium	Major
Project affected persons	Individuals and households	VMGs and socially disadvantaged groups	Medium	High	Major
	Institutions	Education and Health institutions	Medium	Low	Minor

## 5.6 INFORMATION SHARED TO THE COMMUNITY MEMBERS

The MoE representative assisted by the REREC representative gave a description of the KOSAP project and clarified that its objective was to electrify Kibish because the area is not connected to the national grid. They also informed the community that they would access the electricity at a subsidized cost and that the public facilities such as the schools, hospitals and public boreholes would also be connected at the same cost (one thousand shillings). The Environmental and Social experts from Norken International Ltd and Centric Africa shared with the community the ESIA process and discussed the potential impacts associated with the project and the proposed mitigation measures that would reduce the significance of the adverse impacts.

It was also explained that compensation for the land identified by the community for the proposed project will be done in-kind; as a community project chosen from education, health or water sector. The Ministry of Energy through its implementing agency (REREC) would undertake a project for the community in water, health or education sector up to a cost of the value of the cost of the land taken and informed by the NLC valuation criteria. The community was to choose the project of their own choice in the three sectors. Other methods compensation for community land is payment in cash and land for land.

## 5.7 STAKEHOLDER ENGAGEMENT SCHEDULE

The ESIA team identified four categories of stakeholders namely; government officials, opinion leaders at local level and elders and the general community. Stakeholder engagement began early in the planning phases of the project. A letter was written from the Ministry of Energy Turkana County commissioner informing them about the need to undertake public participation for the proposed project. Stakeholder consultations for land identification was undertaken on 16th March 2021 and Stakeholder consultation for ESIA was undertaken on 18th Jan 2022. During this time project information in terms of (preliminary design, land identification, positive impacts, negative impacts, mitigation measures among others were discussed with various stakeholders. Different categories of stakeholders gave their views on the project.

## 5.8 SUMMARY OF STAKEHOLDER ENGAGEMENT DURING THE LAND IDENTIFICATION PROCESS

A Consultative meeting was held with the Kibish community on 16<sup>th</sup> March 2021, to discuss the details of the proposed mini-grid project, the project's land requirements, the impacts of the project and grievance redress. Focus Group Discussions were also carried out separately with men, women and the youth. The FGDs were to allow the groups to freely express themselves and to ensure that they understood the project.

Some of the concerns of the community meeting are summarized in the table below;

**Table 5-4 Issues raised during Land identification stakeholder engagement.**

Issue	Comment	Response
<b>Coverage</b>	How many households will benefit and how much will be charged or is the power free?	All the households within a 3km radius of the minigrid will be connected. A KES 1,000 connection fee will be charged then the household will be paying for the amount of electricity that they use
<b>Land acquisition</b>	Why do we have to sign the land donation forms?	The forms provide evidence that the community has agreed to donate land out of free will
<b>Community request</b>	Apart from the electricity what will you give the community? We would like a secondary school built, water, hospitals	Nothing will be provided for free but we will take this feedback to our managers. Please remember the benefits that having electricity will bring

In conclusion, the community resolved to provide land for the project, the GRC nominees were validated, and officials were elected to lead in the identification of project land and sign the land forms on behalf of the community.

Minutes Of The Meeting Are Appended At The End Of This Report (Appendix 4).

## **5.9 SUMMARY OF STAKEHOLDER ENGAGEMENT DURING ESIA**

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### **5.9.1 Key Feedback Received During Stakeholder Consultation Process**

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The general stakeholder consultation was done in a public meeting (Baraza) organized at Kibish Shopping Centre and over 150 members were in attendance. The meeting was chaired by the area Chief assisted by the village Administrator and the village elders. The feedback received during the stakeholder consultation process have been summarized below:

- **Project Benefits**
  - Improve the security of the area;
  - Improve their livelihood and enhance their living standards;
  - Provide them with affordable energy for domestic use e.g Lighting;
  - Create employment opportunities to the locals;
  - Availability and Reliable source of power;
  - Provide job opportunities for the youth;
  - Improve learning-Morning and evening preps by students and pupils.
- **The community raised the following concerns:**
  - If there is a local committee in charge of the project/to handle grievances;
  - Connection fee and method of payment for each household to solar power and Project timelines;
  - If there will be any training on electricity use due to high level of illiteracy in the village;
  - If the contractor will conduct a public participation with regards to employment during construction period;
  - Waste disposal methods during the project life to avoid environmental pollution;
  - Reliability of solar energy in high electricity consumption works e.g., welding and running a posho mill;
  - Distance coverage of electricity connection;
  - Availability of jobs for the youth during construction;
- **The community requested the following from the project:**
  - Fencing of the site to minimize risks/public health and safety;
  - Employment opportunities especially the non-skilled labor during the construction and operation Phases.
  - The contractor to ensure that the workers are not exposed to risks by putting on proper PPEs.
  - The men inquired about the project's timeline because they were concerned that it would take too long to complete. It has already taken long time to commission the construction since the proponent initiated the land acquisition process and the community willingly gave out the land in anticipation the project would commence expeditiously.

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***Public participation "Baraza" Session***

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***Public participation "Baraza" Session***

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***Focused Group Discussion with women***

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***FGD with the men in the community***

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

**Table 5-5: Issues and comments raised**

No	Issue	Comments	Response
1	Project timelines	When the project implementation will be done	Public participation is part of Environmental impacts assessment that ESIA is the last process before a project is implemented. Proponent will set project timelines upon receiving NEMA License. This might take 6 months or so.
2	GRC	Availability of GRC during project implementation	The community members were reminded of GRC which was formed in March 2021 and informed that the committee will be active during the project implementation period.
3	Compensation in kind project	A community member suggested two projects in education and water sector for compensation in kind	The consultant informed the meeting that the community will be given a chance to suggest the project of their choice after the public meeting and his request will be discussed by the community members chaired by the local chief.
4	Connection fee	Connection fee per household and if VMG will have free/subsidised connection fee.	Connection fee will be 1000Ksh per drop which is quite affordable compared to the normal KPLC connection charges.
5.	Employment	Community participation during project implementation and sourcing of workers	The contractor must involve the community when sourcing for workers, the GRC formed will act as a bridge between the contractor and the community to raise their concerns and grievances.

### 5.9.2 summary FEEDBACK RECEIVED DURING focused group discussion

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

**Table 5-5: FGD dates and attendance**

Group	Date	Attendance	Venue
Men	18th January 2022	17	Kibish shopping Centre
Women	18th January 2022	14	Kibish shopping Centre
Youth	18th January 2022	24	Kibish shopping Centre

The key concerns and expectations that were raised during the FGDs have been summarized below in chapter 4 and the table below;

Groups	Issues/comments discussed
<b>Men</b>	<ul style="list-style-type: none"> <li>➔ The men confirmed that they were fully aware and well conversant with of the project. They added that the project has been disclosed to them a couple of times during land acquisition period and were concerned that the project is taking too long to be implemented;</li> <li>➔ They asked the client to implement the project as soon as possible and that they were not willing to engage the client on any other meeting/public participation-A sign of stakeholder fatigue;</li> <li>➔ Top three community needs according to Men FGD are Water project, Electricity and improvement of kibish primary school classrooms. They requested for a project on water sector e.g., water reticulation to curb on their water challenges as their project of choice in compensation in kind.</li> </ul>
<b>Women</b>	<ul style="list-style-type: none"> <li>➔ The women reported they had heard about the project before and feel they knew what it was about.</li> <li>➔ The project is worthwhile because it would benefit them. They emphasized that the project would lead to business growth in the area and availability of cheap electricity. They stated that the project negative impacts can be mitigated significantly to negligible levels hence the development should process.</li> <li>➔ The women requested that the contractor to consider them for employment during construction period.</li> <li>➔ Top three community needs according to Women FGD are Water project, Maternity ward improvement in kibish dispensary and electrification of the area. They requested for a project on water sector e.g., water reticulation to curb on their water challenges as their project of choice in compensation in kind.</li> </ul>

## Youth

- ➔ The youth reported that they were well conversant with the project and that the project had been disclosed to them severally in 2021.
- ➔ They added that the project will help create jobs for them and improve the security of the area.
- ➔ They were concerned that the project is taking too long to implement and wanted to know the distance coverage of the power connection.
- ➔ The youths in Kibish have a youth group that was established in 2011. The main function of the group is empowering the youth in business and preaching peace/peace making.
- ➔ They asked to be considered for jobs during the project implementation.

### 5.10 DISCLOSURE OF ESIA TO THE STAKEHOLDERS

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

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

## **6 IMPACT ASSESSMENT AND MITIGATION MEASURES**

### **6.1 INTRODUCTION**

This section provides an assessment of potential environmental and social impacts from the proposed Projects as well as the proposed mitigation measures to avoid, reduce, remediate or compensate for potential negative impacts and to enhance positive impacts. A description of the assessment methodology used to assess the significance of potential impacts, taking into account impact magnitude and sensitivity of receptors and resources affected, is provided below. To facilitate the reading of the ESIA, the same heading structure in terms of environmental indicators, receptors or resources affected by the project activities were considered as the ones used in the baseline and listed in section 6. All the mitigation measures identified in this chapter have been collated into the Environmental and Social Management and Monitoring Plan ('ESMMP') matrix. This is including Occupational Health and Safety.

### **6.2 IMPACT ASSESSMENT METHODOLOGY**

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

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

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

### **6.3 DEFINING IMPACT**

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

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

### **6.4 ASSESSMENT OF SIGNIFICANCE**

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

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

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

For this assessment, significance has been defined in *Table 6-1* based on five levels described in table below;

*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 ESIA is to get to a position where the Project does not have any major residual impacts, certainly not ones that would endure into the long-term or extend over a large area. However, for some aspects there may be major residual impacts after all practicable mitigation options have been exhausted (i.e., ALARP has been applied). It is then the function of regulators and stakeholders to weigh such negative factors against the positive ones in coming to a decision on the Project.

For environmental impacts the significance criteria used in this ESIA is shown in Table 6-2:

*Table 6-2: Overall Significance Criteria for Environmental Impacts*

Receptor sensitivity	Impact Magnitude		
	Low	Medium	High
Low	Minor	Minor	Moderate
Medium	Minor	Moderate	Major
High	Moderate	Major	Major

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

## 6.5 MAGNITUDE OF IMPACT

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

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

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

## 6.6 SENSITIVITY OF RESOURCES AND RECEPTORS

Sensitivities are defined as aspects of the natural or social environment which support and sustain people and the physical environment. 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 Table 6-3 below. *Table 6-3*

*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)
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## 6.8 DEFINITION OF MITIGATION MEASURES

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

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

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

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

## 6.9 ASSESSING RESIDUAL IMPACTS

Impact prediction takes into account any mitigation, control and operational management measures that are part of the project design and project plan. A residual impact is the impact that is predicted to remain once mitigation measures have been designed into the intended activity. The residual impacts are described in terms of their significance in accordance with the categories identified in *Table 6-1 and Table 6-2 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 PRE-CONSTRUCTION PHASE -NEGATIVE IMPACTS**

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### **6.10.1 Impacts related to Land Acquisition**

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The proposed project will entail the acquisition of a 1.219 Ha 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.

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 with the school besides it. After implementing the embedded controls, the impact magnitude is assessed to be minor.

An Abbreviated -Resettlement Action Plan (A-RAP) outlining procedures for land acquisition and compensation is annexed to this ESIA.

#### **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., Water reticulation or Construction of a maternity wing in their health centre.

##### **6.10.1.2.1 Significance of Impact**

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

#### **6.10.1.3 Additional Mitigation Measures**

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

- Providing skills-based training interventions, especially for self-employment to the young and unemployed. This will enhance their employability and create potential for income generation through self-employment;
- Procuring resources from the local sources so as to induce more employment in the supply chain;

Community compensation in kind. The community identifying projects admissible in Water, Health and Education sector within a radius of 10 km. During the public meetings the community identified the following projects in order of priority.

- a) Reticulation of water from Tuk-tuk borehole located 100m from the site to the local community;
- b) Construction of a maternity wing at Kibish GOK dispensary located 600m from the site.

### **6.10.2 Impact related to Way leaves acquisition**

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The project proponent will use existing access roads to set up the power distribution lines and will seek access from PAPs 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. It is estimated that a total of 8.67 km of LV circuit will be constructed. During wayleaves acquisition, crop, trees, vegetation and structures along the wayleave may be destroyed

#### **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.
- Compensation for the destroyed vegetation and structures along the wayleave will be made to the affected persons.
- In case the affected persons voluntarily forego compensation, the proponent will document such consents as voluntarily donated

##### **6.10.2.1.1 Significance of Impact**

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

#### **6.10.2.2 Mitigation measures**

- Consultations with the community during construction of the low voltage lines.
- Adequate compensation of PAPs.
- In case the affected persons voluntarily forego compensation, the proponent will document such consents as voluntarily donated.

#### **6.10.3 Impact Related to poor Stakeholder identification and consultations**

These impacts are associated with these risks:

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

##### **Mitigation measures**

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

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

##### **Mitigation Measures**

- In consultation with the identified stakeholders, prepare a stakeholder engagement plan (SEP) that is based on their locations (maps) and their information needs at the various subproject phases;
- Undertake timely and prior disclosure of relevant project information to the various stakeholder categories in line with their information needs and the project phase;

- Carry out robust consultations with all identified community level (primary) stakeholders in a gender, intergenerational and culturally sensitive manner, using appropriate participatory consultative techniques;
- Consult with other relevant (secondary) stakeholders (as appropriate) based on their information needs, project phase and the SEP;
- Document the information disclosure and stakeholder consultation processes (including venues, dates, minutes of discussions detailing consultation agenda, issues/concerns raised for each agenda item, and responses by the implementing agency).

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

**Mitigation measures**

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

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

**Mitigation measures**

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

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

**Mitigation measures**

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

### **6.10.3.1 Embedded/In-built Controls**

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

#### **6.10.3.1.1 Significance of Impact**

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

## **6.11 CONSTRUCTION PHASE- POSITIVE IMPACTS**

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### **6.11.1 Impact on Employment**

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

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, 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**

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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.
- 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;
- 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 CONSTRUCTION PHASE - NEGATIVE IMPACTS**

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#### **6.12.1 Change in Land Use**

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The study area consists of communal land with patches of open scrubland. The distribution lines will be laid by RREC. The distribution line will be laid within 1.5km radius from the mini-grid. The land procured for the project site was uncultivated, and undeveloped. During consultation, it was established that the land belongs to the community in Kibish area. The community has since offered to the land in kind for project use. The establishment of the mini-grid will convert communal land to electrical 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:

- Land Acquisition for the mini-grid, wayleaves and construction camp site;
- 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 Kibish will be used for access to the project site.

#### **6.12.1.2 Significance of Impact**

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

#### **6.12.1.3 Additional Mitigation Measures**

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

### **6.12.2 Impact on Topography**

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

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

#### **6.12.2.1 Embedded/In built Control**

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

#### **6.12.2.2 Significance of Impact**

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

#### **6.12.2.3 Additional Mitigation Measures**

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

### **6.12.3 Impact on Soil (Flora and Fauna)**

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#### **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;
- Soil Erosion;
- 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 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 handler;
- The contractor shall avoid ground-breaking during the seasons of high rainfall to avoid erosion;
- Monitoring of areas of exposed soil during rainy seasons to ensure that any incidents of erosion are quickly controlled;

- The contractor should ensure that construction related impacts like erosion and cut slope destabilizing should be addressed through landscaping and grassing, carting away and proper disposal of construction materials;
- Use silt traps where necessary.

#### **6.12.4 Impact on Air Quality**

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

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

##### **6.12.4.1 Embedded/in-built control**

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

##### **6.12.4.2 Significance of Impact**

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

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

##### **6.12.4.3 Additional Mitigation Measures**

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

### **6.12.5 Impact on Ambient Noise**

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

The main receptors will be the Kibish shopping centre, Kibish GSU camp and Kibish Primary School 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 medium to major considering the receptors listed above are within a close proximity to the proposed site.

#### **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.

#### **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. The site is on very close proximity to a few residential houses nearby and the shopping centre.

#### **6.12.5.4 Additional Mitigation Measures**

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

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

#### **6.12.6 Visual Intrusions and Changes in Landscape Impact**

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

The construction of the mini-grid sites may involve the site clearance of vegetation (minimal vegetation at the site) and other natural attributes. The installation 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 lower the visual appeal of the area.

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

##### **6.12.6.1 Embedded/In-built Control**

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

##### **6.12.6.2 Significance of Impact**

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

##### **6.12.6.3 Additional Mitigation Measures**

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

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

### **6.12.7 Impacts on Waste Generation and Soil Contamination**

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

#### **6.12.7.1 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.

#### **6.12.7.2 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.

#### **6.12.7.3 Additional Mitigation Measures**

- Contractor should ensure that no unauthorized dumping of used oil and other hazardous waste is undertaken at the site;
- Designated areas should be provided for Solid Waste and daily collection and period disposal should be ensured;
- Construction 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 Resources and Water Quality**

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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. The people in Kibish area use a water from river Nakwaa as the main source of water and care must be exercised to avoid any pollution to the water source.

#### **6.12.8.1 Embedded/In-build Control**

- 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.

#### **6.12.8.2 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.

#### **6.12.8.3 Additional Mitigation Measures**

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

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

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

#### **6.12.9 Impact on Occupational Safety and Health**

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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 Kibish village.

##### **6.12.9.1 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;
- Training of the workers on climbing techniques, and rescue of fall-arrested workers;
- Excavated areas should be temporarily fenced to avoid unauthorized access to outsiders and wildlife.

##### **6.12.9.2 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.

##### **6.12.9.3 Additional mitigation measures**

- All workers (regular and contracted) should be provided with training on Health and Safety management system of the contractor during construction stage and EHS policies and procedures during the operation stage;
- Obtain and check safety method statements from contractors;
- Monitor health and safety performance and have an operating audit system; and
- Permitting system should be implemented to ensure that 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.

#### **6.12.10 Community Health and Safety**

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 construction phase activities such as installation of solar panels, construction of distribution lines and movement of material and personnel may result in impacts on the health and safety of the community.

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

Fire hazards are also 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. 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

Currently at the site there is not sanitary waste system (toilet) except one that is being constructed for the dispensary. There is need to dispose sanitary waste in manner that will not pose health hazards to the workers and the community. The receptor sensitivity is medium and low magnitude, hence Minor significance.

##### **6.12.10.1 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;
- 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;
- Construct /install pit latrines for both genders and clearly mark;
- Movement of heavy equipment and construction materials will be regulated during peak hours (0900hrs to 0500hrs).

#### **6.12.10.2 Significance of Impact**

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

#### **6.12.10.3 Additional Mitigation Measures**

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

- Developing an onsite Environmental and Social Management System (ESMS) and EHS Policy by the contractor;
- 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.

### **6.12.11 Increase in Illicit behaviour and crime**

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

#### **6.12.11.1 Significance of Impact**

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

#### **6.12.11.2 Additional Mitigation measures**

- In contract documents for the Contractor, MOE/REREC should make explicit reference to the need to abide by Kenyan law, international best practice and the ratified ILO conventions and MOE's policies in relation to health and safety, labour and welfare standards;
- 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;
- In selection of a Contractor, MOE/REREC should refer to past performance in similar assignments as an indicator of future performance with respect to worker management, worker rights, health and safety as outlined in Kenyan law and international standards;
- Regular checks by MOE/REREC should be undertaken to ensure the relevant labour laws and occupational health and safety plans are adhered to at all times;
- The Contractor will put in place a worker grievance redress mechanism accessible to all workers, whether permanent or casual, directly or indirectly employed. The Proponent worker grievance mechanism shall be open to the Contractor workforce in the event that their grievance is not adequately resolved by their direct employer. The Proponent will then have the authority to act to resolve this grievance;

#### **6.12.12 Increase in competition for scarce resources and strain on public utilities**

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The influx of workers in the area is expected to lead to increase in demand for public amenities such as hospitals, transport, schools water resources etc. This could lead to a loss of access to these services by locals especially those who could be among the vulnerable categories. Due an increase in demand, cost of housing near the sites will disadvantage the locals.

The nature of the project will require technical skills that might not be available in the community. This might require movement of construction workers into the community. It is expected that technically skilled personnel might be sourced from outside the community while the unskilled labour is expected to be sourced locally. It is therefore a possibility that the neighboring communities might go out looking for opportunities in project area thus creating competition.

##### **6.12.12.1 Embedded/In-built Control**

The contractor to ensure reduction of labor influx by tapping into the local workforce to the extent possible and recruitment of local workforce to the extent possible especially unskilled and semi-skilled jobs

##### **6.12.12.2 Significance of Impact**

The significance of this impact is considered to be minor because the receptor sensitivity will be medium, and the impact magnitude is low.

##### **6.12.12.3 Additional Mitigation Measures**

- Consultations with and involvement of local community in project planning and other phases of the project;
- Awareness-raising among local community and workers on the need to have a good /cordial working relation;
- Sensitization/awareness to workers regarding engagement with local community;
- Contactor shall make provision to provide resources needed by the workers if

- the need for such resources may result to competition e.g., water;
- Establishment and operationalization of an effective Grievance Redress Mechanism accessible to community members;
- The contractor and the project/community grievance redress committee to work closely address complains raised on time;
- Gender considerations in employment opportunities;
- Appropriate compensation for work done;
- Respect for community values/culture;
- Prompt payments as per the contractual agreements/terms.

### **6.12.13 Child labour and forced labour**

Implementation of the Kibish 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.

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

#### **6.12.13.1 Significance of Impact**

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

#### **6.12.13.2 Mitigation measures**

- The contractor should develop a code of conduct to ensure children are protected from any negative impact from the construction works;
- The contractor should strictly hire people who are above 18yrs and ensure they provide their Identity Cards;
- The contractor shall ensure every worker under their jurisdiction signs a document committing themselves to the protection of the area children;
- The Contractor must adhere to the employment Act which outlaws any form of forced labor
- The Community to report any form of forced labor at the site;
- The Contractor to ensure that all workers have a national ID card or documentation to show they are adults (above 18 years).

### **6.12.14 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.

#### **6.12.14.1 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.

#### **6.12.14.2 Additional Mitigation measures (Execution of a Chance Find Procedure)**

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

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

### **6.12.15 Gender Based Violence, SEA & SH**

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Gender Based Violence (GBV), Sexual Exploitation and Abuse (SEA) may be committed against the communities by the construction workers and by staff during the operation and maintenance of the mini-grids. Incidences of Sexual Harassment (SH) may occur among the staff during construction, operation and decommissioning phases of the project. During the FGD with the women, they made it clear that they do experience GBV within their community, the most common being intimate partner GBV. This may exacerbate during construction period while the women are searching for jobs and those giving the jobs may ask for sexual favours.

#### **6.12.15.1 Significance of Impact**

This is expected to increase slightly during the project implementation. Thus, the significance of this impact is considered to be Major considering medium sensitivity of the receptor and high magnitude of the impact.

#### **6.12.15.2 Mitigation measures**

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

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### **6.12.16 Exclusion of VMGs, Vulnerable Individuals and Households**

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A significant risk associated with this project is the potential for the exclusion of Vulnerable and Marginalized Groups (VMGs), vulnerable and marginalized households and individuals including the elderly, PLWDs, widows, widowers, orphan-led households, minority clans/sub-clans from participating and or benefiting from the mini-grids project. VMGs participation and inclusion could be disadvantaged based on social identity, which may be across dimensions of gender, age, location, occupation,

ethnicity, disability, sexual orientation and religion. There is potential risk of the exclusion of VMGS from the benefits and opportunities derived from the proposed mini-grid facilities.

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

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

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

#### **6.12.16.1 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.

#### **6.12.16.2 Mitigation measures**

- Participation will be through meetings with the different groups of the vulnerable people identified primarily to ensure that;
  - The VMGs are aware of the project and its impacts.
  - The VMGs are Aware of any restrictions and negative impacts.
  - Provide support to VMG participation arrangements in the project.
- Confer with the VMGs at the outset on how they wish to be engaged;
- Understand and respect local entry protocols as they relate to permission to enter a community;
- 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.

### **6.12.17 Risk of Communicable Diseases**

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The construction 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.

#### **6.12.17.1 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.

#### **6.12.17.2 Mitigation measures**

- The Contractor should develop and implement pre-employment screening measures for workers, which should include applicable diseases. Individuals found to be suffering from these diseases will need to be sensitized on prevention of transmission to others and management of the disease prior to mobilisation to site;
- The Contractor should develop and implement communicable disease policy and an information document for all workers directly related to the Project. The information document should address factual health issues as well as behaviour change issues around the transmission and infection of 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.

### **6.12.18 Impacts of construction material sourcing (e.g., quarrying)**

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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.

#### **6.12.18.1 Significance of Impact**

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

#### **6.12.18.2 Mitigation Measures**

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

#### **6.12.19 Increased Water Demand**

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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 for domestic purposes.

##### **6.12.19.1 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.

##### **6.12.19.2 Mitigation Measures**

- Prudent use of available water;
- Consultations with the project local committee on use of water in the community to avoid conflicts with the community;

Contractor to make own arrangements to provide water for construction works different from the community boreholes to avoid any conflicts with community.

#### **6.12.20 Energy Consumption**

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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.

##### **6.12.20.1 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.

##### **Mitigation Measures**

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

- Regular maintenance of vehicles to ensure efficient consumption of fuels.

## **6.13 OPERATION PHASE- POSITIVE IMPACTS**

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### **6.13.1 Impact on Local Economy and Employment**

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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 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 Improvement of Local and National Economy**

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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.

#### **6.13.2.1 Impact Significance**

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

#### **6.13.2.2 Enhancement Measures**

- REREC should ensure that their contractors/suppliers remit taxes and have a tax compliance certificate;
- Priorities local purchases over imports;
- Remit taxes on behalf of employees.

### **6.13.3 Education**

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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.'

#### **6.13.3.1 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

#### **6.13.3.2 Enhancement Measures**

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

### **6.13.4 Health Benefits of the Project**

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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 nearsightedness in children and adults.

#### **6.13.4.1 Significance of impact**

The project will result in many families replacing kerosene lamps for lighting with electricity there-by reducing chances of the afore mentioned disease incidences hence the impact significance will be high.

#### **6.13.4.2 Enhancement Measures**

- REREC should ensure that electricity is always available, reliable and affordable to Kibish residence.

### **6.13.5 Improved Standard of Living**

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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.

#### **6.13.5.1 Significance of impact**

Impact significance will be high due to improved living standards.

#### **6.13.5.2 Enhancement Measures**

- REREC should consider providing reliable of solar energy in Kibish area.

### **6.13.6 Security**

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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.

#### **6.13.6.1 Significance of impact**

The impact significance is high as the project will improve security situation of Kibish area.

#### **6.13.6.2 Enhancement Measures**

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

### **6.13.7 Communications**

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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.

#### **6.13.7.1 Significance of impact**

The impact significance is high since Kibish community will have access to information cheaply.

#### **6.13.7.2 Enhancement Measures**

- REREC should partner with other network service provider to improve the network situation of Kibish area.

## **6.14 OPERATION PHASE – NEGATIVE IMPACTS**

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### **6.14.1 Impact on Soil**

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The project activities that may impact the environment during the operations phase are described include: waste oil from diesel backup generator, oil spills and accidents during oil loading to the generator, Storage of oil and lubricants onsite, Disposal of municipal solid waste and waste water from site office; and Storage of waste materials onsite.

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 making the overall significance to be negligible.

#### **6.14.1.1 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 construction and operational activities will be confined in the small project area.

#### **6.14.1.2 Additional Mitigations**

- 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;
- Proper storage of the oil is required to ensure no leakages/ spills to the ground;
- Frequent inspection and maintenance of the generator to minimize leakages;
- No vehicles should be serviced or maintained at the Mini-grid area;
- The waste oil or used oil must be disposed-off using NEMA approved waste handlers;
- Proper training for the handling and use of fuels for the operators of the Mini-grid;
- 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;
- Any soil potentially contaminated by chemicals, oils, fuels to be collected and disposed of by a NEMA authorized waste handler.

#### **6.14.2 Waste Generation and management**

During operation phase, the waste generated from project includes domestic solid waste, sanitary waste and hazardous waste like waste oil and lubricants and oil containing jutes and rags will be generated during maintenance activities. Hazardous waste will also be generated from maintenance works e.g., Batteries, damaged panes etc.

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 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.

##### **6.14.2.2 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.

##### **6.14.2.3 Additional Mitigation measures**

- The Contractor shall develop a Solid Waste Management Plan in accordance with the guidelines;
- All Project staff will be trained on this plan and attendance will be recorded;
- Preparation and implementation of a Waste Management Plan (WMP) will be done;
- Fuel shall be stored on site in temporary above ground storage tanks;
- Adhere to Kenyan laws and regulations applicable to waste management and the MSDS;
- Proper waste segregation and colour coding of the waste receptacles;

- Provision of temporary ablution facilities and ensure treatment and/or removal of sewage wastes off site;
- Hazardous wastes such as damaged solar panels and batteries that contain heavy metals shall be collected and stored prior to disposal offshore at a licensed facility as per the requirements of the solid waste management plan. This will be done by a Licenced NEMA Waste Handler;
- Any Solar Panel or batteries removed from the array for disposal will first be collected and stored in the covered 10ft container before being disposed off;
- Hazardous waste shall be shipped 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.

### **6.14.3 Fire Outbreaks**

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

#### **6.14.3.1 Significance of Impact**

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

#### **6.14.3.2 Mitigation Measures**

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

### **6.14.4 Impact on Water quality and demand**

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 Kibish area. During operation phase, there will be no wastewater generation from the power generation process.

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

Discussions with the residents in Kibish confirmed that water is a major concern in the area. As noted earlier, the local community rely on underground water sources;

boreholes in the community and Nakwaa *Lagha* located 2 km away from the site 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.

#### **6.14.4.1 Embedded/in-built control**

- Planning of toilets and waste collection areas should be away from natural drainage channels;
- The contractor to source for a sustainable water source for use;

#### **6.14.4.2 Significance of Impact**

Although the sensitivity of the receptors 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.

#### **6.14.4.3 Additional Mitigation Measures**

- Ensure proper cover and stacking of loose construction material to prevent surface runoff and contamination of receiving water point;
- The workforce will be given training towards proactive use of designated areas/bins for waste disposal and encouraged to use toilets. Open defecation and random disposal of sewage shall be strictly restricted;
- Construction workers to be sensitised about water conservation and encouraged use of water optimally;
- Regular inspection for identification of water leakages and preventing wastage of water from water supply tankers;
- Recycling/reusing water to the extent possible;
- The contractor should provide portable/mobile toilets for use on site.
- Install water-conserving automatic taps;
- Encourage water harvesting from rooftops and storage for cleaning purposes (washing the panels off dust).

#### **6.14.5 Increased Oil Consumption**

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

#### **6.14.5.1 Significance of Impact**

The impact will be of minor significance.

#### **6.14.5.2 Mitigation Measures**

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

will contribute immensely to energy saving during the operational phase of the project. In addition, the plant operators will be sensitized to ensure energy efficiently in their daily operations.

#### **6.14.6 Increased Storm Water Flow**

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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 the impact**

The impact will be of minor significance.

##### **6.14.6.2 Mitigation Measures**

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

#### **6.14.7 Noise, Vibration and EMF**

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Negligible noise and vibration will be produced during operation phase of the project and would be from the backup generator. Electric magnetic fields are only anticipated during operation period, but these are negligible.

##### **6.14.7.1 Significance of Impacts**

Impact significance of noise and vibration will be negligible if the generator will be serviced regularly.

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.

##### **6.14.7.2 Mitigation Measures**

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

#### **6.14.8 Landscape and Visual Impacts**

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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 animal grazing. The permanent change of current landscape to area spread with solar panels will have potential visual impact for nearest habitations and passers.

##### **6.14.8.1 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.

#### **6.14.8.2 Suggested mitigation measures**

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

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

#### **6.14.9 Collision and Electrical hazards from Distribution Infrastructure**

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A number of birds' species were identified during the impact assessment. These include common ostrich (*Struthio Camelus*), African Cuckoo (*Cuculus Gularis*), lappet-faced vulture, isabelline wheatear 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.

##### **6.14.9.1 Embedded/ in-built Control**

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

##### **6.14.9.2 Significance of Impacts**

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

##### **6.14.9.3 Additional Mitigation Measures**

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

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

#### **6.14.10 Dust emissions**

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During operation phase not much dust will be generated from the facility but wind and dust storms are potential impacts.

##### **6.14.10.1 Significance of Impacts**

This impact will be negligible because there will be no activities on site that will have the potential to generate dust.

#### **6.14.10.2 Mitigation Measures**

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

#### **6.14.11 Vehicle exhaust emissions**

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

##### **6.14.11.1 Impact significance**

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

##### **6.14.11.2 Mitigation Measures**

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

#### **6.14.12 Impact on Occupational Safety and Health**

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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.

##### **6.14.12.1 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.

##### **6.14.12.2 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.

##### **6.14.12.3 Additional mitigation measures**

- All workers (regular and contracted) should be provided with training on Health and Safety management system of the contractor during construction stage

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

#### **6.14.13 Impact on Community Safety and Health**

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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.

##### **6.14.13.1 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.

##### **6.14.13.2 Significance of Impact**

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

##### **6.14.13.3 Additional Mitigation Measures**

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

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

#### **6.14.14 Gender Based Violence, SEA & SH**

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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. During the FGD with the women, they made it clear that they do experience GBV within their community, the most common form of GBV being Intimate partner GBV. This may exacerbate during project operation while the women are searching for jobs and those giving the jobs may ask for sexual favours.

##### **6.14.14.1 Significance of Impact**

Thus, the significance of this impact is considered to be Major but if the mitigation

measures will be put in place, the magnitude of the impact will be moderate to low.

#### **6.14.14.2 Mitigation measures**

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

#### **6.14.15 Exclusion of VMGs, Vulnerable Individuals and Households**

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

There is a high likelihood that the targeted PAPs of the new electricity connections to the mini-grids network will be dominated by the local elites. This may lead to the exclusion of those without the financial resources to connect to the mini-grid electricity distribution network. This could result in a situation where a majority persons or households with adequate financial resources in the project area will be able to take advantage of the provision to connect to the electricity grid. This will negate a key objective of the project of overcoming energy poverty.

#### **6.14.15.1 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 Turkana community.

#### **6.14.15.2 Mitigation measures**

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

#### **6.14.16 Risk of Communicable Diseases**

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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.

##### **6.14.16.1 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.

##### **6.14.16.2 Mitigation measures**

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

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

#### **6.14.17 Risks related to poor or inadequate stakeholder engagement (Conflict)**

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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.

##### **6.14.17.1 Significance of Impact**

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

##### **6.14.17.2 Mitigation measures**

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

### **6.15 DECOMMISSIONING PHASE- POSITIVE IMPACTS**

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#### **6.15.1 Employment Opportunities**

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

#### **6.15.2 Site Rehabilitation**

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

### **6.16 DECOMMISSIONING PHASE -NEGATIVE IMPACTS**

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#### **Preparation for decommissioning**

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

- Prepare a Decommissioning Plan and submit to NEMA and the County Governments of 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 negative impacts associated with the proposed project during its decommissioning phase include;

### **6.16.1 Impact on Soil Environment**

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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**

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

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

#### **6.16.2.1 Embedded/in-built control**

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

#### **6.16.2.2 Significance of Impact**

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

### **6.16.2.3 Additional Mitigation Measures**

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

### **6.16.3 Impact on Ambient Noise**

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

#### **6.16.3.1 Assessment Criteria for Impact on Ambient Noise**

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

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

#### **6.16.3.2 Embedded/in-built control**

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

#### **6.16.3.3 Significance of Impact**

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

#### **6.16.3.4 Additional Mitigation Measures**

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

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

#### **6.16.4 Impacts on Waste Generation and Soil Contamination**

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

##### **6.16.4.1.1 Embedded/in-built control**

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

##### **6.16.4.1.2 Significance of Impact**

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

##### **6.16.4.1.3 Additional Mitigation Measures**

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

#### **6.16.5 Impact on Economy and Employment**

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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 who will be affected.

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

##### **6.16.5.1 Significance of Impact**

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

medium magnitude.

#### **6.16.5.2 Additional Mitigation Measures**

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

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

#### **6.16.6 Impact on Occupational Health and Safety**

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

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

##### **6.16.6.1 Embedded/in-built control**

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

##### **6.16.6.2 Significance of Impacts**

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

#### **6.16.6.3 Additional mitigation measures**

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

#### **6.16.7 Gender Based Violence, SEA & SH**

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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. During the FGD with the women, they made it clear that they do experience GBV within their community, the most common form of GBV being Intimate partner GBV. This may exacerbate during project decommissioning while the women are searching for jobs and those giving the jobs may ask for sexual favours.

##### **6.16.7.1 Significance of Impact**

Thus, the significance of this impact is considered to be Major but if the mitigation measures will be put in place, the magnitude of the impact will be moderate to low.

##### **6.16.7.2 Mitigation measures**

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

### **6.16.8 Exclusion of VMGs, Vulnerable Individuals and Households**

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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 Turkana community.

#### **6.16.8.2 Mitigation measures**

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

### **6.16.9 Risk of Communicable Diseases**

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

#### **6.16.9.1 Significance of Impact**

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

#### **6.16.9.2 Mitigation measures**

- The Contractor should develop and implement pre-employment screening measures for workers, which should include communicable diseases. Individuals

found to be suffering from these diseases will need to be sensitized on prevention of transmission to others and management of the disease prior to mobilisation to site;

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

#### **6.16.10 Child labour and forced labour**

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During decommissioning phase of the mini-grid the risk of forced labor and child labour is likely to occur and precaution is needed to safe guard the community from being subjected to forced labor.

##### **6.16.10.1 Significance of Impact**

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

##### **6.16.10.2 Mitigation measures**

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

#### **6.16.11 Impacts related to labour influx**

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

#### **6.16.11.1 Significance of Impact**

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

#### **6.16.11.2 Additional Mitigation measures**

- In contract documents for the Contractor, MOE/REREC should make explicit reference to the need to abide by Kenyan law, international best practice and the ratified ILO conventions and MOE's policies in relation to health and safety, labour and welfare standards;
- 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;
- In selection of a Contractor, MOE/REREC should refer to past performance in similar assignments as an indicator of future performance with respect to worker management, worker rights, health and safety as outlined in Kenyan law and international standards;
- Regular checks by MOE/REREC should be undertaken to ensure the relevant labour laws and occupational health and safety plans are adhered to at all times;

### **6.17 CUMULATIVE IMPACTS**

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#### **6.17.1 Cumulative Impact Assessment**

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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.

### **6.18 SOCIAL PROTECTION**

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There will adequate mechanisms in place to protect local vulnerable population especially women and minors from risks associated with influx of workers (harassment, underage sex). This system will ensure having security on site provided by the contractor as well as sensitization and enforcement by the contractor. There will also be a code of conduct established for contractor employees and contract workers acknowledging a zero-tolerance policy towards child labor and child sexual exploitation. Additionally, the contractor will employ their skilled staff and apply unskilled construction labor from the local population as far as possible to minimize on influx of foreigners into the community.

### **6.19 SOCIAL INCLUSION**

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#### ***Gender Mainstreaming***

Projects usually affect women and men differently, and their roles are highly delineated. The project shall ensure that both men and women are equally consulted about the project and benefit from employment and other opportunities the project will present.

In addition, among communities, some groups are faced with barriers that prevent them from fully participating in political, economic, and social life. Disadvantage is often based on social identity, which may be derived from gender, age, economic status, ethnicity, disability, among other factors. These factors make some groups of people more vulnerable to project impacts than others alongside posing barriers to accessing project benefits. Thus, development projects affect people differently but vulnerable groups are more severely affected than those that are better off. In this project, some groups of the society that can be categorized as the vulnerable. These include the very poor, poor female headed households, poor children headed households, the poor elderly and the special needs persons (disabled). To ensure social inclusion and social sustainability, deliberate effort must be made to ensure the vulnerable take advantage of the project benefits as well as shielding them adverse impacts of the project.

## **7 ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN (ESMMP)**

### **7.1 ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN**

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

The key objectives of the ESMMP are:

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

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

### **7.2 MONITORING**

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

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

During construction phase, the Implementing agency (REREC) shall monitor the contractor's activities in order to verify that the management

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

### 7.3 PLAN MONITORING

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

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

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

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

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

### 7.4 ENVIRONMENTAL AND SOCIAL MONITORING BY CONTRACTORS

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

1. *Safety*: hours worked, recordable incidents and corresponding root cause analysis (lost time incidents, medical treatment cases), first aid cases, high potential near misses, and remedial and preventive activities required (for example, revised job safety analysis, new or different equipment, skills training, and so forth).

2. *Environmental incidents and near misses*: environmental incidents and high potential near misses and how they have been addressed, what is outstanding, and lessons learned.
3. *Major works*: those undertaken and completed, progress against project schedule, and key work fronts (work areas).
4. *E&S requirements*: noncompliance incidents with permits and national law (legal noncompliance), project commitments, or other E&S requirements.
5. *E&S inspections and audits*: to include date, inspector or auditor name, and records reviewed, major findings, and actions recommended and implemented.
6. *Workers*: number of workers, indication of origin (expatriate, local, nonlocal nationals), gender, age and skill level (unskilled, skilled, supervisory, professional, management).
7. *Training on E&S issues*: including dates, number of trainees, and topics.
8. *Footprint management*: details of any work outside boundaries or major off-site impacts caused by ongoing construction—to include date, location, impacts, and actions taken.
9. *stakeholder engagement of PAPS*: highlights, including number of formal and informal meetings, and information disclosure and dissemination—to include a breakdown of women and men consulted and themes coming from various stakeholder groups, including vulnerable groups (e.g., disabled, elderly, children, etc.).
10. *Details of any security risks*: details of risks the contractor may be exposed to while performing its work—the threats may come from third parties external to the project.
11. *Worker grievances*: details including occurrence date, grievance, and date submitted; actions taken and dates; resolution (if any) and date; and follow-up yet to be taken—grievances listed should include those received since the preceding report and those that were unresolved at the time of that report.
12. *PAPs e.g., community grievances*: grievance and date submitted, action(s) taken and date(s), resolution (if any) and date, and follow-up yet to be taken—grievances listed should include those received since the preceding report and those that were unresolved at the time of that report. Grievance data should be age and gender-disaggregated.
13. Major changes to contractor's environmental and social practices.
14. *Deficiency and performance management*: actions taken in response to previous notices of deficiency or observations regarding E&S performance and/or plans for actions to be taken—these should continue to be reported until REREC determines the issue is resolved satisfactorily.

**Table 7.1: ESMMP**

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
<b>Local employment</b>	<ul style="list-style-type: none"> <li>-Prioritize hire of locals for all unskilled labour.</li> <li>-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.</li> <li>-Adhere to labour laws, and labour management practices (timely remuneration, equitable compensation for both genders for equal work etc.)</li> <li>-Create awareness to workers and the community on worker and project grievance redress mechanisms.</li> </ul>	Construction Operations Decommissioning	Contractor Proponent	<ul style="list-style-type: none"> <li>-Fair and transparent local recruitment plan in place.</li> <li>-Recruitment processes (job adverts, interviews, selection etc.).</li> <li>-Number of locals employed based on gender, vulnerability, ethnic group, clan etc.</li> <li>-Type of employment (skilled, semi-skilled and unskilled).</li> <li>-Grievances raised, those aggrieved, status of resolution.</li> </ul>	Quarterly	Contractor's cost
<b>Local Sourcing</b>	<ul style="list-style-type: none"> <li>-Source materials from local businesses/communities, and where necessary give opportunities to businesses owned or operated by vulnerable individuals.</li> </ul>	Construction Decommissioning		<ul style="list-style-type: none"> <li>-Number and types of businesses sourced from, businesses owned and operated by</li> </ul>	Quarterly	No additional cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
				vulnerable individuals, types and quantities of materials etc.		
<b>Land acquisition and compensation for land and assets on land</b>	<p>In line with the RPF provisions;</p> <p>-The proponent has prepared an <b>Abbreviated Resettlement Action Plan (A-RAP)</b> to guide land acquisition for the mini-grid, wayleaves for power distribution.</p> <p>-The contractor will implement and adhere to agreements for temporal use of land and restoration of land after use.</p> <p>-Compensate affected communities in-kind (priority project) for the loss of land.</p> <p>-The construction activities will be restricted to within the allocated land and the immediate surroundings only.</p> <p>-After construction work, any land taken for a temporary</p>	Pre-Construction	<p>Contractor- (<i>contractors' facilities, workers camps</i>)</p> <p>Proponent- (<i>project land for generation assets</i>)</p>	<p>-Land Acquisition and consultation report (consultation minutes and lists of participants).</p> <p>-Type and amount of compensation paid to affected persons.</p> <p>- Priority community project implemented and handed over to affected communities.</p> <p>-Signed agreements with communities on the use and restoration of their land.</p>	Quarterly	1,000,000

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<p>basis for storage of material will be restored to their original form.</p> <p>-Consultations with the community on the low voltage lines.</p> <p>-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.</p>					
<b>Labor Influx and related impacts (SEA/SH, HIV/AIDs and other STIs)</b>	<p>-Tap into the local workforce to the extent possible to reduce labor influx.</p> <p>-Recruit local workforce to the extent possible especially for unskilled and semi-skilled jobs.</p> <p>-Consult with and involve local community in project planning and other phases of the project.</p> <p>-Raise awareness among local community and workers</p>	Construction Decommissioning	Proponent, Contractor	<p>-Records of employees/updated employee register.</p> <p>-Number of local community employees and external employees/updated employee register.</p>	Quarterly	50,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<p>on the need to have a good /cordial working relation</p> <p>-Sensitize workers regarding engagement with local community.</p> <p>-Make provision to provide resources needed by the workers if the need for such resources may result to competition e.g., water.</p> <p>-Establish and operationalize an effective Grievance Redress Mechanism accessible to community members.</p> <p>-The contractor and the project/community grievance redress committee to work closely address complains raised on time.</p> <p>-Include gender considerations in employment opportunities.</p> <p>-Provide appropriate compensation for work done.</p> <p>-Respect for community values/culture.</p>					

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	-Prompt payment of workers as per the contractual agreements/terms.					
<b>Child labor</b>	-Employ workers who are 18 years and above, and with a valid national ID at the time of hire. -Implement and monitor the employment register regularly. Compliance with the national labor laws and labour management practices. -Put visible signage on site <b>"No Jobs for children"</b> -Do not allow children at the project site.	Construction Decommissioning	Contractor, Proponent	-Updated employment register indicating locals employed, their ages, national identification numbers etc. -Grievances raised, aggrieved persons and status on resolution etc.	Quarterly	20,000.00
<b>GBV- SEA and SH</b>	-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	Construction Operations Decommissioning	Contractor Proponent	-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	Quarterly	50,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	and a GRM that ensures confidential reporting of GBV cases. -Implement a code of conduct signed by all those with physical presence on site.			GBV cases in place. Documented referral services for survivors. -Grievances raised, aggrieved persons and status on resolution etc		
<b>Forced Labor</b>	-Adhere to the Employment Act which outlaws any form of forced labor. -Report any form of forced labor at the site. -Ensure that all workers have a national ID card or documentation to show they are adults (above 18 years).	Construction Decommissioning	Contractor Proponent	-Number of reported cases of forced labor.	Quarterly	20,000.00
<b>Risks related to Inadequate stakeholder engagement</b>	-Prepare a stakeholder engagement/consultation plan (SEP) that is proportionate to the subproject and the identified stakeholders. -Timely and prior disclosure of project all project information, including project instruments, the full rights and entitlements of project affected persons,	Construction Operations Decommissioning	Contractor	-Availability of and implementation of the Stakeholder Engagement Plan. -# of stakeholder consultations held -Record of stakeholder consultations held (minutes of meetings and list of participants).	Quarterly	30,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<p>sub-project positive and negative impacts and opportunities, proposed subproject budget.</p> <p>-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.</p> <p>-Prepare and implement a grievance redress mechanism to deal with grievances.</p> <p>-The grievance redress committee to include representatives from the community.</p> <p>-Sensitize stakeholders on SEP and GRM.</p>			<p>-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.</p> <p>-Concerns raised and actions raised.</p>		
<b>Exclusion of VMGs and vulnerable individuals and households</b>	<p>In line with the provisions of the ESMF, VMGF and Social Assessment ensure the following.</p> <ul style="list-style-type: none"> <li>• Early identification and inclusion of</li> </ul>	Pre-construction Construction Operations Decommissioning	Contractor Proponent	Minutes of consultative meetings with all community segments including VMGs and vulnerable	Quarterly	No additional cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<p>VMGs and disadvantaged groups.</p> <ul style="list-style-type: none"> <li>• Meaningful consultation to effectively participate in the project.</li> <li>• Timely and prior disclosure of relevant project information to VMGs and disadvantaged groups.</li> <li>• Adequate and ongoing consultations with VMGs and disadvantaged groups in line with the SEP.</li> <li>• All concerns or grievances raised are fully resolved in a timely manner.</li> <li>• Access to culturally appropriate project</li> </ul>			<p>individuals and households, grievances raised and status on resolution etc.</p>		

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	benefits and opportunities.					
<b>Inaccessibility of project benefits to VMGs and other vulnerable individuals due to affordability challenges</b>	-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	-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
<b>Inadequate grievances management</b>	-Constitute a Local Grievances Committee is in consultation with all community segments, and incorporates the existing local dispute resolution mechanism. -Implement a workers grievances mechanism.	Construction Operations Decommissioning	Contractor Proponent	-Local Grievances Committee in place, composition of committee, awareness of community and workers on project and worker GRMs, updated GRM logs,	Quarterly	No additional cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<ul style="list-style-type: none"> <li>-Awareness on the culturally appropriate and accessible GRM to all community segments including VMGs, vulnerable individuals and households and CSOs</li> <li>-All reported grievances are logged, dated, processed, resolved and closed out in a timely manner.</li> <li>-Proportionate representation of VMGs and vulnerable individuals in the local grievances committee.</li> <li>-GRM provides for confidential reporting of particularly sensitive social aspects such as GBV, as well as anonymity.</li> </ul>			<ul style="list-style-type: none"> <li>types of grievances</li> <li>-Availability of grievance redress process</li> <li>-Number of grievances reported</li> <li>-Number of grievances resolved in a timely manner</li> <li>-Number of grievances escalated to national courts and the World Bank Grievances Redress Service and Inspection Panel.</li> </ul>		
<b>Environmental Impacts</b>						

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
<b>Vegetation clearance</b>	<ol style="list-style-type: none"> <li>1. Clear only the necessary areas</li> <li>2. Ensure proper demarcation and delineation of the project area to be affected by construction works.</li> <li>3. Specify locations for vehicles and equipment, and areas of the site which should be kept free of traffic, equipment, and storage.</li> <li>4. Designate access routes and parking areas</li> <li><b>5.</b> Re-vegetation including planting of trees around the plant/facility</li> </ol>	Construction	Contractor	-Number of trees cleared -Planted trees	Once off	50,000.00
<b>Soil erosion</b>	<ol style="list-style-type: none"> <li>1. Avoid groundbreaking during the seasons of high rainfall to avoid erosion.</li> <li>2. Monitoring of areas of exposed soil during rainy seasons to ensure that any incidents of erosion are quickly controlled.</li> <li>3. Construction related impacts like erosion and</li> </ol>	Construction	Contractor	Assess size of rills or Gulleys forming from accelerated run off from compacted areas	Quarterly	Part of contractor's fee

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<p>cut slope destabilizing should be addressed through landscaping and grassing, carting away and proper disposal of construction materials</p> <p>4. Use silt traps where necessary</p> <p>5. Cover soil stock piles</p> <p>6. Landscaping with grass on areas without electrical installation (lower areas)</p> <p>7. Monitoring of areas of exposed soil during rainy seasons to ensure that any incidents of erosion are quickly controlled.</p>					

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
<b>Contamination of soil from fossil fuels</b>	<ol style="list-style-type: none"> <li>1. Ensure waste water generated is discharged or drained into approved drainage facilities</li> <li>2. Construction vehicles must be maintained in good state and proper servicing to ensure no oils are likely to leak</li> <li>3. Care must be exercised not to spill any fossil fuels</li> <li>4. Any contaminated soil shall be scooped and disposed-off appropriately.</li> <li>5. No servicing vehicles on site</li> </ol>	Construction	Contractor	Records of any leakages from construction equipment/vehicles.	Quarterly	50,000.00
<b>Dust emissions</b>	<ol style="list-style-type: none"> <li>1. The construction area should be fenced off to reduce dust to the public</li> <li>2. Suppress dust during dry periods by use of water sprays;</li> <li>3. Stockpiles of excavated soil should be enclosed/covered/watered</li> </ol>	Construction	Contractor	-Visual Observation of dust -Provision of PPEs especially masks	Daily	100,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<p>d during dry or windy conditions to reduce dust emissions.</p> <p>4. Burning of woody debris &amp; construction waste to be prohibited</p> <p>5. Use of personnel protective equipment (PPE) -masks should be provided to all personnel in areas prone to dust emissions</p> <p>6. Restrict speed on loose surface roads during dry or dusty conditions</p> <p>7. Keep stockpiles and exposed soils compacted and re-vegetate as soon as possible.</p> <p>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</p>					

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	9. Plant short trees to break speed of wind					
<b>Vehicle exhaust and emissions from Generator</b>	<ol style="list-style-type: none"> <li>1. Drivers of construction vehicles must be sensitized so that they do not leave vehicles idling so that exhaust emissions are lowered.</li> <li>2. Maintain all machinery and equipment in good working order to ensure minimum emissions of carbon monoxide, NO<sub>x</sub>, SO<sub>x</sub> and suspended particulate matter</li> <li>3. Maintain equipment in good running condition – no vehicles to be used that generate excessive black smoke</li> <li>4. Use of diesel which is Sulphur- free to run the power producing</li> </ol>	Construction	Contractor	-Engine maintenance records - inspection of stacks	Quarterly	100,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<p>generators to be encouraged</p> <p>5. The stack chimney of the generators will be increased from its normal height of 3 meters to 6 meters</p>					
<b>Solid waste generation</b>	<p>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;</p> <p>2. Segregate waste</p> <p>3. Provide litter collection facilities such as bins</p> <p>4. Contractor to put in place and comply with a site waste management plan</p> <p>5. The contractor should comply with the</p>	Construction	Contractor	Presence of well-maintained receptacles and centralized collection points	Quarterly	100,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<p>requirement of OSHA ACT 2007 and Building rules on storage of construction materials</p> <p>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</p> <p>7. Recovery of materials remains and return to stores</p> <p>8. Re-use of materials where possible</p> <p>9. Proper budgeting to avoid waste generation</p> <p>10. Proper disposal of waste in line with solid waste regulation</p> <p>6. Construction wastes to be managed in accordance with</p>					

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	construction standards in Kenya					
<b>Impacts on Water Resources and Water Quality</b>	<ol style="list-style-type: none"> <li>1. Clear the necessary areas only.</li> <li>2. Appropriate remedial measures shall be implemented by the contractor in the event of erosion.</li> <li>3. Infrastructure shall be designed to ensure that contaminated run-off does not reach water source i.e., earth dam.</li> <li>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.</li> <li>5. No vehicle maintenance and service shall be done at project site</li> </ol>	Construction	Contractor	-Oil spill containment plan. -Provision of fuel/oil drip and spill trays	Quarterly	150,000

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	7. Ensure that potential sources of petro-chemical pollution are handled in such a way to reduce chances of spills and leaks.					

<b>Noise &amp; vibration</b>	<ol style="list-style-type: none"> <li>1. Construction activities to avoid any unchanneled flow of water at the site</li> <li>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.</li> <li>3. The excavation and use of rubbish pits during construction should be strictly prohibited.</li> <li>4. A waste disposal area should be designated within the active construction area and this should be equipped with suitable containers i.e., skips or bins of sufficient capacity and designed to contain and prevent refuse from being blown by wind,</li> <li>11. Areas contaminated by spilled concrete and/or fuels and oils leaking from vehicles and</li> </ol>	Construction	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
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	machinery should be cleaned immediately					
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Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
<b>Impacts from Hazardous materials -</b>	<ol style="list-style-type: none"> <li>1. Maintenance of construction vehicles will not be done on site</li> <li>2. All hazardous products and waste should be labeled and handled properly to avoid contact with the ground</li> <li>3. Dispose hazardous waste through a NEMA approved waste handler</li> </ol>	Construction	Contractor	Presence of well-maintained receptacles and centralized collection points	Quarterly	100,000.00
<b>Accidental Oil Spills or Leaks</b>	<ol style="list-style-type: none"> <li>1. In the event of accidental leaks, contaminated top soil should be scooped and disposed of appropriately.</li> <li>2. Refueling and maintenance of vehicles will not take place at the construction site.</li> <li>3. Create awareness for the employees on site on procedures of dealing with spills and leaks</li> <li>4. Vehicles and equipment must be serviced regularly and kept in</li> </ol>	Construction	Contractor	Records of all accidental spills and number of liters	Quarterly	150,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<p>good state to avoid leaks.</p> <p>5. In case of spillage the contractor should isolate the source of oil spill and contain the spillage using sandbags, sawdust, absorbent materials and/or other materials approved by materials.</p> <p>6. All chemicals should be stored within the bunded areas and clearly labeled detailing the nature and quantity of chemicals within individual containers.</p>					
<b>Fire Hazards</b>	<p>1. Create awareness to the construction workers on potential fire hazards</p> <p>2. Provision of firefighting equipment on site during construction.</p> <p>3. No smoking shall be done on construction site</p>	Construction	Contractor	<p>-Records of any Fire incidences</p> <p>-Fire equipment and evacuation plan</p>	Quarterly	100,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<ul style="list-style-type: none"> <li>4. 'No smoking' signs shall be posted at the construction site</li> <li>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.</li> <li>6. Designate an assembly point</li> </ul>					
<b>Impacts of construction material sourcing (e.g., quarrying)</b>	<ul style="list-style-type: none"> <li>1. Source all building materials such as stone, sand, ballast and hard core from NEMA approved sites.</li> <li>2. Ensure accurate budgeting and estimation of actual construction materials to avoid wastage.</li> <li>3. Reuse of construction materials where possible.</li> </ul>	Construction	Contractor	Sources of raw materials (from local community)	Quarterly	Part of contractor's cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
<b>Increased water demand</b>	<ol style="list-style-type: none"> <li>1. Prudent use of available water</li> <li>2. Consultations with the project local committee on use of water in the community to avoid conflicts with the community</li> <li>3. Source and utilize a sustainable and reliable water supply for both construction and operation phase.</li> </ol>	Construction	Contractor	Water usage records	Quarterly	Part of contractor's cost
<b>Energy Consumption</b>	<ol style="list-style-type: none"> <li>1. Ensure responsible electricity use at the construction site through sensitization of staff to conserve electricity by switching off electrical equipment or appliances when they are not being used.</li> <li>2. Proper planning of transportation of materials will ensure that fossil fuels (diesel, petrol) are not</li> </ol>	Construction	Contractor	Energy consumption records	Quarterly	No additional cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<p>consumed in excessive amounts.</p> <p>3. Complementary to these measures, they monitor energy use during construction and set targets for reduction of energy use.</p>					
<b>Occupational Health and safety Impacts</b>	<ol style="list-style-type: none"> <li>1. Use skilled personnel for activities which demand skills/technical tasks</li> <li>2. Awareness creation/Tool box talks on safety to workers while at construction site</li> <li>3. Workers coming to the site should be knowledgeable on safety precautions to take</li> <li>4. Appropriate PPE (helmet, safety harness, boots, masks, climbing irons)</li> <li>5. Proper general house keeping</li> <li>6. Close supervision of workers</li> <li>7. Risk assessment by contractor of the</li> </ol>	Construction	Contractor	<p>Records of any near misses, incident, and accidents.</p> <p>Records of corrective actions implemented if there was an accident.</p>	Quarterly	1,000,000.00

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

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
<b>Public Health Impacts</b>	<ol style="list-style-type: none"> <li>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 <i>Barazas</i>.</li> <li>2. Awareness creation and consultations with local communities prior and during construction on the dangers of these diseases</li> <li>3. Informing workers on local cultural values and health matters.</li> <li>4. Provision of condoms to workers</li> <li>5. Allowing migrant workers time to be with their families</li> <li>6. The contractor is impressed upon not to</li> </ol>	Construction	Contractor	Number of awareness creation sessions conducted. -Availability of and distribution of condoms	Quarterly	20,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<p>set a construction camp on site.</p> <p>7. The contractor will provide public education/information about HIV/AIDS transmission and prevention measures.</p> <p>8. Ensure equal treatment of workers</p> <p>9. Provide all appropriate COVID-19 preventive measures including campaign to maintain individual measures at the workplace.</p>					
<b>Sanitary waste</b>	<b>1.</b> Construct/ install pit latrines for both genders clearly labelled	Construction	Contractor	Presence of separate and clean washrooms for both the gents and ladies	Quarterly	300,000.00
<b>Solid Waste Generation</b>	<p>1. Provide waste handling facilities such as labeled waste bins</p> <p>2. Emphasis on prudent waste generation and</p>	Operation	Contractor	Presence of well-maintained receptacles and centralized collection points	Quarterly	50,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<p>give priority to reduction at source</p> <p>3. Solid waste management awareness to operators</p> <p>4. Operator to contract a NEMA licensed waste handler to collect and dispose solid waste</p>					
<b>Liquid Waste/Oils Generation</b>	<p>1. Proper storage of the oil is required to ensure no leakages</p> <p>2. Frequent inspection and maintenance of the generator to minimize leakages.</p> <p>3. No vehicles should be serviced or maintained at the Mini-grid area.</p> <p>4. The waste oil or used oil must be disposed-off appropriately.</p> <p>5. Proper training for the handling and use of</p>	Operation	Contractor	<p>-Engine maintenance records</p> <p>-Oil spill containment plan</p>	Quarterly	200,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<p>fuels for the operators of the Mini-grid.</p> <p>6. In the event of accidental leaks, contaminated top soil should be scooped and disposed of appropriately.</p>					
<b>Increased oil Consumption</b>	<p>1. Efficient energy consumption</p> <p>2. Install an energy-efficient lighting system</p>	Operation	Contractor	Energy consumption records	Quarterly	No additional cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
<b>Increased storm water flow</b>	<ol style="list-style-type: none"> <li>1. Construct the drainage system in a way to follow natural drain of the water</li> <li>2. Concrete only the required area and leave the rest of the land with vegetation like grass</li> <li>3. Construct rain water harvesting system on the control buildings/office and harness into storage tanks for use</li> </ol>	Operation	Contractor	Provision of a drainage system and a rain water harvesting system	Quarterly inspections	200,000.00
<b>Fire Outbreaks</b>	<ol style="list-style-type: none"> <li>1. The power plant must contain firefighting equipment (Portable fire extinguishers) of recommended standards and in key strategic points</li> <li>2. Detection/alarm systems that can detect fire should be and installed</li> </ol>	Operation	Contractor	-Provision of serviced fire equipment, evacuation plan and safety signages  -Records of fire safety training	Quarterly	50,000.00

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

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

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
<b>Occupation health and Safety</b>	<ol style="list-style-type: none"> <li>1. Ensure only qualified staff are employed to work in the facility</li> <li>2. All workers operating the Mini-grid must be equipped with appropriate and adequate person protective equipment (PPE) such as; safety footwear, helmet among others.</li> <li>3. Operators must be skilled on firefighting management</li> <li>4. Annual environmental audits should be done</li> <li>5. WIBA cover for staff is mandatory</li> </ol>	Operation	Contractor	-Provision of PPEs and WIBA cover -Environmental audit reports	Quarterly	100,000.00
<b>Hazardous waste-damaged panels</b>	<ol style="list-style-type: none"> <li>1. Segregation from other waste streams</li> <li>2. Proper disposal through a NEMA approved/licensed handler</li> </ol>	Operation	Contractor	Presence of well-maintained receptacles and centralized collection	Quarterly	200,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
<b>Noise and Vibration</b>	<ol style="list-style-type: none"> <li>1. Generator room should be sound proof to ensure no noise of a nuisance level will be produced.</li> <li>2. Monitor noise levels</li> </ol>	Operation	Contractor	Noise levels- Records of noise measurements done by contractor within the project area and at distances of 30m from the Solar mini-grid	Quarterly	Part of contractor's cost
<b>Shocks and electrocutions</b>	<ol style="list-style-type: none"> <li>1. Inspect the wiring of the houses before connecting power</li> <li>2. Safety awareness campaigns to the community before connection of power on safety precautions such as: <ul style="list-style-type: none"> <li>○ Require community to engage a certified technician to do wiring in the premises</li> <li>○ Use of quality materials while wiring</li> <li>○ Refraining from individual illegal extensions of power lines to other houses</li> <li>○ Observing safety</li> </ul> </li> </ol>	Operation	Contractor, Consumer	-Records of awareness sessions conducted -Incidents report	Quarterly	No additional cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<p>measures while using electricity such as not touching sockets and switches with wet hands or wiping with wet cloths</p> <ul style="list-style-type: none"> <li>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</li> <li>Reporting any electric wire/conductors if found fallen on the ground</li> <li>Report any incident regarding electricity at the local office –staff in charge of operating the Mini-grid</li> </ul>					

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
<b>Community Safety- Access to site by general public</b>	<ol style="list-style-type: none"> <li>1. Fencing off the facility to keep of community members, children and livestock from entering into the facility</li> <li>2. Controlled access to the site only with prior approval</li> <li>3. Maintain records of any person who comes to site</li> </ol>	Operation	Contractor	Presence of a controlled access and records of every person accessing the site	Daily	Part of contractor's cost
<b>Risks related to poor or inadequate stakeholder engagement (Conflict)</b>	<ol style="list-style-type: none"> <li>1. Employ from the community to the extent possible</li> <li>2. Engage the community members and other stakeholders in a timely manner</li> <li>3. Work closely with the GRM committee members in solving the conflicts</li> <li>4. Solve all conflicts/grievances at the earliest time possible</li> </ol>	Operation	Contractor, Proponent	Grievance records	Quarterly	20,000.00

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

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<p>transmitted diseases, through staff awareness and awareness campaigns for the community</p> <p>2. Provision of condoms to workers</p> <p>3. Allowing migrant workers time to be with their families</p>			-Availability of and distribution of condoms		
<b>Public health Impacts - Covid 19 disease</b>	<p>1. Social distance must be observed</p> <p>2. Provision of hand wash facilities before access</p> <p>3. Temperature check and monitoring of the temperature of workers and any other person coming to site</p> <p>4. Enforce wearing of masks</p> <p>5. Make provision for testing and treating especially of workers</p>	Operation	Contractor	<p>Availability of hand washing facilities</p> <p>Utilization of hand washing facilities</p> <p>Number of Covid-19 cases reported</p>	Quarterly	30,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	6. Provision of contact numbers for the nearest health facility for testing and treatment  7. Adhering to any other measures from the ministry of health which may be issued from time to time					
<b>Dust Emission</b>	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	Contractor	Visual inspection	Quarterly	50,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
<b>Vehicle Exhaust Emissions</b>	<ol style="list-style-type: none"> <li>1. Drivers of the vehicles must be sensitized so that they do not leave vehicles idling so that exhaust emissions are lowered.</li> <li>2. Company vehicles should be well maintained</li> </ol>	Operation	Contractor	Engine maintenance records	Quarterly	No additional cost
<b>Noise and Vibration</b>	<ol style="list-style-type: none"> <li>1. Install portable barriers to shield compressors and other small stationary equipment where necessary.</li> <li>2. Use quiet equipment (i.e., equipment designed with noise control elements).</li> <li>3. Co-ordinate with relevant agencies in case the noise produced will require a license.</li> <li>4. Limit pickup trucks and other small equipment to a minimum idling time and observe a common-</li> </ol>	Decommissioning	Contractor	Noise levels- Records of noise measurements done by contractor within the project area and at distances of 30m from the Solar mini-grid	Once off	20,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<p>sense approach to vehicle use and encourage workers to shut off vehicle engines whenever possible.</p> <p>5. Demolish mainly during the day when most of the neighbors are out working.</p>					
<b>Solid Waste Generation</b>	<p>1. Demolition contractor to adhere to the various manufacturer's guidelines and requirements regarding demolition and disposal</p> <p>2. Segregation of waste in order to separate hazardous waste from nonhazardous waste and other streams of waste</p> <p>3. Provision of facilities for proper handling and</p>	Decommissioning	Contractor	Presence of well-maintained receptacles and centralized collection points	Daily	700,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<p>storage of demolition materials to reduce the amount of waste caused by damage or exposure to the elements</p> <p>4. Adequate collection and storage of waste on site</p> <p>5. Safe transportation to the disposal sites / designated area</p> <p>6. Hazardous waste must be disposed by NEMA approved waste handler</p>					
<b>Dust Emissions</b>	1. Cover all trucks hauling soil, sand and other loose materials or require all trucks to maintain at least two feet of freeboard	Decommissioning	Contractor	Visual inspection	Daily	20,000.00
<b>Public Health-HIV/AIDS</b>	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	Decommissioning	Contractor	Records of awareness creation sessions conducted. -Availability of and distribution of condoms	Once off	20,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	awareness campaigns/ to the community.					
	Total					5,380,000.00

## 7.5 APPROACH TO IMPLEMENTATION OF ESMMP

**Table 7-4: Institutional Framework and Compliance/Implementation of the ESIA/ESMMP**

No	Institution	Role/Function
1	The National Environment Management Authority (NEMA)	NEMA: <ul style="list-style-type: none"> <li>• Approves the ESIA Report;</li> <li>• Issues EIA License for project implementation; and</li> <li>• Carries out independent Audit to determine compliance with ESMMP.</li> </ul>
2	Directorate of Occupational Safety and Health Services (DOSHS)	DOSHS: <ul style="list-style-type: none"> <li>• Provides OSH permits for workplaces of the project including campsites and quarries; and</li> <li>• Conducts inspections to ensure conformance to OSHA.</li> </ul>
3	Water Resources Authority (WRA)	WRA: <ul style="list-style-type: none"> <li>• Provides necessary water abstraction permits for boreholes and surface water sources (rivers, streams etc.); and</li> <li>• Monitors water use in the region and provide guidance water use.</li> </ul>
4	National Land Commission (NLC)	NLC: <ul style="list-style-type: none"> <li>• Exercises the power of compulsory land acquisition on behalf of MoE and vest the acquired land to MoE.</li> </ul>
5	National Gender and Equality Commission	The Commission: <ul style="list-style-type: none"> <li>• Ensures that there is gender equality and equity throughout the implementation of the project; and</li> <li>• 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</li> </ul>
6	Development of Ministry of Trade, Gender and Youth Affairs	<ul style="list-style-type: none"> <li>• 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.</li> </ul>
7	County Government of Turkana	County Governments will: <ul style="list-style-type: none"> <li>• Provide approval for the project &amp; project site;</li> <li>• Approval of community land consent &amp; verification; and</li> <li>• Provide support.</li> </ul>
8	Supervision Consultant	Supervising Consultant: <ul style="list-style-type: none"> <li>• Will engage the following dedicated full-time safeguards staff to support risk management: <ul style="list-style-type: none"> <li>✓ Supervising Engineer (RE)</li> <li>✓ Social Safeguards Specialist</li> <li>✓ Environmental Safeguards Specialist</li> </ul> </li> <li>• Review and approval of the ESMMPs and other plans;</li> <li>• Day to day supervision of Contractor implementation of the ESMMPs and other plans;</li> <li>• Regular reporting on the ESMMP implementation; and</li> <li>• Has full time Environmental, Health and Safety and Social Specialists</li> </ul>
9	Contractor	Contractor:

		<ul style="list-style-type: none"> <li>• Will engage the following dedicated full-time safeguards staff; <ul style="list-style-type: none"> <li>✓ Environmental Safeguards Specialist</li> <li>✓ Social Safeguards Specialist</li> <li>✓ Registered Occupational Health and Safety (OHS) Expert</li> <li>✓ Community Liaison officer to act as link between the community and contractor and to support the social specialist.</li> </ul> </li> <li>• Will Prepare the C-ESMPs informed by the proponent's ESMMP and other plans before commencing construction;</li> <li>• Will Operationalize and implement the C-ESMPs;</li> <li>• Carries out day to day management of ES, H&amp; S risks; and</li> <li>• Reports on incidents and accidents to the Resident Engineer and regulators.</li> </ul>
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## 7.6 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

### 7.6.1 Construction Management Plan

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

#### a) Management of Fuels and other Hazardous Materials

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

#### b) Management of the Construction Site

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

**c) Fire Prevention and Management**

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

**d) Management of Air Quality**

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

**e) Neighbouring Land Owner and Occupier Relations**

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

**f) Complaints Register**

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

**g) Construction Control**

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

**H) 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.

**7.6.2 Rehabilitation and Site Closure Plan**

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

### **7.6.3 Local Recruitment Plan**

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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.

### **7.6.4 Workplace Health and Safety Plan**

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

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

### **7.6.5 Community Health and Safety Plan**

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

- Adherence to OSHA 2007 Act and its subsidiary legislations to ensure that health and safety of immediate neighbours and the public is not threatened.

- The contractor to ensure that construction work is undertaken in manner not likely pose risks to community health and safety.
- The contractor shall undertake an independent risk assessment prior to construction. The findings of this assessment will inform the development of a community safety plan and create awareness to the community on the same.

#### **7.6.6 Emergency Preparedness Plan**

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

#### **7.6.7 SEA/SH Prevention and Response Action Plan**

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

The mitigation measures shall include:

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

#### **7.6.8 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

#### **7.6.9 Labor Influx Management Plan**

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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

### **7.6.10 Grievance Redress Mechanism and Grievance Mechanism**

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

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

The Land Acquisition Tribunal established under the Land Act 2012 (Part VIIIA 133A) has the jurisdiction to hear and determine appeals from the decision of the NLC on the process of compulsory land acquisition of land. However, if a party is dissatisfied by the decision of the tribunal, they may appeal to the Environment and Land Court. The court will deal with land related disputes. However, the Land Act 2012 and Environment and Land Court Act 2011 advocates for Alternative Dispute Resolution (ADR) methods in tackling land related disputes. ADR approaches will be given preference and based on customary rules, arbitration, or third-party mediation. ADR will be promoted or defended as a resolution to disputes related to land. The affected persons and other stakeholders also have a right to access the World Bank Redress Service (GRS) and the World Bank Inspection Panel at no cost.

#### **7.6.10.2 Grievance Redress Principles**

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

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

#### **7.6.10.3 Grievance Redress Committee Capacity Building**

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

#### **7.6.10.4 Grievance Procedures**

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

#### **7.6.10.5 Grievance Log**

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

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

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

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

Ineligible complaints may include those where:

- The complaint is clearly not mini-grid project -related.
- The nature of the issue is outside the mandate of the grievance mechanism.
- The complainant has no standing to file.
- Other project or organizational procedures are more appropriate to address the issue.
- Closing Out and Escalation: Project-related grievances will be addressed and closed out as appropriate. The GRM will provide a channel for escalation e.g., through legal redress.

The proponent REREC will monitor the activities of the stakeholder engagement and grievance management activities.

The three tiers of the GRM are as described below:

#### **7.6.10.6 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

##### **7.6.10.6.1 Functions of the National Grievances Redress Committee**

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

#### **7.6.10.7 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.

#### **7.6.10.8 Locational Grievance Redress Committee (LGRC)**

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

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

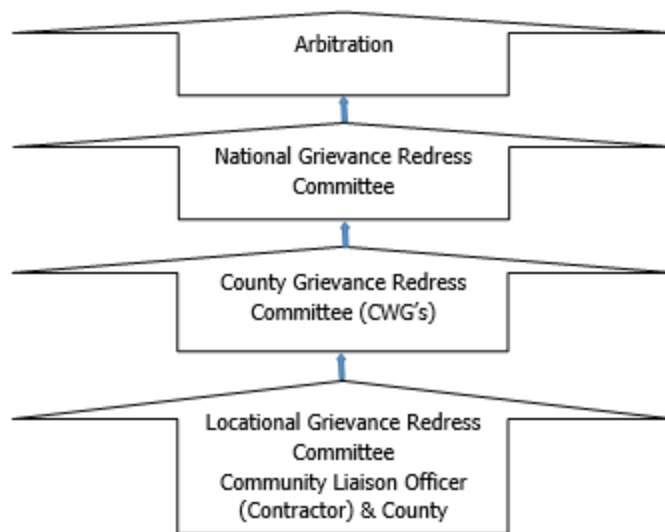
- 1. The locational Chief, who is the Government administrative representative at the locational unit and who deals with community disputes will represent the Government in LGRC
- 2. Assistant Chiefs, who supports the locational Chief and Government in managing local community disputes in village units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

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

**The roles of LRCCs** will include among others the following:

- a) Conducting extensive public awareness and consultations with the affected

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



**Figure 7-1: KOSAP Grievance Redress Mechanism**

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

It is expected that most disputes will be resolved at the lowest level- Locational Grievance Redress Committee and since most disputes arise during the Construction and operation period the contractor's Environmental and Social Safeguard team specifically the Community Liaison Officer will work closely with the community to be able to resolve disputes.

Responsibilities of the Community Liaison Officer include:

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

#### **7.6.10.9 Existence of a Local Grievance Redress Mechanism in Kibish**

A Local grievance redress committee was constituted in 2020. The LGRM was not active during the site visit. It is anticipated that the committee shall become active during the construction and operation phase of the project. The LGRM is composed of the following members of the project committee:

1. The area chief;
2. Youth representatives;
3. Female representatives;
4. Male representative; and
5. Vulnerable persons representative

Contractor will prepare an effective Grievance Redress Mechanisms (GRM) to address and respond to grievances from both the community, the workers and any other stakeholder.

A Grievance Redress Mechanism (GRM) provides access to remedy and identifies procedures to effectively address grievances arising from project implementation. GRM provides an avenue where people can formally lodge their complaints and grievances and have them properly considered and addressed.

The mitigation measures shall include:

- Prepare a project level timebound GRM in consultation with relevant stakeholders
- Ensure the project GRM incorporates existing local dispute resolution mechanisms at the lowest tier and allows access to administrative and judicial processes as well as to other redress mechanisms such as meditation/arbitration and the World Banks grievance redress service (GRS) and the Inspection Panel
- Have a subproject level GRM Focal Point to be responsible for receiving, logging/registering, submitting to the responsible tier for resolution and responding to and updating complainants on resolution status
- Sensitize all stakeholder categories on the GRM and encourage them to make use of it
- Ensure the GRM is functional, culturally appropriate, and accessible to all stakeholders without any cost to them and without fear of retribution or reprisal
- Ensure adequate and proportionate representation of VMGs and vulnerable individuals in the local grievances handling committee.
- Prepare a timebound Contractor's GRM and sensitize community members and project workers its processes
- Ensure all reported grievances are logged, dated, processed, resolved and closed out in a timely manner, or escalated to other levels.
- Ensure the GRM provides for confidential reporting of particularly sensitive social aspects such as GBV, as well as anonymity for those who wish to report anonymously.

#### **7.6.10.10 World Bank Grievances Redress Mechanism**

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

#### **7.6.10.10.1 World Bank Grievances Redress Service**

The Grievance Redress Service (GRS) is an avenue for individuals and communities to submit complaints directly to the World Bank if they believe that a World Bank-supported project has or is likely to have adverse effects on them, their community, or their environment. The GRS enhances the World Bank's responsiveness and accountability to project-affected communities by ensuring that grievances are promptly reviewed and addressed. Complaints must be in writing and addressed to the GRS and sent through the following methods namely:

Those aggrieved or their representatives can report their complaints through the following mediums;

- (i) Online by accessing the online form;
- (ii) Sending an Email to [grievance@worldbank.org](mailto:grievance@worldbank.org); or
- (iii) Submitting a letter to the World Bank Headquarters in Washington D.C., United States or World Bank Kenya County Office.

#### **7.6.10.10.2 World Bank Inspection Panel**

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

#### **7.6.11 Government Management of Land Acquisition Disputes**

The Environment and Land Court, established under the Environment and Land Court Act 2011, is a superior court (with offices across the country) that hears and determines disputes relating to land and the environment. Likewise, the Land Acquisition Tribunal established under the Land Act 2012; (PART VIIIA 133A) has jurisdiction to hear and determine appeals from the decision of the NLC on the process of compulsory acquisition of land. Therefore, in the first instance, such appeals are referred to the Tribunal. However, a party dissatisfied with the decision of the Tribunal may appeal to the Environment and Land Court on a question of law only. The regulations to set the Land Acquisition Tribunal established under the Land Value (Amendment) Act of 2019 are underway. Besides, the Judicial Service Commission will chair the Land Acquisition Tribunal once operational.

### **7.6.13 STAKEHOLDER ENGAGEMENT AND GRIEVANCE MANAGEMENT POST ESIA**

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During implementation of the project or construction phase, stakeholder engagement will be progressed to ensure the community and other stakeholders are kept abreast of the progress of the project. For the target community this will take the form of meetings and focus group discussions between local community and the contractor which will also act as forums for the community to ask questions or provide feedback. Therefore, the contractor will prepare a stakeholder engagement plan to guide on the engagements with various stakeholders guided by the Stakeholder Engagement Plan prepared during ESIA.

#### **7.6.13.1 Objectives and Principles of Stakeholder Engagement post ESIA**

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Stakeholder engagement is the basis for building strong, constructive, and responsive relationships that are essential for the successful management of a project's environmental and social impacts.

In order to ensure effective engagement and consultation of all stakeholders, the contractor and the proponent will apply the following principles.

- Ensure the affected persons are provided opportunities to express their views on project risks, impacts and mitigation measures, and response provided.
- Begin consultations early even before construction begins because there is a lapse of time between ESIA consultations and implementation time. Identification of environmental and social risks and impacts should continue on an ongoing basis as risks and impacts arise.
- Consultations should continue in a manner that is transparent, objective, meaningful and allow for ease in accessing information in a culturally appropriate local language(s) and format that is understandable to affected and interested persons.
- Consultations with affected persons and interested parties should avoid manipulation, interference, coercion, or intimidation.
- Consultations should also pay attention to the needs of VMGs, vulnerable individuals and households.

The contractor shall identify the stakeholders early and consider appropriate methods for engaging them. The stakeholder engagements will be reported to REREC on monthly basis alongside the construction progress reports.

## **8 IMPACT SUMMARY AND CONCLUSION**

### **8.1 INTRODUCTION**

This chapter gives a summary of impacts conclusion and recommendations.

### **8.2 SUMMARY OF IMPACTS IDENTIFIED AND ASSESSED**

#### **8.2.1 Pre-construction Phase Impacts**

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

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

#### **8.2.2 Construction Phase Impacts**

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

The significance of the identified negative impacts associated with the construction phase is Major, minor and moderate prior to the application of appropriate mitigation measures. Prior to the application of appropriate mitigation measures, Impact on Exclusion of VMGs, Vulnerable individuals and households will be of major significance during the construction phase due to the sensitivity of the identified impacts. Fourteen of the negative impacts identified are of minor significance and four are moderate significance before the application of appropriate mitigation measures. With the application of appropriate mitigation measures, the significance of all the identified negative impacts associated with the construction phase will be reduced to minor or negligible.

#### **8.2.3 Operational Phase Impacts**

A number of impacts have also been identified to be associated with the operational phase of the proposed Kibish solar project. Of these, impacts on Economy, Employment, Education, Health benefits, Improved security, standards of living and communication will be positive impacts. Prior to the application of appropriate mitigation measures, Impact on Exclusion of VMGs, Vulnerable individuals and households will be of major significance during the operational phase due to the sensitivity of the identified VMGs. The presence of electrical infrastructure will pose this health threat to avifauna prior to the application of appropriate mitigation measures. Fifteen of the negative impacts are of minor significance and two are of Moderate significance before the application of appropriate mitigation measures.

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

#### **8.2.4 Decommissioning Phase Impacts**

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A number of impacts have been identified as a result of the decommissioning of the proposed Kibish project. Employment creation and rehabilitation of the project site are considered to be positive impacts.

The significance of the identified negative impacts associated with the decommissioning phase is moderate to minor prior to the application of appropriate mitigation measures. With the application of appropriate mitigation measures, the significance of all the identified negative impacts associated with the decommissioning phase will be reduced to minor or negligible.

#### **8.2.5 CONCLUSION AND RECOMMENDATIONS**

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

An Environmental and Social Management Plan (ESMMP) has been prepared to ensure that social and environmental impacts and risks identified during the ESIA process are effectively managed during the construction and operations of the Project. The ESMMP specifies the mitigation and management measures to which the Project Proponent and the Contractor will be committed and shows how the Project will mobilize organizational capacity and resources to implement these measures. The ESMMP also shows how mitigation and management measures will be scheduled and will ensure that the Project complies with the applicable laws and regulations within Kenya, as well as the requirements of WB OPs on environmental and social sustainability.

The Project Proponent and Contractor should accommodate the mitigation measures recommended during the ESIA process to the extent that is practically possible, without compromising the economic viability of the Project or having a lasting impact on the environment.

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

## 9 REFERENCES

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

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21. Community Land Act, 2016
22. The Land Registration Act, 2012
23. The Land Act, 2012
24. The Energy Act, 2019
25. The Constitution of Kenya, 2010
26. Turkana County Integrated Development Plan 2018-2022



## 10 APPENDICES

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

## APPENDIX 1 – MINUTES OF THE MEETING HELD



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

Date: 18/01/2022

Time: 11:40am

Venue: KIBISH VILLAGE

#### PRESENT

#### 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	
	<p>The meeting started at 11:40am with a word of prayer from a village elder.</p> <p>The area chief introduced the village elders as he welcomed everyone to the meeting.</p> <p>The KOSAP team was introduced by the CREC</p>	



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Min 2/22	Opening Remarks	
	Mr. Esai described KOSAP and its components to the community. It was said that; KOSAP is funded by World Bank & implemented by the Ministry of Energy together with REREC and Kenya Power. The members were informed of the compensation method i.e compensation in-kind, whereby they discussed among themselves their prioritized project from either Health, Education, Water.	
Min 3/22	Remarks by the consultant	
	<p>Mr. Alan explained the main steps involved in ESIA such as identification of potential impacts &amp; benefits, stakeholder engagement &amp; public consultation, mitigation &amp; optimization measures.</p> <p>KOSAP benefits were also described e.g provision of reliable electricity, enhancement of trade/businesses, use of green energy; clean lighting and cooking solution e.t.c</p> <p>The consultant also explained the social impacts of KOSAP to the community such as; labour influx, child labour, elite capture, impacts on cultural heritage, the GBV and exclusion of VULGs e.t.c</p> <p>Ms. Lydia described the environmental impacts that might be brought by KOSAP. Some of these impacts include: environmental exposure to hazardous &amp; toxic materials, operations of standby Generators, impacts on Air Quality</p>	

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	<p>The consultants discussed the environmental and social mitigation measures such as the use of personal protective equipments, implementation of specific intervention for vulnerable to have equal access to project benefits &amp; opportunities, vegetation replanting to offset cleared vegetation.</p>	
Min 4/22	<b>Concerns / Issues/Recommendations from participants</b>	
	<p>Ekhalé Atana was concerned on the payment of the power. She was also concerned on whether there will be a committee for KASAP.</p> <p>Albert Udehame brought up the issue on illiteracy level within the community being high and that they lack knowledge of electricity.</p> <p>James Edeche was concerned on the project timelines and also whether the contractor was going to conduct public participation with the community regarding employment and payment.</p>	



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	<p>Dennis Ekitela was concerned on the means of waste disposal to be used by the contractor.</p> <p>Benron Mro engaged on the reliability of the project power)</p>	
<b>Min 5/22</b>	<b>Responses to concerns/issues raised</b>	
	<p>The consultant discussed that;</p> <p>The workforce will be given training towards proactive use of designated areas/bins for waste disposal and encourage the use of foilies, any soils potentially contaminated by chemicals, oils, fuels will be collected &amp; disposed off by a NEMA authorized waste-</p>	

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RURAL ELECTRIFICATION & RENEWABLE ENERGY  
CORPORATION

- handlers.
- Kosap is at its initial stages, as soon as approval is issued then the project will commence.
  - The Ministry of Energy & Kenya Power will manage the project & ensure that power is reliable to the beneficiaries.
  - The Kenya power will offer training upon completion of the project to equip the community on the usage and dangers of electricity.
  - During land acquisition process, the community had chosen a few members to form the Grievance Redress committee and one of their main roles will be to ensure that the local concerns raised regarding the project are promptly addressed by the proponent of the contractor.



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RURAL ELECTRIFICATION & RENEWABLE ENERGY CORPORATION


Min 6/22	Acceptance/Rejection of the project	
	All the members Accepted the project. as they all agreed on water articulation for their prioritized community project.	
Min 7/22	Adjournment	
	The Meeting adjourned at 1:41 pm with words of prayer from a village elder.	

Minutes Prepared By:  
Name: Umutkar Kaballe Date: 18-01-2022  
Position: ECIA Expert Signature: [Signature]


Minutes Confirmed By:  
Name: ASURU ESEKAY Date: 18-01-22  
Position: CHIEF Signature: [Signature]

THE CHIEF  
KIBISH LOCATION  
P.O. BOX 1  
KIBISH.


## APPENDIX 2 – PUBLIC MEETING PARTICIPANTS' LISTS



Kenya Power



PEREC



Ministry of Energy and Petroleum

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

Venue: Kisumu

Date: 18.12.2014


Time: 12:00pm

**List of Participants**

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	Enroni Enipon	Elder	M	N/A	
2.	Diko Ngaukan	Youth	M	N/A	
3.	Dennis Ekitela	Youth	M	0799828974	
4.	Abdinasir Muktar	Youth	M	0725935957	
5.	John Ekeno	Businessman	M	0795063714	
6.	David Krufu	Youth	M	0740482668	
7.	Patrick Ekaghe	Youth	M	0712749735	
8.	Samuel Epen	Youth	M	0720157871	
9.	Ehyen Eorek	Youth	M	0740833457	
10.	Evis Ebei Edome	Youth	M	0706187269	
11.	Lekomu Kgae	Youth	M	N/A	
12.	Benson Mro	Youth	M	0791215517	
13.	Elias Longorok	Youth	M	N/A	
14.	Nafar Ekkaran	Youth	M		

THE CHIEF NATION  
KIBISH LOCATION  
P.O. BOX 1  
KIBISH.

CENTRIC AFRICA



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BUSINESS AND MANAGEMENT CONSULTANTS



Ministry of Energy and Petroleum



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

Venue: Kisumu

Date: 18th Feb 2022

Time: 12:05 PM

**List of Participants**

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	Kamrin Clinton	Youth	M	0114009916	
2.	Kevin Ekal	Youth	M	0711502220	
3.	Charles Lesika	Elder	M	0799787475	
4.	Joseph Ediga	Security	M	0768763956	
5.	Emilia Elin	Youth	M	N/A	
6.	Frederick Loring	Elder	M	0729978609	
7.	Blanche Maida	Youth	M	0702214663	
8.	Julius Echaga	Security	M	N/A	
9.	Albert Loharant	Youth	M	0741696881	
10.	Love Ekarle	Youth	M	N/A	
11.	Loperox Ekaral	Youth	M	N/A	
12.	Joseph Labwin	Youth	M	33225656	
13.	Geoffrey Echugundu	Youth	M	0743769990	
14.	Sharif Makena	Youth	M	0779188287	



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AFRICA

THE CHIEF LOCAL GOVERNMENT  
KIBISHI  
P.O. BOX 1  
KIBISHI



Ministry of Energy and Petroleum



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

Venue: KIBISHI

Date: 18/07/2022

Time: 10:51 A.M

**List of Participants**

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	JOHN EKAL NACHEKO	YOUTH	M	0741594062	
2.	SAMUEL EDEM	YOUTH	M	0700157871	
3.	ALBERT LOMNAT	YOUTH	M	0741696881	
4.	NATELO ALBERT	YOUTH	M	070115861764	
5.	EKAI ETEMIO	YOUTH	M	0111560423	
6.	STEPHEN MACHU	YOUTH	M	0745316456	
7.	DENNIS EKITELA	YOUTH	M	0799803984	
8.	ESINYEN ECHAPAN	YOUTH	M	0769523471	
9.	GIAN EKWUM	YOUTH	M	0792184944	
10.	AKAAL JONATHAN	YOUTH	M	0707559162	
11.	EWESIT IKENY	YOUTH	M	27776254	
12.	JOSEPH LOBUIN	YOUTH	M	33225656	
13.	PHILEMON EREGAE	YOUTH	M	0742864841	
14.	DAVID ERUPE	YOUTH	M	0740432664	



KIBISHI  
P.O. BOX 1  
CENTRIC AFRICA



Ministry of Energy and Petroleum



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

Venue: Kisumu

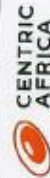
Date: 18/11/2024

Time: 12:00 PM

**List of Participants**

#	Name	Position/Institution/Business/Location	Gender M/F	Phone No. or ID No.	Signature
1.	AKOPE PEDD	HOUSE WIFE	F		<i>Tide</i>
2.	AKOPE EDEUKA	KIBISH	F		<i>Akopa</i>
3.	NAKAPURAE ELIM	KIBISH	F		<i>Nakopa</i>
4.	IKAPAE LOBAR	Kibish	F		<i>Ekihi</i>
5.	IMONI IDUNGH	Kibish	P		<i>Idini</i>
6.	SUNDAY LEKAT	Kibish	F		<i>Sunday</i>
7.					
8.					
9.					
10.					
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THE PROJECT LOCATION  
KIBISH LOCATION  
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Ministry of Energy and Petroleum



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

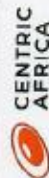
Venue: Kisumu

Date: 11/08/2023

Time: 12:00 PM

**List of Participants**

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	Umutheir A. Abdi	CENTRIC AFRICA	F	0795023954	
2.	Lydia Komen	Kenya W. LTD	F	077153720	
3.	Patrick Mwangi	ACC Kibisi	M	0716614997	
4.	Peter L. Ekechi	APS KIBISI	M	0720485119	
5.	Joseph Enob Ekan	VILLAGE ADMIN	M	0726135872	
6.	Kennedy Sherten	Min. of Energy	M	0722541122	
7.	Abdullah Owino	CENTRIC AFRICA LTD	M	0729929873	
8.	Elizabeth Kadu Simon	Clerical officer	M	0713516567	
9.	Asurui E. Robert	CITEF - KIBISI	M	0724798943	
10.	ABDI AUTELO	PBO - KIBISI	M	0718197729	
11.					
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Ministry of Energy and Petroleum



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

Venue: KIBISHI CHIEF OFFICE

Date: 15th August 2023

Time: 10:59 AM

**List of Participants**

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	ABDINISIR MUKTAR	YOUTH	M	0725935957	
2.	ELIAS E EDOMIE	YOUTH	M	0706187269	
3.	ELIAS N. KEVIN	YOUTH	M	0711500220	
4.	JOTHIN FLEMMING LOKOSINDA	YOUTH	M	0709423380	
5.	EKIRO EKAAHE	YOUTH	M	0706611324	
6.	KOMDIN CLINTON AMENIAE	YOUTH	M	0114069416	
7.	JUSUF FUCALADE	YOUTH	M	0727943438	
8.	EKOPE LOPONGOI	YOUTH	M		
9.	JOSEPH ECUARAT	YOUTH	M	0768762956	
10.	ELIAB EMURIA	YOUTH	M	07	
11.	KELVIN EKAI	YOUTH	M	074310952	
12.	JOHN LOTELIRO	YOUTH	M	0758041868	
13.	FRANCO LUNYAT	YOUTH	M	27946593	
14.	SHARIF MAKABA	YOUTH	M	0794828253	



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

Venue: KIBISHI VMT

Date: 18/12/2022

Time: .....

**List of Participants**

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	Eteke Kapxia	PLHDS	M		
2.	Akenex Lotio	PLHDS	M		
3.	Enefe Lokusio	old	M		
4.	Ekuu Napio	old	M		
5.	Nakimat Lokusio	old	M		
6.	Euprest Ng'oto	old	M		
7.	Chila Eki. Par	old	M		
8.	Kave Ekuu M	old	M		
9.	Lokoto Emusia	old	M		
10.					
11.					
12.					
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**ENVIRONMENTAL IMPACT ASSESSMENT PROJECT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES**

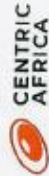
Venue: Kisumu

Date: 18/12/2021

Time: 12:00

**List of Participants**

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	Aron Longorok	Herdsman	M	N/A	<i>[Signature]</i>
2.	Ekonai Amui	Herdsman	M	N/A	<i>[Signature]</i>
3.	Mary Muli	FPO	F	0752959429	<i>[Signature]</i>
4.	Abu Kachiga	Woman	F	N/A	<i>[Signature]</i>
5.	Akuse Padi	Woman	F	N/A	<i>[Signature]</i>
6.	Norahet Kalabi	Woman	F	0703473355	<i>[Signature]</i>
7.	Nakidian Tokise	Woman	F	N/A	<i>[Signature]</i>
8.	Ikaal Lokai	Woman	F	N/A	<i>[Signature]</i>
9.	Betinda Afari	H/wife	F	0746065863	<i>[Signature]</i>
10.	Fusaly Arifa	Widow	F	070579158	<i>[Signature]</i>
11.	EUNICE NTPAO	Widow	F	0712730955	<i>[Signature]</i>
12.	Nakwai Koran	Woman	F	N/A	<i>[Signature]</i>
13.	Rebecca Enajeta	H/wife	F	0797136218	<i>[Signature]</i>
14.	Sunday Lokai	H/wife	F	N/A	<i>[Signature]</i>





Ministry of Energy and Petroleum



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

Venue: Kibish

Date: 18/12/2023

Time: 12:40

**List of Participants**

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	Nang'ol Comsenger	Widow	F	N/A	
2.	Kotama Amud	Youth	M	N/A	
3.	Lokwara Kohuro	Youth	M	N/A	
4.	Solomon Erong	Elder	M	0740925710	
5.	Asekwa Awasit	H/wife	F	N/A	
6.	Ethax Naichure	Widow	F	N/A	
7.	Mogot Nafese	Widow	F	N/A	
8.	Hautina Longelol	H/wife	F	N/A	
9.	Ekaale Naisgo	Widow	F	N/A	
10.	Nakafusan Felim	H/wife	F	N/A	
11.	Akope Ebeukha	Widow	F	N/A	
12.	Carlyss Ekaale	Youth	M	0977112106	
13.	Scholasica Lamudia	H/wife	F	32924984	
14.	Lokotonab Natchura	H/wife	F	N/A	



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

Venue: Kisumu

Date: 12/08/2024

Time: 12:00pm

**List of Participants**

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	Lokoro Eruuxia	Elder	M	N/A	
2.	Loring Lolea	Elder	M	N/A	
3.	Lochuga Byaga	Elder	M	N/A	
4.	Elim Lokale	Elder	M	N/A	
5.	Nakimat Lekahua	Elder	M	N/A	
6.	E. Erupe Lokisio	Elder	M	N/A	
7.	Lwesi Ntoto Okale	Elder	M	N/A	
8.	Ekaale Atara	Elder	M	N/A	
9.	Ethoya Echaaka	Elder	M	N/A	
10.	Osae Ekhunom	Elder	M	N/A	
11.	Chita Ekhunom	Elder	M	N/A	
12.	Ekuu Napayo	Elder	M	N/A	
13.	Ebonyo Akales	Elder	M	N/A	
14.	Ekaale Nangura	Elder	M	N/A	



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

Venue: Kisumu

Date: 11.11.2024

Time: 11:00

**List of Participants**

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	Isiine Namuton	Youth	F	0726057151	
2.	Kisraiah Atanoe	Youth	F	0797172093	
3.	Enock Nakawa Kigo	Youth	M	0741891069	
4.	Ilete Ewei	Widow	F	0768367414	
5.	Millicent Atabo Ekwee	H/w	F	0799787475	
6.	Akuwam Nanya	H/w	F		
7.	Ejem Ebeluka	H/w	F		
8.	Nangomo Ebur	Youth	F		
9.	Lokwa Naya Mankia	woman	F		
10.	Maisa Namompus	Woman	F		
11.	Nacheva Namuton	woman	F		
12.	Lokurio Nizukawoi	woman	F		
13.	Josephine Emujen	Youth	F	0701132397	
14.	Kosbur Lord Kokuwe	woman	F		



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

Venue: Kisumu

Date: 11/05/2023

Time: 12:00

**List of Participants**

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	Nawaste Namuton	Youth	F	0799771854	<i>[Signature]</i>
2.	Apua Ebun	Woman	F	-	<i>[Signature]</i>
3.	Ichiung Koriang	Woman	F	-	<i>[Signature]</i>
4.	Ajikon Kokure	Youth	F	-	<i>[Signature]</i>
5.	Nasurn Oppo	Woman	F	-	<i>[Signature]</i>
6.	Elizabeth Etirwage	Woman	F	-	<i>[Signature]</i>
7.	Adapel Namuton	Woman	F	-	<i>[Signature]</i>
8.	Ketape Ektela	woman	F	-	<i>[Signature]</i>
9.	Akai Nuyia	woman	F	-	<i>[Signature]</i>
10.	Nakheer Eteen	Aged	F	-	<i>[Signature]</i>
11.	John Rka	Youth	M	074594062	<i>[Signature]</i>
12.	MUHAMMED ASOJI NI	Youth entrepreneur	M	0702294372	<i>[Signature]</i>
13.	Ruthikai Kady James	clerical officer II	M	0713516567	<i>[Signature]</i>
14.	Nasirama Lobek Kogot	Youth	M	33781684	<i>[Signature]</i>



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# FOCUS GROUP DISCUSSION PARTICIPANTS LISTS



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

Venue: Kisumu

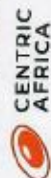
Date: 16/11/2016

Time: 12:30

### List of Participants

FGD NEW 16.11.2016

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	Nekwaga Nyangia	Elder	M	0714745541	
2.	Rzekel Loraapi	Elder	M	0729978609	
3.	Ejore Makach	Elder	M	079584996	
4.	Nakimat Lokakuaan	Elder	M	N/A	
5.	Ewert-Natoo Ekakale	Elder	M	N/A	
6.	Kare Ekunam	Elder	M	N/A	
7.	Chila Ekitor Loodu	Elder	M	N/A	
8.	Ekaaten Echakan	Elder	M	N/A	
9.	Erupe Lokyo	Chief Elder	M	N/A	
10.	Eragle Afaang	Chief Elder (Chairman)	M	N/A	
11.	Charles Losye	Kikuyu-Chairman	M	N/A	
12.	Lepwin Lodea	Elder	M	0799787475	
13.	Lochups Eyen	Herdsman	M	N/A	
14.	Elim Lokale	Elder	M	N/A	



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

Venue: Kisumu

Date: 14/11/2023

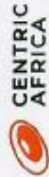
Time: 9:30 AM

**List of Participants**

FGD MEETING

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	Ebenyo Akantes	Elder	M	N/A	
2.	Refika Ekono	Businessman	M	0905063714	
3.	Lekorio Kapoko	Elder (HDC) Blind	M	N/A	
4.					
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**ENVIRONMENTAL IMPACT ASSESSMENT PROJECT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES**

Venue: Kibera

WOMEN

Date: 18/11/2020

Time: 1:30

**List of Participants**

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	PURITY AIPA	HOUSE WIFE	F	0707579158	<i>[Signature]</i>
2.	CECILIA EMEJEN		F	0746955066	<i>[Signature]</i>
3.	EUNICE NADAO		F	0712730955	<i>[Signature]</i>
4.	AJIKEN EBEI		F		<i>[Signature]</i>
5.	FAITH AKIRU		F	0710263486	<i>[Signature]</i>
6.	MARY MURWA		F	0702959429	<i>[Signature]</i>
7.	MARGARET KATABOI		F	0703475885	<i>[Signature]</i>
8.	SUSAN NASOIG		F	0703475885	<i>[Signature]</i>
9.	MARGARET KONIAT		F	0703475885	<i>[Signature]</i>
10.	NAKARU NATOO		F		<i>[Signature]</i>
11.	ABU KACHINGA		F		<i>[Signature]</i>
12.	PAULINA NANG'OLOL		F		<i>[Signature]</i>
13.	NALUNG AKALEET		F		<i>[Signature]</i>
14.	MARGARET NAPESE		F		<i>[Signature]</i>



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

Venue: KIBISHI

Address: KIBISHI

Date: 18/01/2022

Time: 12:55 PM

**List of Participants**

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	Mary Joseph Muliwa	Partner	F	0722389427	Mary Joseph
2.	Salomon Twarang	Member	M	0740725110	Salomon
3.	Margaret Katigira	Member	F	0703473388	Katigira
4.	Kachibah Abur	Member	F	0729025812	Abur
5.	Ezekiel Katigira	Member	M	0729516607	Ezekiel Katigira
6.	Nathan Njoroge	Member	M	0719745541	Nathan
7.	Ekalo Atang	Chairman	M		Chairman
8.	Engel Lokungu	Member	M		Engel
9.	ASUBUT EBEN ROBERT	CHIEF	M	0724799723	Robert
10.					
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**ENVIRONMENTAL IMPACT ASSESSMENT PROJECT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES**

Venue: KIBISHI VMC

Date: 18/1/2022

**List of Participants**

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	Ikwal Lokol		F	8599972	
2.	Akute Afana		F	93628830	
3.	Nakieten Kohu		F	-	
4.	Nachewa Namton		F	-	
5.	Nang'ole Lomaxang		F	072705552	
6.	Asekha Ewest		F	-	
7.	Etem Ebelubg		F	-	
8.	Afel R. imon		F	-	
9.	Magyet Kataba		F	0703475385	
10.	Mady Mula		F	0702959429	
11.	Solomon Eseng		M	0940825110	
12.	Abu Kachinga		F	-	
13.	Namait Ngimbe		F	38081096	
14.	Ezekiel Longo		M	07299978609	



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**Polucon**  
At your service

TEST REPORT NO: 202216010309B

SAMPLE	SOIL
DATE & PLACE SUBMITTED	08 <sup>th</sup> February 2022 at Polucon Laboratory, Nyali
DATE ANALYSIS STARTED	09 <sup>th</sup> February 2022
SAMPLING METHOD	N/A
MARKS	Turkana 2

TEST	METHOD	RESULTS	UNITS	CLIENT SPECIFICATIONS
<b><u>RTEX</u></b>				
Benzene	PQA/LIM/002	<0.01	mg/kg	-
Toluene	PQA/LIM/002	<0.01	mg/kg	-
Ethyl benzene	PQA/LIM/002	<0.01	mg/kg	-
Xylene	PQA/LIM/002	<0.01	mg/kg	-
<b><u>PAH</u></b>				
Naphthalene	PQA/LIM/004	<0.01	mg/kg	-
Acenaphthylene	PQA/LIM/004	<0.01	mg/kg	-
Acenaphthene	PQA/LIM/004	<0.01	mg/kg	-
Fluorene	PQA/LIM/004	<0.01	mg/kg	-
Phenanthrene	PQA/LIM/004	<0.01	mg/kg	-
Anthracene	PQA/LIM/004	<0.01	mg/kg	-
Fluoranthene	PQA/LIM/004	<0.01	mg/kg	-
Pyrene	PQA/LIM/004	<0.01	mg/kg	-
Benzo(a)anthracene	PQA/LIM/004	<0.01	mg/kg	-
Chrysene	PQA/LIM/004	<0.01	mg/kg	-
Benzo(b)fluoranthene	PQA/LIM/004	<0.01	mg/kg	-
Benzo(k)fluoranthene	PQA/LIM/004	<0.01	mg/kg	-
Benzo(a)pyrene	PQA/LIM/004	<0.01	mg/kg	-

-----End of test results-----

Mombasa Lab  
15<sup>th</sup> February 2022

Analyst

M. Bahati – Chemist



Where a statement of conformity is made, the following decision rules are applied not considering uncertainties: 'conform/complete' - Results are within limits while 'do not conform/complete' - Results exceed limits. This test report and/or certificate is issued subject to PricewaterhouseCoopers (PwC) Limited Standard Terms and Conditions, a copy of which is available on request, and cannot be reproduced except in full, without prior approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

NE: This report relates to submitted sample(s) only. The source and/or markings are as provided by the customer.

Polucon Services (Kenya) Limited

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GL8856

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 polycan@polycan.com

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1-800-733-2299

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Member of PDLUCON Group



ISO 9001:2015  
Certified



Designated  
Laboratory



Heat Treatment provided  
IPPC #E-015

TEST REPORT NO: 202216010310A

SAMPLE	WATER
DATE & PLACE SUBMITTED	08 <sup>th</sup> February 2022 at Polucon Laboratory, Nyali.
DATE ANALYSIS STARTED	09 <sup>th</sup> February 2022
SAMPLING METHOD	N/A
MARKINGS	Turkana 2

TESTS	TEST METHOD	RESULTS	UNITS	KS EAS 12: 2018: NATURAL POTABLE WATER SPECIFICATION
<b>PHYSICAL-CHEMICAL TESTS</b>				
Turbidity	APHA 2130 B	0.47	NTU	25 Max
*pH value	APHA 4500-H <sup>+</sup>	7.87	@ 25.0°C	5.5 Min – 9.5 Max
*Conductivity	APHA 2510 B	3200	µS/cm	2500 Max
Dissolved oxygen as DO	AOAC 973.45	6.50	mg/L	-
Temperature	APHA 2550	25.3	°C	-
<b>INORGANIC CONTAMINANTS</b>				
Nitrate as NO <sub>3</sub>	APHA 4500-NO <sub>3</sub>	27.00	mg/L	45 Max
Phosphates as PO <sub>4</sub>	APHA 4500-P E	<0.01	mg/L	2.2 Max
*Manganese as Mn	APHA 3111B	<0.01	mg/L	0.1 Max
Mercury as Hg	APHA 3112B	<0.003	mg/l	0.001 Max
*Calcium as Ca	APHA 3111B	3.55	mg/L	150 Max
*Lead as Pb	APHA 3111B	<0.01	mg/L	0.01 Max
*Copper as Cu	APHA 3111B	<0.01	mg/L	1.0 Max
Arsenic as As	APHA 3114 B	<0.01	mg/L	0.01 Max
*Cadmium as Cd	APHA 3111B	<0.003	mg/L	0.003 Max

\*\*\*\*\*End of test results\*\*\*\*\*

**Comment:** Based on the above tests only, the water does not conform with the referenced specifications for natural potable water due to high conductivity.

Mombasa Lab  
15<sup>th</sup> February 2022

Analyst

  
E. Wambughu – Chemist



\*Indicates test(s) covered under the KENAS accreditation schedule while "+" indicates test(s) subcontracted to an approved Laboratory holding ISO/IEC 17025 accreditation.  
Where a statement of conformity is made, the following decision rules are applied not considering uncertainties: "conform/comply" – Results are within limits while "exceed limits" – Results exceed limits.  
This test report and/or certificate is issued subject to Polucon Services (P) Limited Standard Terms and Conditions, a copy of which is available on request, and, cannot be used to accept in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.  
\*Unless otherwise stated the results shown in this test report refer only to sample(s) tested and such sample(s) are retained for 90 days only (if non-perishable)."

NB: This report relates to submitted sample(s) only. The source and/or markings are as provided by the customer.

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Polucon Services (Kenya) Limited  
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☎ +254-741-4470775 ☎ +254-733-228945 🌐 www.polucon.com  
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Page 1 of 1

## **APPENDIX 4 – MINUTES OF LAND IDENTIFICATION MEETING**

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### **MINUTES OF COMMUNITY CONSULTATION MEETING**

Minutes of the community consultation meeting held on 16/03/2021 at Kibish Village starting 12:15pm

#### **AGENDA**

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

In attendance (refer to annexed list of participants)

#### **MIN 1.0 WELCOMING AND OPENING**

Ezekiel Lorogoi welcomed the KOSAP team to the meeting and invited them to address the community.

The visiting team introduced themselves as following;

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

#### **2.0 KOSAP AND KIBISH MINI GRID**

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

She said KOSAP entails the following components;

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

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

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

### **3.0 PROJECT LAND REQUIREMENTS: RIGHTS AND ENTITLEMENTS OPTIONS AND IMPLICATIONS**

The Surveyor, Ms. Agnes Gachoki told the Baraza that the main purpose of the Baraza was to seek community consent for land donation for the project. Land required for the construction of the Mini grid is 1.219 ha. Land in Kibish, falls under the Community land category. It is yet to be registered, has no title but is jointly owned by the community. Its use and management is governed by the Community Land Act 2016.

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

#### ***VLD criteria***

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

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

1. They can refuse to donate the land.

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

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

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

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

#### **4.0 PROJECT TECHNICAL DESCRIPTION, WIRING, CONNECTION AND PAYMENTS**

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

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

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

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

#### **MIN 5.0 SOCIAL AND ENVIRONMENTAL ISSUES**

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

##### **Potential positive impacts:**

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

##### **Potential negative impacts:**

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

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

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

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

## **6.0 GRIEVANCE RESOLUTION COMMITTEE (GRC)**

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

The following details shall be recorded for each grievance reported; and a close-out form issued to indicate the grievance registered has been closed.

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

## **Existing indigenous grievance redress mechanism**

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

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

The summary of the comments/remarks from the community in the meeting held at Kibish on 16/03/2021

#### QUESTION/COMMENTS ANSWER/REMARKS

QUESTION/COMMENTS	ANSWER/REMARKS
<b>Charles Losike (youth)</b> 1. Iko mashamba mingi hii area hakuna amegawia watu- Hii area huwa inakaa ichomeke Chomeka sasa si mradi utachomeka. 2. We are willing to get donate land. 3. Will you sub divide land for us so that each gets their own plot	Plot will be fenced  Noted.  It is not within our mandate to do land subdivision
<b>Babale Ngorok- Youth</b> Qns- Hii kijiji lazima ibomolewe kila mtu aende kwake, Msiweke stima kwa kijiji , itachomeka.	Noted.
<b>Akah Kokure ( Men)</b> Tumesikia maneno ya stima vile mumeeleza. Stima naelewa ni moto kubwa. Watu moja moja ndio wanaelewa juu ya stima . People live in the area. All houses are close to one another .Better to put on street lights.	Contractor to educate community on safety
<b>Ezekiel Orogoi ( Men)</b> Kuna watu wako na nyumba za nyasi wengine mabati at the same place – No one has plot how will connection be done?	Everyone will be connected irrespective of nature of buildings.
Brandon Ereng- Youth Project ikikuja – kuna watu Wako skills- How will they be assisted (electrical installation)	if you are skilled- you shall assist in electrical installation for community. Can also be employed by the project as an operator

## 7.0 FOCUS GROUP DISCUSSIONS

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

### FGD-MEN

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

Kioko them the FGD was a good avenue for the elders to express their opinions and freely ask any questions they might not have been unable to ask in front of the youth and women, He

said that at the end of the FGD discussion the group should come into consensus on issues discussed in the earlier meeting, select a representatives to the GRC. Matters agreed on and selected representatives would then be presented to the main meeting for adoption. The men said they had understood the project and did not have any further questions. They nominated the following to the GRC

Name	ID number	Telephone number
Macho eyanae lokai	24300924	Un available
Ekale katana alokou	8599672	Un available

## FGD-WOMEN

A focus group discussion was held with women. The main objective of this discussion was to gauge whether the women had understood the project and its requirements and to provide them an opportunity to air their issues/give their opinions on the project. Myra explained to the women that it was important to hold a separate discussion with them so that they have opportunity to freely express themselves as this may have not been possible in the Baraza. The women were allowed time to ask questions, give suggestions and or seek clarifications.

From the questions in the group, it was clear that they had not understood the issue. Myra then explained that the meeting was to clarify any issues about the project on environmental and social issues as well as request land donation from the community. She explained further that the Ministry wanted land for was to construct a solar minigrid.

### *Question, Suggestions, feedback and response for focus group discussion with Women*

Name of Person making the contribution (e.g. comment or question)	Question, Comment, Suggestion	Feedback/Responses by project team	Response by agency on how feedback will be used or acted upon
Mary Mulwa	How many households will benefit and how much will be charged or is the power free?	Myra responded that all households within a 3km radius of the minigrid will be connected. A KES 1,000 connection fee will be charged then the household will be paying for the amount of electricity that they use	
Mary Mulwa	Why do we have to sign the land donation forms?	Agnes responded that the forms provide evidence that the community has agreed to donate land out of free will	
Apur Kokure	Apart from the electricity what will you give the community? We would like a secondary school built, water, hospitals	Myra responded that nothing will be provided for free but we will take this feedback to our managers. Please	In future consider providing benefits to the community

Name of Person making the contribution (e.g. comment or question)	Question, Suggestion	Comment,	Feedback/Responses by project team	Response by agency on how feedback will be used or acted upon
			remember the benefits that having electricity will bring	
	Also please put electricity in the forest. It can be along the road. This will help keep away bandits that come to the village and enhance security.		She further responded that electricity will be put along the forest so long as it falls within the 3km radius	

After the discussions in the FGD for women, Myra requested that they elect 2 women to the GRC

The women nominated were:

Name	ID number	Telephone number
Mary Mulwa	1344683	0702959429
Apur Kokure	9673718	0729026812

#### FGD YOUTH

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

Name	ID number	Telephone number
Meyen Lobwar	33671396	0703488115
Akiru Emunyen Yomer	27362069	-

#### 8.0 REVIEW OF FEEDBACK FROM FGDS BY ALL COMMUNITY MEMBERS

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

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

The community nominated the following as members of the GRC:

No	Name	Design.	ID No.	Mobile No.
1	Mary Mulwa	WOMEN	1344683	0702959429
2	Apur Kokure	WOMEN	9673718	0729026812
3	Meyen Lobwar	YOUTH	33671396	0703488115

4	Akiru Emunyen Yomer	YOUTH	27362069	-
5	Macho eyanae lokai	MEN	24300924	-
6	Ekale katana alokou	MEN	8599672	-



## REPUBLIC OF KENYA

### MINISTRY OF ENERGY

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

SITE ..... KIBISHI

MEETING VENUE ..... KIBISHI

DATE ..... 16/03/2021

#### LIST OF ATTENDANCE/PARTICIPANTS LIST (PARENTS)

















No	NAME	Identification number-ID No	Mobile No.	Gender Male/Female	Village	Do you agree to donation of land Yes/no	SIGN.
1.	SHARIF MAKABA	33702911	0794828753	M	KIBISHI	YES	
2.	NAKULAN NYANQA	21645784	0714745411	M	KIBISHI	YES	
3.	JAMES EYEN	9245953	071644965	MM	KIBISHI	YES	

ID No	Name	Sex	Village	Land Ownership	Sign
4	STANLEY MOUNI LUTUNGA	MALE	MUNDO PETA	YES	
5	ARIDNG KOSUR	FEMALE	MUNDO PETA	YES	
6	PAUL TAMONI KATE	MALE	MUNDO PETA	YES	
7	ANUPE EGEJUMA NEPAMU	FEMALE	MUNDO PETA	YES	
8	IZIKIRINT EKUNDA LOPAN	MALE	MUNDO PETA	YES	
9	AKAI LAIABOI MARGARET	FEMALE	MUNDO PETA	YES	
10	DEANIS EKITELE	MALE	MUNDO PETA	YES	
11	MARY JOSEPH MULWA	FEMALE	MUNDO PETA	YES	
12	APUR KOKORE	FEMALE	MUNDO PETA	YES	
13	KONSEPT MUDINI EIPA	FEMALE	MUNDO PETA	YES	
14	CICILIA BUISITATE GABEN	FEMALE	MUNDO PETA	YES	
15	HABIBIA ATIMED SHUPA	FEMALE	MUNDO PETA	YES	
16	RETOCCA NAMUNDAF DUDU	FEMALE	MUNDO PETA	YES	
17	NATIAOR KORIYE EDMAH	FEMALE	MUNDO PETA	YES	
18	KOBUEIN KATERO EION	FEMALE	MUNDO PETA	YES	



DO NOT  
WRITE IN  
THIS SPACE

	NAME	ID	Photo	Gender	Wage	Donation	Sign
19	PHUMU KAKUO KAREAE	29189871	X	Female	Female	12	
20	BOAE KUIE BUCIKON	21595884	X	Female	Female	15	
21	PHUMOPU BUCIKON	108777	091526001	Female	Female	15	
22	NATCI ROSENTEL MINWA	33659533	0916701794	Female	Female	18	
23	AEIUM BSA DAPA	2352187	-	Female	Female	15	
24	MOROT ATABO KOBORON	32262312	-	Female	Female	15	
25	KAT BUIRE BUCIKON	3614749	-	Female	Female	15	
26	SEIINA ABOE KONGOLE	0736208	-	Female	Female	15	
27	KOTON KOUNATE LEBERERE	07362106	-	Male	Male	15	
28	SAGATA BUCIKON	256344229	072444246	Female	Female	15	
29	AMOLEER NAWATA LEBERERE	25705988	0702785285	Male	Male	15	
30	MOROT - JUSUP BUCIKON	34524039	07 -	Female	Female	15	
31	EYAWANE AGNU BUCIKON	33850248	-	Female	Female	15	
32	MOROT KUIE BUCIKON	28425909	-	Female	Female	15	
33	MOBUEA KUIE BUCIKON	20972896	-	Female	Female	15	

NAMES		ID		PHOTO NO	SEX	RELIGION	ILLUSTRATION	DO YES	Signature
34	LODWIN MAREKA TUKO	9336643	—		FEMALE	RELIG	YES	YES	
35	ANDEEN APEET TSENG	93659642	—		FEMALE	RELIG	YES	YES	
36	ABCHULA KOKUE EMOION	9380250	—		FEMALE	RELIG	YES	YES	
37	NAKUPE PEDO ATAMMA	9368830	—		FEMALE	RELIG	YES	YES	
38	ANONI LOTIENG LOTIWD	93799668	—		FEMALE	RELIG	YES	YES	
39	PIBIRARE EDABWE MAREKA	93673634	—		FEMALE	RELIG	YES	YES	
40	KAPLENG EKUPE LEKOT	93648610	—		MAL	RELIG	YES	YES	
41	KATO EMOION	93368907	—		FEMALE	RELIG	YES	YES	
42	NAUUT EMOION LEKOT	93365616	—		FEMALE	RELIG	YES	YES	
43	DORCELS LOKO NHEUWA	93149233	—		FEMALE	RELIG	YES	YES	
44	LOTIENG KOKUE EMOION	93812445	—		FEMALE	RELIG	YES	YES	
45	KATIEE TUKA EKAL	93714110	—		FEMALE	RELIG	YES	YES	
46	ANONI MAREKA EMOION	93799668	—		FEMALE	RELIG	YES	YES	
47	NAKOLET LOKUE EMOION	93679466	—		FEMALE	RELIG	YES	YES	
48	PAZABERU ATAKO KOTIWD	93102200	—		FEMALE	RELIG	YES	YES	

ID	Name	Phone No	Gender	Village	Do you have an identification card?
49	NBICHIRAI ZEPPE KACUARO	821404808	Female	Apetani	Yes
50	Jakomoro Ntari Ruisi Legera	83600763	Female	Apetani	Yes
51	Amuram Ntisi pami Killet	80418556	Female	Ntice Dak	Yes
52	CECILIA ASIBITAP	81826879	Female	KIBISH	Yes
53	Arub Gacholi	11599322	Female	Wag	Yes
54	Koko Maitya	10924668	Male	Wag	Yes
55	LAWENCE Lokmura	8366366	Male	LOBNOR	Yes
56	LENE KAUICA	26961056	Female	HAICOB	Yes
57	Nyira Mukulu	81796390	Female	NAB	Yes



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SITE ..... KIGISH

MEETING VENUE ..... KIGISH

DATE ..... 16/03/2021

#### LIST OF ATTENDANCE/PARTICIPANTS LIST (9611421)

No	NAME	Identification number -ID No	Mobile No.	Gender Male/Female	Village	Do you agree to donation of land Yes/no	SIGN.
1	ANNA KIMKOPU JENGERANA	33668232	-	Female	RENUG	YES	
2	NABURA LOSANTAT TIBOYE 33812150		-	Female	RENUG	YES	
3	AKAI MUTH KOKIO	8579339	-	Female	RENUG	YES	



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MINI-GRID FOR COMMUNITY FACILITIES, ENTERPRISES, AND HOUSEHOLDS.

SITE ..... KIGISH

MEETING VENUE ..... KIGISH

















DATE ..... 16/03/2021

#### LIST OF ATTENDANCE/PARTICIPANTS LIST (9611421)

No	NAME	Identification number -ID No	Mobile No.	Gender Male/Female	Village	Do you agree to donation of land Yes/no	SIGN.
1	ANNA KIMKOPU JENGERANA	33668232	-	Female	RENUG	YES	
2	NABURA LOSANTAT TIBOYE 33812150		-	Female	RENUG	YES	
3	AKAI MUTH KOKIO	8579339	-	Female	RENUG	YES	



ID	Name	Sex	Age	Marital Status	Religion	Education	Employment	Do you have a mobile phone?
49	Ngũgĩthuri Ezeke Kachani	Male	21/04/2002	Single	Protestant	Primary	Yes	Yes
50	Jakomanga Nthirauo Lusaka	Female	33/02/1973	Married	Protestant	Primary	Yes	Yes
51	Amunon Nthirauo Kiliat	Female	20/08/2000	Single	Protestant	Primary	Yes	Yes
52	Cecilia Asiri	Female	31/02/1979	Married	Protestant	Primary	Yes	Yes
53	Arus Chetoni	Male	11/05/1932	Married	Protestant	Primary	Yes	Yes
54	Koko Maiti	Male	10/02/1966	Married	Protestant	Primary	Yes	Yes
55	Lanreus Lokman	Male	03/06/1977	Married	Protestant	Primary	Yes	Yes
56	Leone Kachani	Female	26/06/1956	Married	Protestant	Primary	Yes	Yes
57	Mura Muriu	Female	21/06/1990	Married	Protestant	Primary	Yes	Yes

NAME		ID			No	Gender	Village	Age	Signature
4.	MUTHON THERAPY EXHIBIT	3815704	-	-		Female	BEHLE	70	
5.	NAWATOT LOKUWU	25020672	0748929228	-		Female	BEHLE	70	
6.	DOLU EDHAP LOKHAPU	30444068	-	-		Female	BEHLE	70	
7.	NAWATOT EXHIBIT LOKH	33657288	-	-		Female	BEHLE	70	
8.	POBET MENTEN EXHIBIT	33988433	-	-		Male	BEHLE	70	
9.	NAWATOT LOKHAPU	33783368	-	-		Female	BEHLE	70	
10.	NAWATOT MENTEN EXHIBIT	12910211	0706651675	-		Female	BEHLE	70	
11.	AKAT EXHIBIT EXHIBIT	21303014	-	-		Female	BEHLE	70	
12.	AKAT LOKHAPU EXHIBIT	21128261	-	-		Female	BEHLE	70	
13.	EXHIBIT MENTEN EXHIBIT	37282256	0745933014	-		Female	BEHLE	70	
14.	STANLEY EXHIBIT EXHIBIT	33228838	-	-		Female	BEHLE	70	
15.	AKAT MENTEN EXHIBIT	30270803	-	-		Female	BEHLE	70	
16.	ONKONON EXHIBIT MENTEN	36620695	-	-		Female	BEHLE	70	
17.	NAWATOT LOKHAPU EXHIBIT	10123544	-	-		Female	BEHLE	70	
18.	AKAT EXHIBIT EXHIBIT	25114817	-	-		Female	BEHLE	70	



NMDC

ID


NB

Approved

Valley

for use on land, Pongorwa Shw

19	MARSHET AMORE	20490828	-	P	AMMO	YES	<del>YES</del>
20	EMATA ADAM PEOPLE	29195335	-	P	BEHOLD	YES	<del>YES</del>
21	KHANYINDI LOPOTNAI BEGAB	33859844	-	P	AMMO	YES	<del>YES</del>
22	LOPICE LOKABE ZOKOROR	4791927	-	P	AMMO	YES	<del>YES</del>
23	THUVERI EXOZ LOPOMIR	87348860	-	P	AMMO	YES	<del>YES</del>
24	AROBANYIT 14441 NALUYEN	20309991	-	P	AMMO	YES	<del>YES</del>
25	EDZABEBOU NALUYEN	27364571	-	P	AMMO	YES	<del>YES</del>
26	AMMO KHAKER EUGET	27218089	-	P	AMMO	YES	<del>YES</del>
27	LOYE EDOES EUGION	80490189	-	P	AMMO	YES	<del>YES</del>
28	LEWET EGET ACHYU	20423222	0794951684	P	AMMO	YES	<del>YES</del>
29	LETC BODI LOMININ	20469809	0768367414	P	AMMO	YES	<del>YES</del>
30	AMMO EDOES LOPOROR	36081096	-	P	AMMO	YES	<del>YES</del>
31	ARLEHAT NALUYEN	33720111	-	P	AMMO	YES	<del>YES</del>
32	MAKUA KITE EDOES	20495010	-	P	AMMO	YES	<del>YES</del>
33	MAKUL LOTECE ACHYU	21462766	-	P	AMMO	YES	<del>YES</del>

NAME		ID			NO	MEMBER VILLAGE	DO T-60	Any	long	house	5/5/5
34	RENZA AWEKENG.	33850261	-	P	AWALE	YES	<del>that</del>				
35	KOLWIN EDAPAK JETHAPPA	343920433	-	P	RENJA	YES	<del>that</del>				
36	AKAK AKIRI APOROTO	31346126	-	P	AKHUE	YES	<del>that</del>				
37	AFAPAK NAPPILAKA RUA	377833000	-	P	AKHUE	YES	<del>that</del>				
38	AKIETAK LOTETE AKINNA	33850092	-	P	AKHUE	YES	<del>that</del>				
39	ADUKAN ENEDEN AKUWE	29371213	0995818201	P	AKHUE	YES	<del>that</del>				
40	EDEN ENEDEN ENEDEN	37822822	-	P	AKHUE	YES	<del>that</del>				
41	AKO LOTULE ATINNA	11573017	-	P	AKHUE	YES	<del>that</del>				
42	ESOPAK ENANATI ENANATI	9336754	-	P	AKHUE	YES	<del>that</del>				
43	MAKOT ANUEET AKHUE	20378718	-	P	AKHUE	YES	<del>that</del>				
44	TIMANU KOPERANU ENANATI	27388182	-	M	AKHUE	YES	<del>that</del>				
45	MOEKORAK ENANATI	24447732	-	M	AKHUE	YES	<del>that</del>				
46	ADOKOT KAKA LOTULE	37140700	-	P	AKHUE	YES	<del>that</del>				
47	AKUWE KAKA LOTULE	38664678	-	P	AKHUE	YES	<del>that</del>				
48	KANIAN KAKA LOTULE	30763322	-	M	AKHUE	YES	<del>that</del>				





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MINI-GRID FOR COMMUNITY FACILITIES, ENTERPRISES, AND HOUSEHOLDS.

SITE ..... K.BUH

MEETING VENUE ..... K.BUH

DATE ..... 16/3/21

FGD → MEM

### LIST OF ATTENDANCE/PARTICIPANTS LIST

No	NAME	Identification number - ID No	Mobile No.	Gender Male/Female	Village	Do you agree to donation of land Yes/no	SIGN.
1.	ETIKA Lokotor	8560597	0799978609	M	mbury pari	Yes	
2.	ETENGO ETOMES	12436991		M	Adude	Yes	
3.	YKant mwarao	38064382	07	M	Nakron mwarao	Yes	



4.	John Abeno	11512991	0795063314	M	Ngikent- Aak	Yes	<del>Heard</del>
5.	Elin Lopanga	30963229		M	Nikoveri mobile	Yes	<del>Heard</del>
6.	Nedale Lopanga Elin	34340986		M	Nidomon mobile	Yes	<del>Heard</del>
7.	Nusag Ekalo	25942316	0722942348	M	Mlungo phone	Yes	<del>Heard</del>
8.	Ekelali Kokue	33850563		M	ngikindak	Yes	<del>Heard</del>
9.	Enoi Lokulan	39140292		M	ngikindak	Yes	<del>Heard</del>
10.	Lokula Amot	33853735		M	Nidomon mobile	Yes	<del>Heard</del>
11.	Koyesa Arikafe	4791829					<del>Heard</del>
12.	Ekin Ntopya	8599840		M	Mlungo phone	Yes	<del>Heard</del>
13.	Empe lokutis	39142684		M	Akula	Yes	<del>Heard</del>
14.	Norinuri Akut	20181596		M	Mlungo phone	Yes	<del>Heard</del>
15.	Lokai Ekekon	8738584		M	Nidomon	Yes	<del>Heard</del>
16.	Ekoyn lopadko	33659469		M	Nidomon	Yes	<del>Heard</del>
17.	Kake Ekuon	99095150		M	Mlungo phone	Yes	<del>Heard</del>
18.	Eikale Kutua	8599692		M	Akula	Yes	<del>Heard</del>



19	Donyino Atani	12910116		M	Natpol men male	Yes	
20	Kokoro Kakelue	214230604		M	Natpol non mobile	yes	
21	Ekin Naleyd	33212170		M	mlngo jess	yes	
22	Edung Kokure	201420252	0799-70224	M	mykenline	yes	
23	Charles Isake	22564256	074898534	M	"	yes	
24	Lokoya Edaki	27362131		M	mlngo jess	yes	
25	Ekin Ariapa	33644975		M	Achule	yes	
26	Lochupa Eyen	33184456	079417224	M	Achule	yes	
27	EBENYO MBISA	32196263	0703214663	M	mlngo	yes	
28	mlu-ya Akwoto	33779341		M	mlngo	yes	
29	JOTHN ETOLE	23546941		M	mlngo	yes	
30	mbaka EYANKE	24300924		M	mlngo	yes	
31	EKEUDE NMANEKUPUR	22665289		M	mlngo	yes	
32	Ekinu-eh EBENLE	21324861	074092510	M	mlngo	yes	
33	EDOPAT KOOTURUP	21305465		M	mlngo	yes	



19	Donyino Atani	12910116		M	Natpol men male	Yes	
20	Kokoro Kakelue	214230604		M	Natpol men mobile	Yes	
21	Ekin Naleyd	33212170		M	Naleyo yes	Yes	
22	Edung Kokure	201420252	0799-70224	M	Nykenkue yes	Yes	
23	Charles Isake	22564256	074898534	M	"	Yes	
24	Lokoya Edaki	27362131		M	Nleugo yes	Yes	
25	Ekin Ariapa	33644975		M	Nthule	Yes	
26	Lockupa Eyen	33184456	079417244	M	Adale	Yes	
27	EBENYO MBISA	32196263	0703214663	M	Neluen	Yes	
28	ngurua Akwoto	33779341		M	Neluen	Yes	
29	JOTHN ETOLE	23546941		M	Neluen	Yes	
30	maeta EYANKE	24300924		M	Neluen	Yes	
31	EKEKE NMADEUPUR	22665289		M	Neluen	Yes	
32	Ekinueta EBENLE	21324861	074092510	M	Nykenkue	Yes	
33	EDOPAT Kooturup	21305465		M	Neluen	Yes	

2



34	EDRE ELIM MAKABA	25064252	0799584996	MALE	ACHUKUE	YES	<del>INTERVIEW</del>
35	JULIUS EKIPOR	9673720		MALE	NETERDOK	YES	<del>YES</del>
36	METEN LOBUEL	33671396	070348815	MALE	NETERDOK	YES	LONG
37	EKA LOKURE ENOTON	8908074		MALE	NETERDOK	YES	KNOW
38	EMONI EKIPOR LOYE	33672685		MALE	NETERDOK	YES	KNOW
39	EKOPÉ LOFONGOE MUYA	27362170		MALE	NETERDOK	YES	KNOW
40	ERON ESEM EKABELI	37218040	0744428414	MALE	ACHUKUE	YES	KNOW
41	LOTIENO LIMAN EYINAE	24499682		MALE	NETERDOK	YES	
42	NAMILIK ELIM LONDELLO	10128596	0748929267	MALE	NETERDOK	YES	
43	LOOLE ELIM NABIMEL	20230760		MALE	NETERDOK	YES	
44	LOKAE LOKEREDE ERUMA	4777729		MALE	NETERDOK	YES	
45	LOKURE NAKILA			MALE	NETERDOK	YES	
46	NALUMBN NYANGA	21645782	071474554	MALE	NETERDOK	YES	
47	ETABA LOKOU	27546593	0758320389	MALE	NETERDOK	YES	KNOW
48	KIDKO MALLA	10924666	072217657	"	NETERDOK		



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SITE Kibish

MEETING VENUE Kibish

DATE 16/3/2021

#### LIST OF ATTENDANCE/PARTICIPANTS LIST (Ferd Wony)

No	NAME	Identification number -ID No	Mobile No.	Gender Male/Female	Village	Do you agree to donation of land Yes/no	SIGN.
1.	EMUTONO EREGAE EMOI	27377384	NIL	FEMALE	MLANCO PESA	YES	
2.	AKONGAT KOGULEI KAKALEL	37242800	NIL	FEMALE	MLANCO PESA	YES	
3.	KABONGIRO LOKIENT NYAYOLAK	33659520	NIL	FEMALE	NATODD MERI	YES	



4.	NARIION XOKURE EMOION	33659638	NIL	FEMALE	Village	
5.	NKALU NAIRO EBEI	11512984	NIL	FEMALE	Kibishi	yes
6.	PURITY EIPA ESINTEN	28556057	NIL	FEMALE	Kibishi	
7.	EUNICE NAIRO LOLEM	23690687	NIL	FEMALE	Kibishi	NAIRO
8.	ECHOTO LOKALEI LOKERE	20773973	NIL	FEMALE	Kibishi	
9.	ABANTO LONGOKK ATMANA	20857410	NIL	FEMALE	Kibishi	
10.	ATEKEI EKALE NAIKITO	33657754	NIL	FEMALE		
11.	EREGAE LOTINGAKOLE LOKME	27363094	NIL	FEMALE		
12.	ARORONTIT AMULI ICTOR	34341928	NIL	FEMALE		
13.	REBECCA EYENAE AKIBOR	33710878	NIL	FEMALE		
14.	NAPEIMONG ATANAKK EMOION	12910173	NIL	FEMALE		
15.	NGARAIOT BOTAGE NAIKIKULI	37225198	NIL	FEMALE		
16.	LOPBOKE KOBOLLE AMENTAE	30309818	NIL	FEMALE		dash
17.	ATUA EKUTAI ERUKAN	20418464	NIL	FEMALE		
18.	LOKORODO AKLEES LOKU	20204260	NIL	FEMALE		



19	AMZEE LOLMIKI IKIMAT	3942727	NIL	FEMALE			
20	LOKI EYELEL NAKAYEN	37364742	NIL	FEMALE			
21	NARIONDBUKU EGBENO NAKIMU	34438979	NIL	FEMALE			
22	AKAL ESEKON	24470835	NIL	FEMALE			
23	AKUKUBI LOSENY LOKUYA	27365254	NIL	FEMALE			
24	KANYING KARIWO KAI	27364549	NIL	FEMALE			
25	ARENQ EDOMTE IKARAN	33676518	NIL	FEMALE			
26	MUKI JOSEPH MULWA	1344683	0702957429 MKE	FEMALE			MKE
27	NABONGIRO ESEM EKABELI	9337973	0741428414	FEMALE			
28	AKISIL NAMUTOA SAMAL	33783483	NIL	FEMALE			
29	AKAI LOFETAMI EGBENYO	35673642	NIL	FEMALE			
30	AKAI KATIBOI MARGARET	23367821	0703475385	FEMALE			MKE
31	NARIMON ERENQ	24470820	NIL	FEMALE			
32	EPETA NARIMON NAIMOSIMKO	30762655	NIL	FEMALE			
33	AKOPE KARE LOBURE	37349141	NIL	FEMALE			



34	NASURU LOPO TITA	33781851	NIL	FEMALE			
35	PAULINA APWA	24524335	NIL	FEMALE			
36	ARENDIT KAROKO ESURON	33775095	NIL	FEMALE			
37	AKATEKELE ESEKON ITAGA	21426711	NIL	FEMALE			
38	AKUDOM EUDOI EREI	9673719	NIL	FEMALE			
39	KAROKO EVANAE LOCTAM	27963415	NIL	FEMALE			
40	MUYA LOKODONG	24479582	NIL	FEMALE			
41	AKITHIL NAMATE LOMODO	33850548	NIL	FEMALE			
42	EKOMOL EKOYEN ECHAKAI	21380413	NIL	FEMALE			
43	AYUHO EBULON NIGMBSINGO	20730778	NIL	FEMALE			
44	ROKALE EADUN KAKUDE	33644841	NIL	FEMALE			
45	NAKUKA ERUE LOMODOL	33659434	NIL	FEMALE			
46	AMURIA NIGMODE ENJAMMAL	30444085	NIL	FEMALE			
47	AKAM LOKATELE NIGICHIAE	33628838	NIL	FEMALE			
48	KABOI LOPOUDOI AKORI	27365582	NIL	FEMALE			



49	ADAPAL LOWA IKAI	33671378	NIL	FEMALE				
50	ASINYEN NUKURO	27537638	NIL	FEMALE				
51	APUR KOKORE EMBUTON	9673718	0729026812	FEMALE				

52. NAKENYI EIYEN NAKALI 4791928 NIL FEMALE

53. LOKUDA NGIMBE 27969178 NIL FEMALE

54. EKOEL EJOKE 10123536 NIL FEMALE

55. CILILIN AKAL 27362168 0743549210 FEMALE

56. PHYLIS ASOBT 24490525 0712642981 FEMALE

GRF



4	ATHLETIC CLUBS ECHWATHE	33761835	V/A	F	UBH	15
5	ATHLETIC CLUBS ECHWATHE	33659108	N/A	F	"	15
6	ATHLETIC CLUBS ECHWATHE	33659108	N/A	F	"	15
7	ATHLETIC CLUBS ECHWATHE	33659108	N/A	F	"	15
8	ATHLETIC CLUBS ECHWATHE	33659108	N/A	F	"	15
9	ATHLETIC CLUBS ECHWATHE	33659108	N/A	F	"	15
10	ATHLETIC CLUBS ECHWATHE	33659108	N/A	F	"	15
11	ATHLETIC CLUBS ECHWATHE	33659108	N/A	F	"	15
12	ATHLETIC CLUBS ECHWATHE	33659108	N/A	F	"	15
13	ATHLETIC CLUBS ECHWATHE	33659108	N/A	F	"	15
14	ATHLETIC CLUBS ECHWATHE	33659108	N/A	F	"	15
15	ATHLETIC CLUBS ECHWATHE	33659108	N/A	F	"	15
16	ATHLETIC CLUBS ECHWATHE	33659108	N/A	F	"	15
17	ATHLETIC CLUBS ECHWATHE	33659108	N/A	F	"	15
18	ATHLETIC CLUBS ECHWATHE	33659108	N/A	F	"	15



19	KAREE KACHUMBE	2935091	N/A	F	UBIJA	16-
20	KO KATO EUBODI SEBU	34427733	N/A	F	"	16-
21	KATIMWA LOTELWA	33852374	N/A	F	"	16-
22	KUWODA CTARA KOKA	33711428	N/A	F	"	15-
23	KUWOSA NAKA LA LELAYI	33603551	N/A	F	"	16-
24	CEGROTE KUMBE KUMBE	33534479	N/A	F	"	16-
25	ELUTAN CHILA	3365042	N/A	F	"	16-
26	GUN TOLBO LUNDARA	4777865	N/A	F	"	16-
27	UAPATE KETANU	33859113	N/A	F	"	16-
28	ADAPAL KUMUTON	23858435	N/A	F	"	16-
29	KUMODO WAKA LOPAT	27364567	N/A	F	"	16-
30	KATILUPIT KAMBO	33673828	N/A	F	"	16-
31	NACHICH ECHILES LOKU	38153522	N/A	F	"	16-
32	LOJWA LOKHALA	33704361	N/A	F	"	16-
33	LOTIWA NAKA KUMBE	33673467	N/A	F	"	16-



34	Mphahlela Likhutshwa	29388424	N/A	F	Likhutshwa	N/S.
35	ECHETO ECHETO	12436727	N/A	F	"	N/S.
36	NADINE MATHEU GADI	13647983	N/A	F	"	N/S.
37	LOKUNGE LOKUNGE MATHEU	23365758	N/A	F	"	N/S.
38	ADAPHE ECHETO LOKUNGE	34088726	N/A	F	"	N/S.
39	NADINE LOKUNGE MATHEU	24321316	N/A	F	"	N/S.
40	NADINE ECHETO MATHEU	23368734	N/A	F	"	N/S.
41	KBO ECHETO MATHEU	38659714	N/A	F	"	N/S.
42	ADAPHE MATHEU LOKUNGE	2849583	N/A	F	"	N/S.
43	ADAPHE LOKUNGE MATHEU	20433709	N/A	F	"	N/S.
44	KBO ECHETO MATHEU	30423834	N/A	F	"	N/S.
45	ADAPHE LOKUNGE MATHEU	6564582	N/A	F	"	N/S.
46	KBO LOKUNGE MATHEU	33483596	N/A	F	"	N/S.
47	MILICENT MATHEU LOKUNGE	33434284	299987475	F	"	N/S.
48	KBO LOKUNGE MATHEU	10125008	675809225	F	"	N/S.



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SITE ..... K/BUSH

MEETING VENUE ..... K/BUSH

DATE ..... 16/03/2021

IGD - YOUTHS

#### LIST OF ATTENDANCE/PARTICIPANTS LIST

No	NAME	Identification number - ID No	Mobile No.	Gender Male/Female	Village	Do you agree to donation of land Yes/no	SIGN.
1.	LOREA EKARE NGIMOE	27364553	0798799427	MALÉ	Mogadishu	YES	
2.	ESERON LOKOCIN AUEU	27999105	0701130017	MALÉ	Adirweri	YES	
3.	MIDRETO ASUYEBU BOMBI	33672536	0112532530	FEMALE	KARISUMUK	YES	



4.	JOSPHINE NIGHILAH EWEGBY	35429510	070132377	Female	Adunwa	yes	
5.	LOET AKUM EKUM	33001218	0794160025	Female	Adunwa	yes	
6.	MENEN LOBER	33671396	0703488115	Male	Adunwa	yes	
7.	EBBAYO NABONFOR	32196865	0703214663	Male	Adunwa	yes	
8.	JOHN EKAT NACHIKO	32203560	0741594062	Male	Adunwa	yes	
9.	FRANCIS KONET	27546593	0758320329	Male	Adunwa	yes	
10.	AKONTE AKUMOR NYABAN	33853241	0759397294	Female	Adunwa	yes	
11.	REGINA AGONYEN LAMUKUKA	27362191	0702285285	Female	Adunwa	yes	
12.	EKAKALE EKIM NABUET	23511295	-	Male	Adunwa	yes	
13.	ELA KOFENOR AKUMOR	37218859	-	Male	Adunwa	yes	
14.	EKIDOR EKEND EKAI	27381278	-	Male	Adunwa	yes	
15.	SAWETE ELEN CONLOR	31969156	0700159871	Male	Adunwa	yes	
16.	JOSEPH ECHAEART EKAKALE	24038715	0757992509	Male	Adunwa	yes	
17.	BRANDON LOTIRENTE EKERE	37514056	07691539812	Male	Adunwa	yes	
18.	NATIANO AKENAKU NYO	8560957	0716975394	Female	Adunwa	yes	

66. NABEED OGULET KAKALE 34292166 Female Adunwa yes  
 67. TEKORO EKALALE KAPKO 37855787 Male Adunwa yes  
 68. AZOE KAREBUE EBEI 21449758 Female Adunwa yes  
 69. VADADE EUNOR LAMUKUKA 21201220 Female Adunwa yes



19	ELIM KAUTON ABOBOKON	83995488	0791918914	Male	Mlang'o Pasa	Yes	Sti
20	KAMRINDELIGAL ROBE	39142765	-	Male	Adukale	Yes	Sti
21	KARON KIMAKA / LOUELO	30315932	0729894353	Female	Mlang'o Pasa	Yes	Sti
22	AKOGE ENET KIMOF	38081116	-	Female	Mlang'o Pasa	Yes	Sti
23	DAVID ENET ELOFE	33578121	0740432664	Male	Adukale	Yes	Sti
24	YAKALAE LOMANAT KLEET	30423956	0706010627	Male	Adukale	Yes	Sti
25	KLANOYS ANON KUAL	2856095	0709334892	Female	Mlang'o Pasa	Yes	Sti
26	AKESIT NAMUTON DAPAC	36667135	0709771859	Female	Katendak	Yes	Sti
27	ACHAKA NARIMON	23367617	-	Male	Katendak	Yes	Sti
28	CONCEPTA AKUKUE KAKI	33161211	-	Female	Katendak	Yes	Sti
29	VINCENT NIDEMOT	32206006	0792623607	Male	Adukale	Yes	Sti
30	ELIRO EKALIE KATANA	29368669	0706611324	Male	Adukale	Yes	Sti
31	AKIRU ENUNTEL YOMER	29362069	-	Female	Katendak	Yes	Sti
32	NAKODO LOYEE ATANNA	33477824	0713495902	Female	Mlang'o Pasa	Yes	Sti
33	EVERLASTE EYAPAN OMOMI	38155570	0713452290	Female	Adukale	Yes	Sti



34	NAAMANO GOBEN KOPET	93781684	07-01-01	Male	Adulthood	Yes	At
35	KASUNAT EBUR MYE	21426669	—	Female	Adulthood	Yes	At
36	NAKAPURAE EKIM KODS	30762354	07-13-624502	Female	Adulthood	Yes	At
37	ATA PEDD ATANA	27362115	—	Male	Minor	Yes	At
38	NAKUNA Kyo Ekok	34425197	07-14-891069	Male	Adulthood	Yes	At
39	PATRICIA IKAC EYANAE	36132010	09-07-172093	Female	Adulthood	Yes	At
40	ABU KATHANA KERO	26665761	07-09-218951	Female	Adulthood	Yes	At
41	KORE KOCHEUDE ETOKE	27364531	—	Male	Minor	Yes	At
42	DAMARIS EAUPE EMEJEN	31826567	09-16-002566	Female	Adulthood	Yes	At
43	ATERITE LOTANANMENA	37544938	—	Female	Adulthood	Yes	At
44	KANFICHEN Amoskion KOKUWA	24492057	—	Female	Adulthood	Yes	At
45	KOKHANI ENUVERA KOKUWA	24253877	—	Male	Adulthood	Yes	At
46	PALCENON TSEGTAE IKAT	27546364	07-10-741164	Male	Adulthood	Yes	At
47	JOSEPH KOBUN ENODOK	33226656	—	Male	Adulthood	Yes	At
48	ATYOT KOBUT MAMENO	2399535862	—	Male	Minor	Yes	At



49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66
KOSONO TEFON COMETEKIN	AGIKAN EGETI EBOITE	IBOBU MAKADA NABOBU	ETAGE KIM MAKADA	NABOBU KOKOKE JONTON	ANUEIA EGETI EBOITE	ATAYO EBOITE AITAM	NAITA TIKI EBOBU	ANUTEN KAYAN ABILA	LOTONI PEDO KATANA	AKOFE KAREBU EGETI	EBONON KAPANA	ADOME EGETI ECHAKA	MAZY KOTOME NAUTO	KONOBOK PEDO ATANA	AYEDEL EGIN NABOBU	EBUWA EBUWA NABOBU	KUNYAN EBUWA ECHAKA
24495749	33644802	21413329	25064252	39142045	11572949	33659829	29983335	21862530	10123553	28556004	23366543	29366094	4823124	33853821	22344298	33644856	32207914
—	—	090732296	099584996	—	—	—	—	097128125	—	—	—	—	090690706	—	—	0941987163	0969528494
Male	Female	Female	Male	Male	Female	Female	Male	Female	Female	Female	Female	Female	Female	Male	Male	Female	Male
Male	Male	Male	Male	Male	Female	Female	Male	Female	Female	Female	Female	Female	Female	Male	Male	Female	Male
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes



## REPUBLIC OF KENYA

### MINISTRY OF ENERGY

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

SITE Kidash

MEETING VENUE Kidash

DATE 16/3/2021

#### LIST OF ATTENDANCE/PARTICIPANTS LIST - FOCUSED GROUP DISCUSSIONS (Wananchi)

No	NAME	Identification number -ID No	Mobile No.	Gender Male/Female	Village	Do you agree to donation of land Yes/no	SIGN.
1	Elmale <del>Leah</del> Mwangi	3892762	N/A	F	Kidash	Yes	
2	Ausit Leah A	24490395	N/A	F	"	Yes	
3	Carien Eudith Wair	21392571	N/A	F	"	Yes	

**ABBREVIATED RESETTLEMENT ACTION PLAN****(A-RAP)****1. Kibish Sub-project Site**

The Kibish sub-project site is on unregistered community land and held in trust by the County Government of Turkana on behalf of the community, in line with the Community Land Act 2016. The proposed site is uninhabited, has no structures, community facilities, or incumbrances. The local community agreed for the project to utilize 1.219 hectares for the mini-grid. The minutes of the discussions including key agreements are annexed to the Kibish Environmental and Social Screening report. *Refer to Chapter 4 of the ESIA for the comprehensive socio-economic profile.*

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

The number of project-affected persons (PAPs) is 4592 (approximately 1816 households). The land acquisition-related impacts are loss of land and pasture. Mitigation measures include in-kind compensation for loss of land and pasture, and designing power distribution lines to avoid impacting trees, crops, structures, and community facilities. No physical displacement is anticipated; however, there is minimal loss of pastures occasioned by the acquisition of land utilized by the community for grazing. The 1.219 hectares identified for the sub-project will be acquired compulsorily by the National Land Commission (NLC). The proposed site will be valued and compensated in line with the provisions of the Resettlement Policy Framework (RPF) prepared under KOSAP. Refer to section 2.2 of the ESIA for the sketch map of the site.

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

The proponent requested the community identify three priority projects, whereby one out of the three would be provided as in-kind compensation for loss of land and pasture. The Kibish community requested the reticulation of water from Tuk-tuk borehole located 100m from the project site to the local community or construction of a maternity wing at Kibish GOK dispensary located 600m from the project site. The value of the priority community project will be proportional to or higher than the value of land under acquisition. In addition, loss or damage to crops, trees, structures, and community facilities will be compensated in line with the provisions of the RPF and as summarized in the entitlement matrix below.

**3.1 Entitlement Matrix**

Types of Impact	Person(s) Affected/Eligible for Compensation	Compensation/Entitlement/Benefits	Responsible organization
<b>1. Loss of Land</b>			
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.	
<b>2. Loss of Use on Land</b>			
Loss of use on public land (e.g., grazing, farming etc.).	Communities utilizing public land.	Communities do not own public land; however, they utilize public land with consent from the relevant agencies. The project will implement the infrastructure project prioritized by the community as compensation for the loss of public land use.	REREC
Loss of use on unregistered community land, unregistered group ranches	Communities utilizing unregistered community land, unregistered group	Compensation in-kind as prioritized by the community.	

and registered group ranches (e.g., grazing, farming etc.).	ranches, and registered group ranches.		
<b>3. Loss of /Damage to Assets on Land</b>			
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, <sup>1</sup> 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,

**Figure 1:** \_\_\_\_\_

<sup>1</sup> A cost basis that will yield compensation sufficient to replace assets, plus necessary transaction costs associated with asset replacement).

and the NLC land valuation process. The following sections provide a summary of the consultations.

#### 4.1 Engagement of Project – Affected Persons (PAPs)

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

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

#### 4.2 Identification of Community Representatives

The Kibish 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
16th March 2021	Environmental and Social Screening.  Voluntary land donation (VLD).	Ministry of Energy (MoE)  Rural Electrification and Renewable Energy	Site identification and land allocation for the sub-project.  Criteria for VLD.	Iko mashamba mingi hii area hakuna amegawia watu- Hii area huwa inakaa ichomeke Chomeka sasa si	Plot will be fenced  Noted.

	Constitution of the Locational Grievance Redress Committee (GRC).	Corporation (REREC) Kenya Power (KPLC)	Community entitlements (forms of compensation and implications for each).	mradi utachomeka. 2. We are willing to get donate land.  3. Will you sub divide land for us so that each gets their own plot  Why do we have to sign the land donation forms?	It is not within our mandate to do land subdivision       Agnes responded that the forms provide evidence that the community has agreed to donate land out of free will
				Apart from the electricity what will you give the community? We would like a feedback to our secondary school built, water, hospitals.	Myra responded that nothing will be provided for free but we will take this feedback to our managers. Please remember the benefits that having electricity will bring.
January 18th 2022	Environmental and Social Impact Assessment.	Consultants MoE REREC KPLC	Land acquisition through compulsory acquisition (not voluntary land donation).  Selection of three priority community projects, whereby one is to be implemented as in-kind compensation for land.	The Kibish community requested in kind development project by Reticulation of water from Tuk-tuk borehole located 100m from the site to the local community or Construction of a maternity wing at Kibish GOK dispensary located 600m from the site.	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	<ul style="list-style-type: none"> <li>Coordinate A-RAP implementation and provide budget for in-kind compensation.</li> </ul>
National Land Commission	<ul style="list-style-type: none"> <li>Implement the statutory process for compulsorily land acquisition, including site gazettement and inspections, inquiries, valuation, and award of compensation.</li> </ul>
REREC	<ul style="list-style-type: none"> <li>Monitor all land acquisition and compensation aspects (including A-RAP closure), complemented by a third-party monitor.</li> <li>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.</li> </ul>
Mini-grid Contractor	<ul style="list-style-type: none"> <li>Implement in-kind compensation concurrently with the solar mini-grid project.</li> </ul>
Supervising Consultant	<ul style="list-style-type: none"> <li>Monitor and report on implementation of in-kind compensation, and overall project compliance with social safeguards.</li> </ul>
Grievance Redress Committees	<ul style="list-style-type: none"> <li>Formed at the locational, county, and national levels, and responsible for resolving complaints, including A-RAP related grievances.</li> </ul>
A-RAP Implementation Committee	<ul style="list-style-type: none"> <li>Coordinate A-RAP engagements at the community level, monitoring A-RAP implementation and closure.</li> </ul>
Affected Community	<ul style="list-style-type: none"> <li>Responsible for the operation and maintenance (O&amp;M) of in-kind compensation project. An agreement stipulating the O&amp;M roles and responsibilities of the community will be effected.</li> </ul>

## 6. Procedures for Grievance Redress

The Project procedures for grievance redress were established through a public consultation process and informed by the existing conflict resolution structures in the community. The Grievance Redress Mechanism (GRM) comprises tiers at the project, county, and national levels. *Refer to Chapter 6 of the ESIA for a detailed GRM.*

## 7. Implementation Timetable and Budget for the ARAP Implementation

### 7.1 Timelines

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

### 7.2 Budget

The proponent has set aside KES 1 million for the community project (budget captured in the ESMP). The compensation award from NLC and the Bill of Quantities will inform

the final cost of the community project. The costs for in-kind compensation, stakeholder engagement, grievance management (including the facilitation of the GRCs and the A-RAP Implementation Committee), and monitoring are covered under the project.

## APPENDIX 7 – NEMA LICENCES

  
**nema**  
nadi ngiza yetu | ukat wetu | wajiba wetu

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/ERP1/18279  
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

