



**MINISTRY OF ENERGY  
REPUBLIC OF KENYA**

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT  
FOR THE PROPOSED BUBISA SOLAR MINI-GRID**



**PROJECT:** KENYA OFF-GRID SOLAR ACCESS PROJECT

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

**LOCATION :** BUBISA VILLAGE, BUBISA SUB-LOCATION,  
BUBISA LOCATION, NORTH HERR SUB-COUNTY  
IN MARSABIT COUNTY

**2023**

## CERTIFICATION

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

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### Disclaimer:

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

## **ACKNOWLEDGEMENT**

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## LIST OF ACRONYMS

AIDS	Acquired Immuno-Deficiency Syndrome
A-RAP	Abbreviated Resettlement Action Plan
CBO	Community Based Organization
CDI	County Development Index
C-ESMP	Contractor Environment and Social Management Plan
CGRC	County Grievance Redress Committees
CoC	Code of Conduct.
Covid 19	Coronus Virus Diseases 2019
CLO	Community Liaison Officer
CPR	Comprehensive Project Report
CPS	Country Partnerships Strategy
CRA	Commission on Revenue Allocation
CSO	Civil Society Organization
DL	Distribution Line
DOSHS	Directorate of Occupational Safety and Health Services
ECD	Early Childhood Development
EHS	Environmental and Health Standards/Environmental Health and Safety
ESHS	Environment, Social and Health and Safety
EMCA	Environment Management Coordination Act
EPRA	Energy and Petroleum Regulatory Authority
EPT:	Energy and Petroleum Tribunal
ESI	Electricity Supply Industry
ESIA	Environmental and Social Impact Assessment
ESMS	Environmental and Social Management System
ESMP	Environmental and Social Management Plan
FGD	Focus Group Discussions
GBV	Gender Based Violence
GDC	Geothermal Development Company
GRM	Grievance Redress Mechanism
HIV	Human Immunodeficiency Virus
HSMS	Health and Safety Management System
IA	Impact Assessment
KETRACO:	The Kenya Electricity Transmission Company

KII	Key Informant Interview
KOSAP	Kenya Off-Grid Solar Access Project
KP	Kenya Power
LEP	Labor & Employment Plan
LGRC	Locational Grievance Redress Committees
MoE	Ministry of Energy
MoH	Ministry of Health
MS	Management System
NEMA	National Environmental management Authority
NGOs	Non-Government organizations
NGRC	National Grievances Redress Committee
NLC	National Lands commission
OP	Operation procedures
OP/BP	Operational Procedures/bank policy
OSH	Occupational Safety and Health
OSHRA	Occupational Safety and Health Risk Assessment
PAP	Project Affected Persons
PLWDs	People living with disabilities
PPE	Personal Protective Equipment
RAP	Resettlement Action Plan
REREC	Rural Electrification and Renewable Energy Corporation
SA	Social Assessment
SEA/SH	Sexually Exploitation Activity/Sexual Harassment
SH	Safety and Health
SEP	Stakeholder Engagement Plan
STI	Sexually Transmitted Infections
TMP	Traffic Management Plan
TSC	Teachers Service Commission
VMGs	Vulnerable and Marginalized Groups
WB	World Bank's
WMP	Waste Management Plan

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### 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 Energy 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 Marsabit County, one of the target counties, the Proponent is proposing to develop 15 No. mini grid facilities including Bubisa 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 Bubisa 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 Bubisa 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 Baseline**

The proposed project site is in Bubisa village, North Horr sub-county-Marsabit County has an estimated terrain elevation above sea level of 575 metres. There are no water bodies i.e. rivers/streams in the area apart from a rain fed dam and water pan.

The area is characterized under Ecological Zone VI which is described as very arid/dwarf scrubland zone and experiences harsh climate conditions. The site is sparsely populated with low trees and shrubs. The ground surface at the site is flat lying with a very gentle slope towards east.

The soils in the project location are predominantly sandy soils with patches of clay soils. During the FGD with the women it was reported that a number of women in Bubisa have tried practicing agriculture through greenhouses although it has not been successful due to the types of soils in the area.

Due to the harsh climate the area suffers water scarcity and food security. The least amount of rainfall occurs in June. The average in this month is 1 mm. Most of the precipitation here falls in April, averaging 126 mm.

The temperatures are highest on average in March, at around 27.4 °C. July is the coldest month, with temperatures averaging 24.6°C. The variation in the precipitation between the driest and wettest months is 125 mm. Throughout the year, temperatures vary by 2.8 °C. The average rainfall and temperature are 33mm and 26°C, respectively.

The main tree species in the area include Acacia tortillis), Warra & Agarsu (Commiphora sp.), Mader (Cordia sp.), Ogomdi (Grewia sp.), Sukela (Delonix sp.), Dumasho (Maerua sp.),Tiile (Lannea sp.), Badan (Balanites sp.), Sigirso (Acacia reficiens), Adde (Salvadora persica), Wolena (Erythrina sp.), Garse (Dobera glabra), Lokho (Diospyros sp.), Karari (Sterculia africana), Harken (Euphorbia sp.).

The key wildlife species in the project area includes reticulated giraffes, elephants, Beisa Oryx, Grant's gazelles, gerenuk, Grevy's zebras, baboons, lions, leopards, greater kudu, buffalos, ostrich, spotted hyena, bat-eared fox, African wild dogs among others.

The nearest major town is Marsabit town approximately 47km from the site. According to the community profile information collected with the assistance of the Chief of Bubisa location, Bubisa sub-location has a population of approximately 6000 people with about 1000 households. The gender ratio is currently estimated at about 45% male and 55% female. The inhabitants are mainly pastoralists keeping livestock such camels, goats, sheep, and donkeys.

## **E.6 Project Description**

The Bubisa Mini Grid project aims to provide electricity to approximately 960 residential and 12 non-residential consumers in Bubisa Village at Bubisa Sub-location, Bubisa Location, North Horr sub-county in Marsabit County.

The project will utilize solar photovoltaic panels, a Battery Energy Storage System, and a Diesel Generator to generate electricity. A 25.44km Low Voltage Power Distribution Network will be established to distribute the power to customers. The project utilizes solar panels with a total capacity of 250 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 625kWh 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 175 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 250 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 760,035.56 although this amount may change as more detailed plans are developed.

The project consists of two main components: Hybrid Mini-Grids and power line reticulation lines. The Hybrid Mini-Grids will combine solar panels and diesel power generation. These energy sources will be integrated through a centralized photovoltaic plant connected to a 3-phase AC busbar line. The configuration is designed to prioritize direct supply from the solar generator during daylight hours, reducing reliance on battery storage. The battery storage will primarily be used when solar generation is low or demand is high. The construction of power line reticulation lines will ensure the efficient distribution of electricity to residential, commercial, and other consumers, ensuring a reliable and efficient power supply.

To develop the Mini Grid, approximately 1.388 hectares of land will be compulsorily acquired by the Proponent from the community. This land is unregistered community land. The Proponent engaged with the community during the land acquisition process, and there were no objections to transferring 1.388 hectares of land to REREC for the management of the solar mini grid. In accordance with the World Bank's Operation Procedure 4.12 on Involuntary Resettlement, an Abbreviated Resettlement Action Plan (A-RAP) was prepared, outlining the principles and procedures for land acquisition and compensation. This plan is annexed to the project report.

## **E.7 Project Alternatives**

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

The local community has agreed to a Compensation in Kind arrangement for the land acquired in Bubisa. The community proposed the following projects as compensation:

1. Extra ward at the Bubisa Health Center
2. Dining Hall at Bishop Cavalera School
3. Meeting hall at Bishop Cavalera School

## **E-8 Stakeholder Engagement**

It is important to highlight that two rounds of stakeholder engagement were carried out for the project. The first round 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 17<sup>th</sup>, 2022, a total of 35 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 views and provide feedback on the project.

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

- 1. Impacts of the project:** The community wanted to know what mitigation measures had been put in place to curb accidents, fire, property damage and loss of life. It was confirmed that proper procedures shall be followed to ascertain the cause of the damage/fire and if it is as a result of REREC's shortcoming then the affected party shall be duly compensated. However, if it is determined that it was as a result of poor workmanship in electrical wiring of the structure/house then the responsibility will lie with the owner

She urged the community members to ensure that all electrical wiring of their houses/businesses are done by a competent person.

A completion certificate shall also be issued prior to installation and supply of power.

- 2. Project Timeline:** The community requested to know when the project is likely to start. It was confirmed that the project had already started.

The project will take approximately 6 months to complete from the start date of construction activities.

Organizations and independent contractors are already bidding for contract awarding to construct the mini-grid.

- 3. Benefit of the project to other households:** The community enquired on the benefits of the project for households found outside the 3km range. The community was informed that there would be a second project for providing alternative solar solutions through provision of solar items/ equipment's at affordable prices.

## 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, potential diffusion and transfer of communication and knowledge from specialist construction staff to the local participants, boosting local businesses through sourcing materials locally among others. 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 similar to the construction phase impacts.

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

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

Impact	Significance Of Impact (Pre-Mitigation)	Residual Impacts (Post-Mitigation)
Land acquisition	Minor	Negligible

Impact	Significance Of Impact (Pre-Mitigation)	Residual Impacts (Post-Mitigation)
Way leaves	Minor	Negligible
Risks related to stakeholder identification and consultations	Major	Minor

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

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

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

<b>Impact</b>	<b>Significance Of Impact (Pre-Mitigation)</b>	<b>Residual Impacts (Post-Mitigation)</b>
Impact On Economy and Employment	Positive	Positive
Clean, reliable power supply	Positive	Positive
Education	Positive	Positive
Health benefits	Positive	Positive
Improved standard of living	Positive	Positive
Security	Positive	Positive
Communication	Positive	Positive
Soil environment	Negligible	Negligible
Waste generation and management	Minor	Negligible
Water environment	Minor	Negligible
Landscape and visual impacts	Moderate	Minor
Fire outbreaks	Moderate	Minor
Water demand	Negligible	Negligible
Electric and magnetic fields (EMFs)	Negligible	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
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 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.

## 1.1 Project Background

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The Government of Kenya has pledged to stimulate economic growth and accelerate job creation to improve the economic wellbeing of Kenyans. Among the many interventions to achieve this is expansion of the new sources of energy to enable more Kenyans to connect to the grid at affordable cost and hence initiate economic activities at the micro-economic level. Driven by the imperative to provide equal opportunities across the entire Kenyan territory as key to achieving Kenya's Vision 2030, and the national target of achieving universal access to electricity by 2020, the GoK seeks to close the access gap by providing electricity services to remote, low density, and traditionally underserved areas of the country. Consequently, the Government of Kenya partnered with World Bank and conceptualized a project by the name Kenya Off-grid Solar Access Project (KOSAP). The project's objective is to achieve increased electricity access to Kenyans in off-grid areas (areas not covered by the national electricity grid network).

The project targets 14 out of the 47 counties in Kenya that have been defined as marginalized by the Commission on Revenue Allocation (CRA). The 14 underserved counties collectively represent 72% of the country's total land area and 20% of the total population. The population is highly dispersed at a density of 4 times lower than the national average. These counties are also characterized by infrastructural deficits, including lack of access to roads, electricity, water and social services. The 14 counties include Garissa, Isiolo, Kilifi, Lamu, Kwale, Marsabit, Narok, Samburu, Taita-Taveta, Tana River, Turkana, Wajir and West Pokot. The total number of un-electrified households is roughly 1.2 million in these counties

## 1.2 KOSAP Objective

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The objective of KOSAP is to increase access to modern energy services in underserved counties of Kenya, and is to be achieved through the implementation of the components below;

- Component 1: Mini-grids for Community Facilities, Enterprises, and Households
- Component 2: Standalone Solar Systems and Cooking Solutions for Households
- Component 3: Standalone Solar Systems and Solar Water Pumps for Community Facilities
- Component 4: Implementation Support and Capacity Building

## 1.3 Mini-grids for Community Facilities, Enterprises and Households

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This component supports the electrification of areas where electricity supply through mini-grids represents the least cost option from a country perspective, as underpinned by the geospatial plan. Depending on the number of users to be supplied, and the service level defined for each type of user (households, businesses, community facilities, etc.), the generation system of each specific mini-grid will combine solar PV, battery storage and thermal units running on diesel Mini-grids. The component will be implemented in approximately 151 locations throughout the 14 target counties, typically in Mini-grids supplying 100-700 prospective users, with approximate total demand of 20-300kW. These potential sites, capturing approximately 27,000 consumers in total, have preliminarily been identified as part of the geospatial plan. In Marsabit County, 15 locations were proposed for the solar Mini-grids installation. Bubisa village in Bubisa sub-location, Bubisa location, North Horr Sub-County is one of the villages in Marsabit County that will benefit from this component.

## 1.4 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 Bubisa site was proposed as part of this project due to its isolated nature and the high cost of grid extension to the area..

## **1.5 Institutional and Implementation Arrangements**

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The Ministry of Energy and Petroleum (MoEP) will provide overall coordination of the project and oversight during planning and implementation of the project. This will include overall coordination and oversight for safeguards due diligence, and implementation.

REREC will be responsible for the implementation of the Solar Mini-grid during construction while KPLC will be in charge of Operations and Maintenance (O&M). In addition, REREC will have overall responsibility for safeguards, due diligence and implementation. The County Government of Marsabit is also working in liaison with the Ministry of Energy in implementation of the project.

## **1.6 Environmental and Social Impact Assessment (ESIA) Report**

### **1.6.1 Justification for the ESIA**

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This Environmental and Social Impact Assessment on the proposed solar Mini-grid in Bubisa was commissioned in order to examine its impacts on the environment and community prior to its construction. The study sought to identify positive and negative impacts of the Mini-grid and propose measures to mitigate the negative impacts while maximizing the positive impacts.

The ESIA was conducted in accordance with Section 58 of Environmental Legislation, EMCA 1999, and its 2015 Amendment and the Environmental Impact Assessment and Auditing Regulations (ESIA/EA) of 2003. Further, international environmental and social policies have been adhered to in this report especially the World Bank OP4.01 (Environmental assessment). In addition, appropriate sectoral legal provisions relevant to this project have also been referred to for the necessary considerations during the construction, commissioning, operation and decommissioning of the project.

This Environmental Impact Assessment has identified both positive and negative impacts of the proposed project to the environment and community. The report proposes mitigation measures in the Environmental and Social Management and Monitoring Plan (ESMMP) developed to mitigate the negative impacts and enhance positive impacts thus ensuring sustainability of the project.

### **1.6.2 Objectives of the Study**

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The main objective of this ESIA study 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.

### **1.6.3 Scope of the ESIA Study**

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The ESIA scope largely covered the following areas:

a) Baseline Conditions:

- Environmental setting (climate, topography, geology, hydrology, ecology, water resources, sensitive areas, baseline information etc.)
- Socio-economic activities in the surrounding areas (land use, human settlements, economic activities, institutional aspects, water demand and use, health and safety, public amenities, etc.),
- Infrastructural issues (roads, water supplies, drainage systems, power supplies, etc.).

b) Legal and policy framework:

Focusing on the relevant national environmental laws, regulations and by-laws and other laws and policies focusing on allied activities relative to the project in question.

c) Interactive approach was adopted for the immediate neighborhood in discussing relevant issues including among others: land use aspects, project acceptability, social, cultural and economic aspects,

d) Identification of Environmental impacts namely physical impacts, biological impacts and Legal Compliance.

### **1.6.4 Terms of Reference (ToR) for the ESIA Process**

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The Experts were assigned the task of carrying out Environmental and Social Impact Assessment of the proposed solar Mini-grid. The scope covered various activities related to; project planning activities, construction works of the proposed development which included all works of civil, mechanical, electrical or other nature necessary to construct, commission and decommissioning of the project. The output of this work is a comprehensive Environmental Impact Assessment project which will aid NEMA in deciding on the project. The report is also in compliance to Environmental and Social Safeguard Policies of the proponent's development partners.

The ESIA experts conducted the study guided by the following terms of reference:

1. Establish the suitability of the proposed site/location to set up a solar Mini-grid.
2. A concise description of the national environmental legislative and regulatory framework, baseline information, and any other relevant information related to the project.
3. A description of the technology, procedures and processes to be used, in the implementation of the project.
4. A description of materials to be used in the construction and implementation of the project, the products, by-products and waste to be generated by the project.
5. A description of the potentially affected environment/social economic and cultural setting of the project area.
6. Identification and consultation with stakeholders including the proposed Project Affected Persons (PAPs).
7. A description of positive and negative impacts of the project on the environmental, health, safety and social cultural aspects of the community
8. Analysis of alternatives including project site, design and technologies
9. Identification of the most appropriate mitigation measures/interventions against negative impacts during construction, operation and decommissioning.
10. Development of an Environmental, Health, Safety and Social Management Plan proposing the measures for eliminating, minimizing or mitigating adverse impacts on the environment, including the cost, timeframe and responsibility to implement the measures.

## **1.7 ESIA Methodology**

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

### **1.7.1 Key activities undertaken during the study included the following**

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

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

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

### **1.7.2 Desk study/literature review**

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A critical literature review of secondary data was done to establish the following:

- Relevant legislations and institutional framework governing the proposed project.
- Licenses and permits requirements and conditions.
- Baseline information of the project area
- Types of waste likely to be generated.

Documents relevant to the proposed development were reviewed. Some of the documents reviewed included Marsabit County Integrated Development Plan 2018-2022, various Kenyan legal legislations, World Bank safeguard policies, project frameworks (ESMF, VGMF, and RPF), topographical maps, google earth/maps, Kenyan government publications among others.

### **1.7.3 Environmental, Socio-economic and Cultural Setting/Status**

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To gain a better understanding of the environmental, socio-economic and cultural setting of the project site and it's surrounding the ESIA team needed to gather primary data. This entailed collection of the data using various tools and methods. Interviews, discussions, photography and observations and check lists

are some of the methods employed in gathering the data needed from different stakeholders.

#### **1.7.4 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.

Public consultations were conducted thorough public barazas organized at appropriate location near the proposed site for the Mini grid. Key stakeholder's views on the project were solicited through interviews and discussions with County officials, technical teams at Ministry of Energy and REREC and also (KOSAP project implementation unit) officers.

##### **1.7.4.1 Stakeholder Identification and Mapping**

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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 PAPs and interested persons or parties. The stakeholders include;

- Project Affected Persons (PAPs) who are largely the community members living within 3km radius of the proposed project:
- Interested parties include:
  - ✓ County government of Marsabit various departments 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.

##### **1.7.4.2 Approach and Methodology used in carrying out the Public Participation**

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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, focused group discussions with the men, women and youth and a public baraza/meeting for the community members.

##### **1.7.4.3 Mobilization for the Community Meeting**

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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 village administrator and village elders in Bubisa village.

##### **1.7.4.4 Public Forum/Meeting**

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The project team undertook community engagement forums with the 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 meetings were well attended by all people including men, women, youth and persons with special needs.

#### **1.7.4.5 Focus Group Discussions**

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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 were held. 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. The Focus Group Discussions were also used as a form of baseline data collection. The respondents were able to give feedback on socio-economic status of their community i.e. education, healthcare, economic activities, cultural practices etc.

#### **1.7.4.6 Key Informant Interviews**

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Key Informants were identified both at the county and locational levels and they were interviewed to obtain baseline information in regard to the proposed project. The key informants interviewed were from the education and health sectors at the project area level.

#### **1.7.4.7 Stakeholder Engagement Schedule**

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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. A letter was written from the Ministry of Energy to the Governor Marsabit County, the County commissioner informing them about the need to undertake public participation for the proposed project. Stakeholder consultation was undertaken on January 17<sup>th</sup>, 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 on the project.

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

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

### **1.7.5 Outline of the basic ESIA steps followed during the assessment**

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#### Step 1: Project Concepts

The project details regarding; scope, design, implementation, tests, commissioning were first analysed.

#### Step 2: Terms of Reference (Tor)

The terms of Reference were developed guided by EMCA 1999 and The Environmental Impact Assessment/ Audit regulations 2003. Any new developments out of character with their surrounding must have an ESIA undertaken; for review, Approval and Licensing by NEMA.

### Step 3: Project Screening

Details about baseline conditions and potential environmental and social impacts were collected through desktop study, stakeholder consultations, site visits, photography, and inductive methods.

### Step 4: Identification of Potential Environmental and Social Impacts

The Potential Environmental impacts were identified, Classified and magnitude determined.

### Step 5: Impact Assessment and Consultations

The Environmental and Social Impacts were analysed, assessed and discussed in details involving consultations with the REREC and other stakeholders.

### Step 6: Formulation of Mitigation measures

Mitigation measures to ameliorate or minimize the potential Environmental and Socio – economic impacts were formulated for the entire project life.

### Step 7: Development of an Environmental & Social Management and Monitoring Plan:

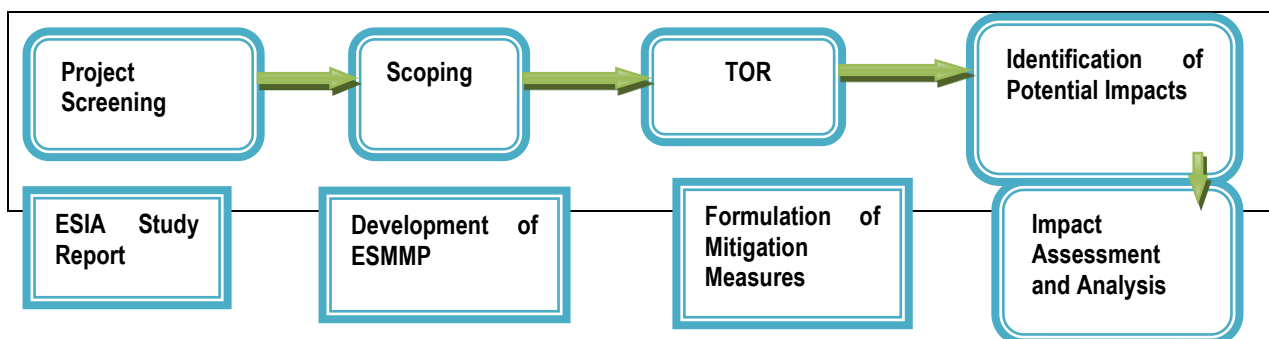
An E&SMMP for the project life was developed indicating parameters to be monitored, persons responsible, timing and costs involved.

Specific issues covered in the project report include but are not limited to:

- Name of the proponent, address and contact person
- Title of the project
- Objectives and scope of the project
- Nature of the project;
- Location of the proposed project, including the physical area that may be affected by the project's activities;
- Types of activities that will be undertaken during the project construction, operation and decommissioning phases;
- Design of the project;
- Materials to be used, products and by-products, including waste to be generated by the project and the method(s) of their disposal;
- Potential environmental impacts of the project;
- Economic and social impacts to the local community and the nation in general;
- Views of the public/potentially affected people about the project; and
- An Environmental and Social Management Plan (E&SMP) for the entire project cycle to include mitigation measures to be taken during and after implementation of the project and an action plan for the prevention and management of foreseeable accidents during the project cycle.
- An Environmental and Social Management and Monitoring Plan (*ESMMP*)

## 1.8 ESIA Procedure

### Summary of ESIA Procedure



## 1.9 Target Group for the ESIA Report

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

In this regard, the report is useful to the following stakeholders:

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

## 1.10 Study Team

This EIA study was conducted by a team of experts that comprised the following professionals; -

S/No	Names	Position
1	Irene Mate	Senior Environmentalist-REREC
2	Hottensia Kabuki	Associate Expert, Environmental and Social specialist- Centric Africa Ltd
3	Lucy Bii	Environmental Expert- Centric Africa Ltd
4	Dickson Alubala	Environment, Health and Safety Specialist- Centric Africa Ltd
1.	Said Luba	Environmental Expert- Centric Africa Ltd.

## 1.11 Limitations

- ✓ Communication barrier; It was mitigated through having a translator (the translator was sourced from the local community)
- ✓ Some data which the consultants sought the community could not be ascertained e.g. the exact number of the VMG's, Child headed households, male headed households, PLWDs, number of cases of GBV etc.

- ✓ Risk of being infected or transmitting COVID-19. The teams had to adopt preventive measures by wearing face masks and providing the community members with hand sanitizers and maintaining social distance during the public meetings and interactions.
- ✓ The Bubisa community meeting and primary baseline data collection was interrupted by a heavy downpour/hailstorm and the exercise had to be postponed to a later date. However, the consultants were able to return to project area and finish the data collection.
- ✓ In many respects, the proposed project is still in the early stages of design. Therefore, figures quoted in the estimates of certain potential impacts such as numbers of employment opportunities that will be created may be subject to change

## **1.12 Assumptions**

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The Experts made the following assumptions in preparing this ESIA;

- ✓ The responses from the community members during the Focus Group Discussions and Key Informant interviews were honest and a true reflection of the socio-economic conditions of the area.
- ✓ All the technical data and information provided by the proponent, implementing and the specialists are accurate and up to date.
- ✓ The design features will be put in place to minimize risks from external factors which could threaten the integrity of the facility which include risks from landslides and other natural calamities; measures to minimize threats or damage from third parties e.g., terrorist attack.
- ✓ The public involvement process has been sufficiently effective in identifying the critical issues that needed to be addressed
- ✓ REREC and the Contractor will implement the measures in the proposed ESMMP
- ✓ REREC will undertake monitoring to track the implementation of the ESMMP to ensure that management measures are effective to avoid, minimize and mitigate impacts and that corrective action will be undertaken to address shortcomings and/or non-performances.

## **1.13 Uncertainties in Compiling Information**

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Uncertainty arises from a variety of aspects in any development, and for this particular study report has emanated from the following:

- The changes that may occur in baseline conditions, due to external factors over the lifetime of the project.
- Uncertainty related to Proponent's policy initiatives that might influence the assessment of future baseline and post-development conditions.
- Uncertainty in design information which should be dealt with by the definition of design parameters for the development by the Contractor and Proponent.
- Uncertainty in relation to project planning and implementation as the detailed program and means of construction may be influenced by the choice of Contractor and the detailed design of the development; and
- Uncertainty in the understanding of who VMGs are, and their population.

## 2 DESCRIPTION OF THE PROPOSED DEVELOPMENT PROJECT

### 2.1 Introduction

This chapter provides an overview of the proposed Bubisa solar mini grid as currently designed. The description borrows largely from preliminary project designs, discussions with the project engineers, field observations, feasibility study, interviews and available project documentation availed by REREC. The components of the proposed solar mini grid are provided as follows.

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

**Table 4: Component of the proposed Solar Mini-grid**

S/NO.	PARTICULARS	DESCRIPTION
1.	Project location	The project is located 47km East of Marsabit town, in Bubisa village, Bubisa sub-location, Bubisa Location in Marsabit County. Geographically, the site is located on coordinates of latitude 2°42'4.00N and longitude 38°5'31.86"E  The solar mini grid will contain solar panels, batteries, inverters, and perimeter fence
2.	Proponent	Ministry of Energy
3.	Administrative Location	Bubisa Village, Bubisa Sub-Location, Bubisa Location, North Horr Sub-County, Marsabit County
4.	Land Size/Tenure	The proposed solar mini grid will be located on a 1.388 hectares piece of land in Bubisa village. The land is unregistered community land set aside for public use
5.	Mini grid Capacity	- Minimum PV Inverter of 250kw; 625kWh Battery
6.	Distribution Line	LV Circuit of 25.44km
7.	Project Cost	USD 760.035.56
8.	Target Consumers	972(960Residential and 12 Non-residential)
9.	Climatic condition	The project area can be characterized under Ecological Zone VI which is described as very arid/dwarf scrubland zone. The area experiences harsh climate. Due to the harsh climate the area suffers water scarcity and food security The least amount of rainfall occurs in June. The average in this month is 1 mm. Most of the precipitation here falls in April, averaging 126 mm. The temperatures are highest on average in March, at around 27.4 °C. July is the coldest month, with temperatures averaging 24.6 °C. The variation in the precipitation between the driest and wettest months is 125 mm. Throughout the year, temperatures vary by 2.8 °C. The average rainfall and temperature are 33mm and 26°C, respectively
10.	Site Conditions	The site is generally in an open area with minimal <i>fauna</i> and <i>flora</i> .

S/NO.	PARTICULARS	DESCRIPTION
11.	Road Accessibility	The site can be accessed through the Isiolo-Marsabit-Moyale Road which is a tarmac road
12.	Nearest Airport	Marsabit Airport is approximately 40km away
13.	River/canal/nallah/ pond present in project footprint	No rivers are present in the village
	Protected areas (National Park/ Sanctuary)/ Forest land within 10 kms	None

## 2.2 Description of the Proposed Project Site and its Surroundings

Following comprehensive consultation during the preparation of the National Electrification Strategy with the County Governments, NGOs, CBOs and local communities, the government identified possible sites within 14 counties that would benefit from solar mini grids. Consequently, NRECA a consulting firm was tasked to undertake a feasibility study and map out the possible project site in Marsabit County and Bubisa is one of the areas that was identified.

The land identified as the project site for the construction of the proposed off-grid solar power plant is located in Marsabit County in Northern Kenya, in Bubisa sub-location, Bubisa Village, approximately 47 km North of the town of Marsabit and approximately 200km from the Kenyan-Ethiopian boarder.

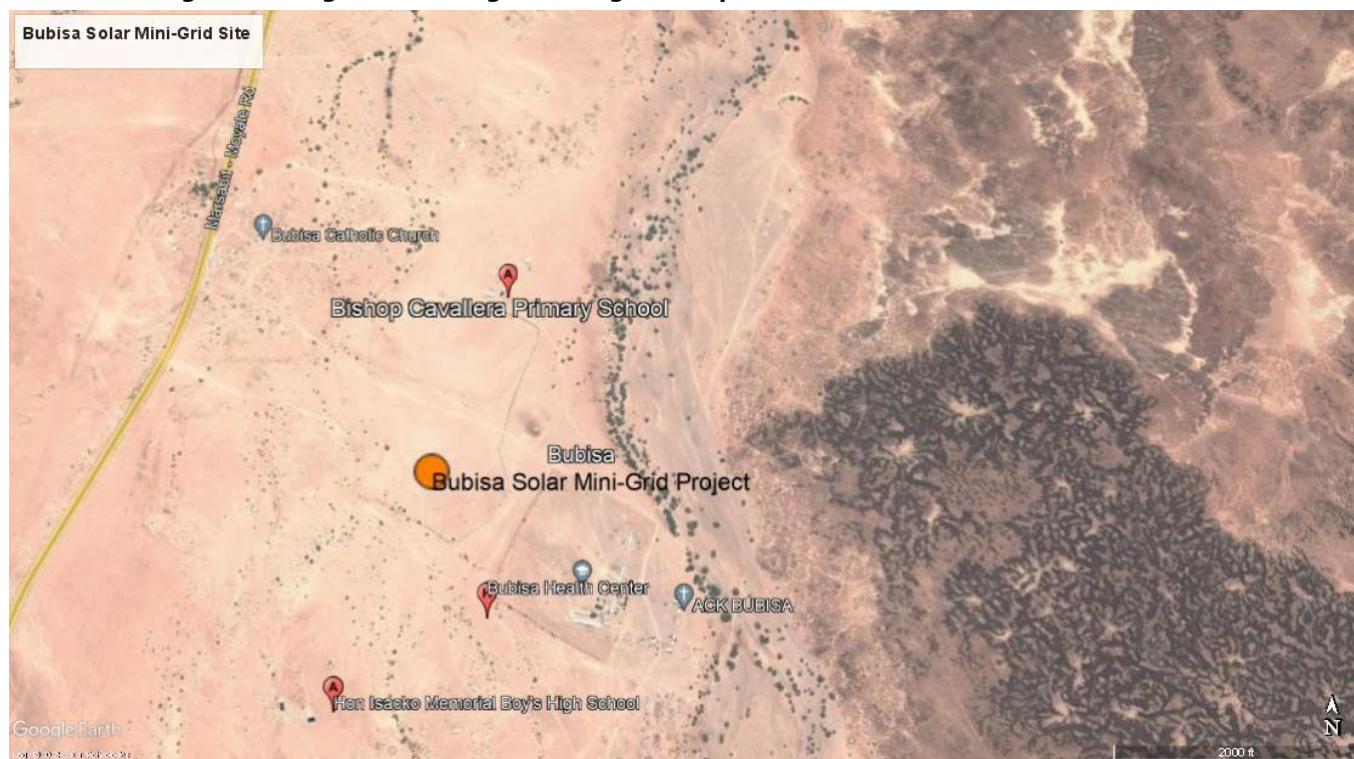
The proposed project site is approximately 1.388 hectares, which is unregistered community land set aside for public use. Currently the site is unutilized with minimal flora and fauna.

**Figure 1: Image of the proposed off-grid solar power plant site in Bubisa Village**



The plot coordinates are latitude 2°42'4.00N and longitude 38°5'31.86"E. at an elevation of 575m above sea level as shown in figure 3 below

**Figure 2: Google Earth Image showing the Proposed Solar Power Plant Site**



The site is bordered by Bishop Cavallera Primary School and the PACIDA borehole water and desalination plant on the North, Bubisa Primary on the South, *Manyattas* on the East and more households (*Manyattas* and Permanent Housing structures) on the west. The only Government institutions include a local health center and a two primary schools and a boys' secondary school.

The village also has a center, located next to the Isiolo-Marsabit-Moyale highway, where a small number of businesses have been set up.

Site access is via the -Marsabit-Moyale road which is part of the 500km long Isiolo- Marsabit-Moyale highway. Some of the factors that were considered when selecting the site for the off grid solar power plant include; 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; and availability and accessibility of infrastructure for the provision of services, manpower and social structure for the construction and operation of the power plant.

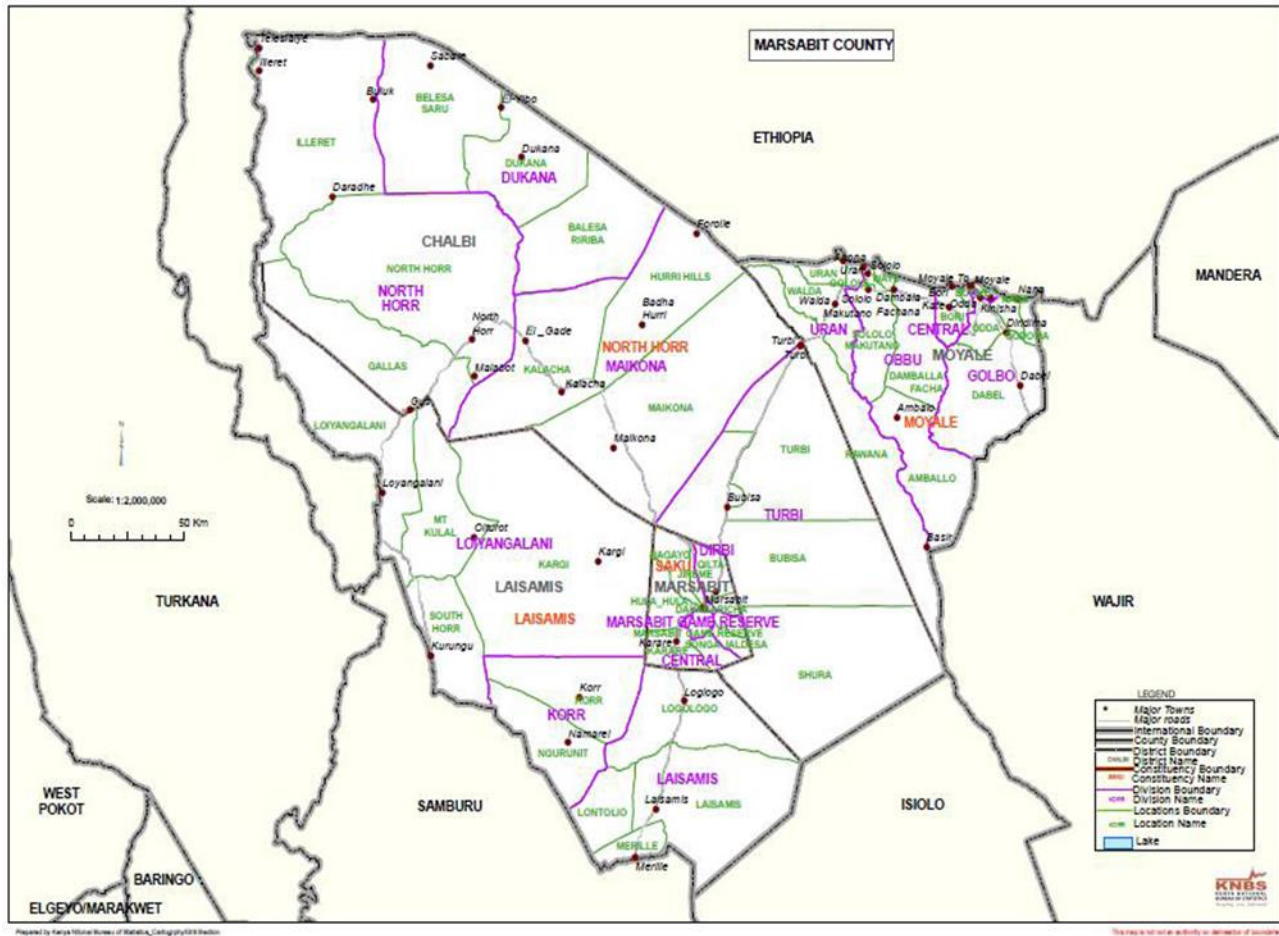
### **2.3 Project site setting**

The proposed Bubisa mini grid is in the North Horr sub-county, Marsabit County. Marsabit County occupies the extreme part of Northern Kenya. It covers an area of 70,961.2km<sup>2</sup>. The county shares an international border with Ethiopia to the North, borders Lake Turkana to the West, Samburu County to the South and

Wajir and Isiolo counties to the East. It is located between longitudes 37° 57' and 39° 21' East and latitudes 02° 45' and 04° 27' North

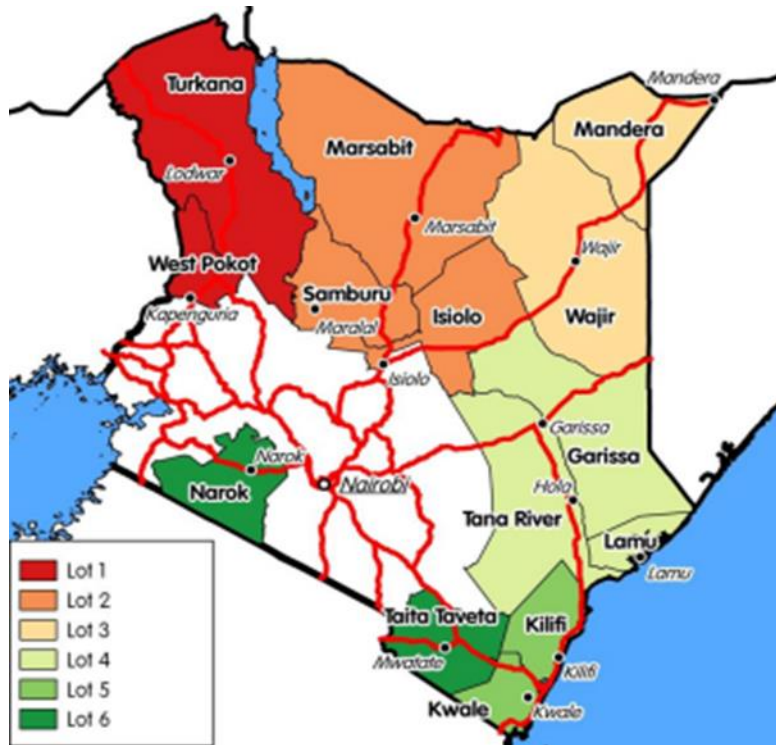
Marsabit county is divided into 4 sub-counties (also referred to as constituencies) which include North Horr, Saku, Laisamis and Moyale. The proposed site for the mini-grid is within the North Horr sub-county.

**Figure 3: Marsabit County Administrative Units**



The project site falls under Lot 2 of clusters 3 which has a total of 48 mini-grids. The area is characterized as sub-project site with a mix of unregistered community land and public land. There are a total of 15 proposed mini grids in Marsabit under the KOSAP program.

**Figure 4: Map showing the KOSAP Counties under Lot 4**



## 2.4 Description of the Proposed Solar Mini-Grid

Name	Residential	Non-residential	LV Circuit (km)	Peak demand (kw)	Generation output (kw)	PV(DC -KWp)	Batteries	Generator (kva)	Generator Fuel Tank (L)	Cost (USD)
Bubisa	960	12	25.44	149	250	250	200	175	2000	760,035.56

### 2.4.1 Nature of the Project

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

#### 2.4.1.1 PV Hybrid Mini-Grid Sizing

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

- The proposed Residential & Non-Residential Users available
- The PV Capacity in kilo Watt peak.
- The storage battery Capacity

- The Inverter capacity in (kW)

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

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

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

## **2.4.2 Architecture and Basic Design Specifications**

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This hybrid power generation site is projected to generate power meant to serve 960 households. 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 and battery house. The solar panels will have a connection to the batteries through underground cables. 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 standby generator will also be connected to the system as a backup. This generator will have a capacity of 175 kVA with a fuel tank with a capacity of 2000litres. 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 noise rating for the inverter and the diesel generator is 85-90dB.

The power will be distributed to the customers by overhead lines. The project site is expected to serve clients within a radius of 3km 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 Battery Energy Storage System (BESS) will comprise of Lithium-ion Battery pack that conforms to IEC standards with warranty of 10 years, 3,000 cycles minimum. The Lithium-ion Battery Power Packs will be used to cater for required energy capacity, or equivalent as per approved design, minimum 80% DOD for Lithium-Ion. Batteries will be capable of at least C/4 charge and discharge rate. Batteries will be charged by Battery Inverter / Charger. The project will use 625 kWh batteries.

### **2.4.2.1 Key Components of the Project**

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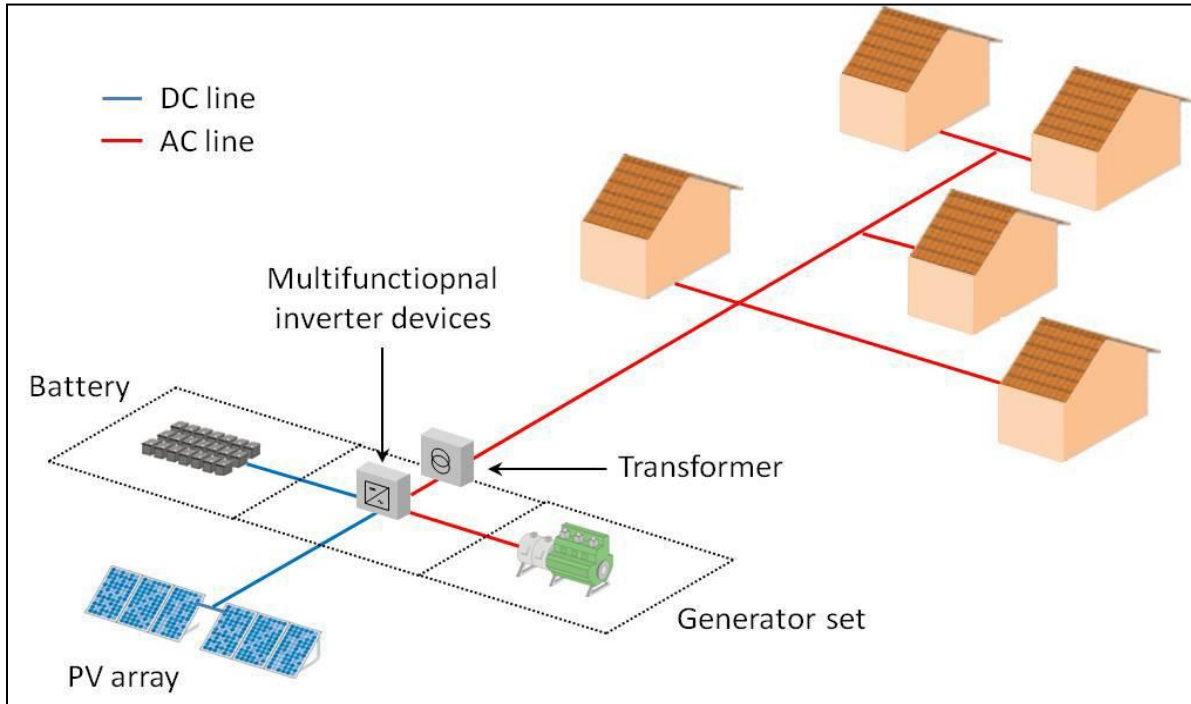
- ✚ **Solar Photovoltaic Panels:** The project utilizes solar panels with a total capacity of 250 kWp to harness solar energy. Solar power is a clean and renewable energy source that will provide a significant portion of the electricity needed for the project.

- ✦ **Battery Energy Storage System:** A 625 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.
- ✦ **Diesel Generator:** A 175 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 250kW 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 175 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.
- ✦ **Transformers:** The solar mini- grid site will be equipped with one step up transformer with a rating of 200KVA and 3 step down transformers with a rating of 50 KVA.
- ✦ **Low Voltage Power Distribution Network:**
  - A 25.44-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 24,000 kWh.
  - Daily Energy Demand: The average daily energy demand is approximately 800 kWh, ensuring a consistent supply for the consumers.
  - Peak Demand: The peak demand of the system is 149 kW, which is the maximum power requirement during any given moment.
- ✦ **PV Capacity:** The solar photovoltaic panels have a total capacity of 250 kWp.
- ✦ **Estimated Project Cost:** The estimated cost of the Bubisa Mini Grid project is approximately USD 760,035.56. 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 5 below illustrates a sketch of the proposed design as it will be set up at the proposed project site.

In addition to this Design architecture, the project site shall have an Office that shall also have a Control Room adjacent as well as a guard house. The guard shall be constructed using Concrete and Masonry works whereas the Control room and Office can also be a containerized facility.

**Figure 5: Illustration sketch of the proposed design of the proposed project**



#### **2.4.2.2 The PV Generator**

The PV generator consists of Silicon Crystalline Photovoltaic modules of capacity 250 kWp. 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.

### **2.4.2.3 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.

### **2.4.2.4 PV and Battery Inverter Charger**

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PV Inverter: A 250 kWp solar PV inverter will be 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 175 kW battery inverter charger will be employed to manage the energy flow to and from the battery storage system. The inverter charger ensures efficient charging and discharging of the battery, maximizing the system's overall performance

#### **Battery**

---

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

OPzS stands for:

O = Ortsfest (stationary)

Pz = PanZERplatte (tubular plate)

S = Flüssig (flooded).

Other batteries can be considered:

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

The batteries must be manufactured according to DIN 40736-1: "Stationary batteries with tubular positive plates. Capacities, measurements and weights".

#### **2.4.2.4.1 Battery Rating**

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

#### **2.4.2.4.2 Battery Performance**

The battery shall have a self-discharge when new of less than 5% per month (at 25oC 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)

#### **2.4.2.4.3 Lifetime**

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

#### **2.4.2.4.4 Battery Cabling and Protections**

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

#### **2.4.2.5 Diesel Genset**

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The Diesel Generator Set shall have a capacity of 175 kVA. 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 500 liters. The proponent, through the operating entity will have regular inspection by the manufacturer. The noise rating for the generator set will be 85-90dBA @ 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.

#### **2.4.2.6 Transformers**

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The solar mini- grid site will be equipped with one step up transformer with a rating of 200KVA and 3 step down transformers with a rating of 50 KVA.

#### **2.4.2.7 Distribution Line**

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The Bubisa site will have a distribution line circuit of 25.44 km in total. Supply of concrete poles for the distribution lines will be based on detailed survey and accessories like phase plates, circuit plates, number plates, danger plates, anti-climbing devices as per KPLC requirements/specifications. Erection of the Poles, fixing of insulator strings, stringing of conductor and earth wires along with all necessary line accessories and earthing will be as per KPLC requirements/specifications.

### **2.5 Site Ownership**

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The proposed works will be carried out on 1.388 hectares proposed site which the community identified for setting up the project. Stakeholder engagement with the community on this matter has been conducted. The proposed site land is unregistered community land set aside for public use. The sub-project site will

be acquired by NLC compulsorily and affected communities compensated in-kind through their community project of choice.

## **2.6 Access to the site**

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Bubisa can be accessed using the Marsabit-Moyale tarmac road which is part of the 500km Isiolo-Marsabit-Moyale highway that terminates at the international border with Ethiopia. The road is a component of the Lamu Port and Lamu-Southern Sudan-Ethiopia Transport Corridor (LAPSSET). The highway is under the mandate of the Kenya National Highways Authority (KeNHA).

The proposed Bubisa site will be accessed via the Marsabit-Moyale Road. Upon reaching the entrance to the village, the site is accessible through an earth road that meanders through the village. The Contractor will establish the proper route that will ensure safe transportation of construction materials and equipment and one that will have minimal impact on traffic movements and patterns of the community members.

## **2.7 Fencing and Security**

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The site is in an area that is basically open and in close proximity to residential and public facilities. 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.

All construction personnel would be issued identification badges that would be verified on entry and exit from the mini-grid site.

## **2.8 Fire Safety**

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There is potential for fire on the site, and this will be avoided by the provision of fire protection and firefighting equipment including fire extinguishers, signage, danger plates and name plates. The fire equipment will be placed where they are visible and easy to reach.

## **2.9 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.

## **2.10 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 site clearance and leveling, civil works and construction of utilities and structures for the facilities, installation and connection of the power plant as described in the section below.

Safety protocol, requirements and precautions and established National and International Environmental protection regulations/ standards as well as all management plans proposed under this ESIA report for this project, shall guide the contractor and project operator during the project cycle. Modest construction procedures will be followed to reduce noise and vibration levels and the production of dust and any form of pollution that may affect the neighboring community within the project area.

## **2.11 Construction, Operations and Maintenance Arrangements**

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REREC will be responsible for the implementation of the Solar Mini-grid during construction while KPLC will be in charge of Operations and Maintenance (O&M). In addition, REREC will have overall responsibility for safeguards, due diligence, and implementation. The County Government of Marsabit is also working in liaison with the Ministry of Energy in implementation of the project.

## **2.12 Construction Procedures:**

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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.

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

The project inputs will include the following.

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

### **2.12.1 Outline of Construction Activities**

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The construction activities will include 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.

#### **2.12.1.1 Soil Excavation**

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Soil will be excavated to pave way for the construction of the Solar Mini-grid. Soil excavation process shall be done with utmost care to ensure that the excavated soil is not improperly heaped or not carried away by any surface flows to any nearby surface waters causing siltation. The excavated soil will be used to backfill, and any remainder shall be disposed appropriately in accordance with the environmental management plan. Company safety and environmental policy and other established local environmental protection regulations/standards shall guide the contractor. This will include appropriate safety wear at all times and the contractor will appoint a safety officer on site during all construction activities.

#### **2.12.1.2 Construction Supervision and Safety**

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Throughout the construction phase, supervision shall be carried out by the REREC to ensure:

- Workers use personal protective equipment (such as hand gloves, helmets, safety shoes earmuffs, overalls and dust coats) at all times as is appropriate.
- Motorized equipment is checked to ensure that it is in good working condition, safe to use and produces minimal noise levels and reduced smoke emission.
- Provision of first aid kit and firefighting equipment (portable cylinders) and placement at strategic positions for access
- Proper disposal of waste material and toilet facilities are provided for construction workers.
- Emergency response procedures are in place and all workers are aware of them, like in case of fire.
- Any work involving deep excavations, elevated heights and lifting heavy loads poses a number of risks to personnel. The contractor shall develop a worksite plan before commencement of each of the construction. This will ensure that personnel are equipped with the correct protective clothing and equipment and are ready to work safely while also safeguarding the environment.
- Workers shall be provided ablutions facilities and changing rooms.

#### **2.12.1.3 Mini-Grid Components**

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The following components are planned to be constructed and operated on site. The same will need to undergo regular maintenance during the operation phase.

1. Technician Room

2. Battery Room
3. Generator Room
4. PV Array/Panels
5. Distribution network
6. Guard house

### **2.12.2 Operation Phase Activities**

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

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

### **2.12.3 Project's Decommissioning Activities**

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REREC 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.

## **2.13 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.

### **2.13.1 Input Materials and Equipment and Services**

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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:

1. Lorries
2. Plumbing equipment
3. Concrete mixers
4. Welding machines, wheelbarrows
5. Electrical equipment
6. Excavators
7. Raw construction materials (Sand, cement, natural building stone blocks, hard core, gravel, concrete among others).
8. Timber (e.g., doors and frames, fixed furniture, etc.),
9. Paints, solvents, whitewash, etc.,
10. Labor force (of both skilled and unskilled workers).
11. Generator Sets,
12. Bus bars, Switch gears, Circuit breakers
13. Lightning arrestors and Steel structure members
14. Water
15. Solar panels
16. Conductors
17. Poles
18. Meters
19. Fuels (Diesel)
20. Sand
21. Hardcore
22. Building stones
23. Glass

### **2.14 Resource Requirement**

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The following are the resource requirements for construction and operation of the solar mini-grid plant;

#### **2.14.1 Workforce Requirement**

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##### **2.14.1.1 Construction Phase**

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

### **2.14.1.2 Operation Phase**

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Approximately 5 unskilled workers will be involved during operation phase of the project for grass cutting and module cleaning. Also, two trained security guards will be engaged at the operations phase.

## **2.14.2 Water Requirement and Source**

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### **2.14.2.1 Construction Phase**

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It has been estimated that approximately 50 litres per capita of water will be required per day for civil works during construction stage. Further, water will be required for workers at project site. However, this quantity of water requirement will vary depending upon the mobilization of construction workers at site. The water for the construction phase will be supplied by a water tanker from the area water vendors.

### **2.14.2.2 Operation Phase**

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The water required during operation phase of the project will be mainly for cleaning of the solar panel. Minimal water will be used for this purpose. Water requirement during operational phase of the project will be met from the water vendors in the area.

Approximately, 10 employees (direct and contractual) will be working during operation phase. For this workforce, approximately 500 Liters of water per capita per day will be required for domestic consumption.

## **2.14.3 Raw Material Requirement**

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### **2.14.3.1 Construction Phase**

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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.

### **2.14.3.2 Operation Phase**

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

## **2.14.4 Power Requirement**

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

## **2.14.5 Fire Safety and Security**

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### **2.14.5.1 Construction Phase**

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During the construction phase, the Contractor will comply with all applicable requirements of the Occupational Safety and Health Act 2007 (OSHA) and its subsidiary legislation especially Legal Notice 40 of 1984 titled "The Building Operations and Works of Engineering Construction (BOWEC) Rules".

Employees and contractors would be required to report all safety-related incidents, including accidents or injuries, to a designated project representative. Corrective action would be taken as necessary based on the nature of the reported incident.

On fire safety and as a minimum, the contractor will comply with all applicable requirements of Legal Notice 59 of 2007 titled "The Factories and Other Places of Work (Fire Risk Reduction) Rules.

Employees and contractors would be advised of their responsibilities under the above regulation and be required to report any project-related fire to a designated project representative. If a project-related fire were to occur, immediate actions would be taken by the contractor to respond to the fire.

Contingency planning contacts would include the contractor's construction manager, the County OSH officer, and the local County fire department.

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

#### **2.14.5.2 Operation Phase**

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

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

### **2.15 Pollution Streams**

#### **2.15.1 Solid Waste Generation**

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##### **2.15.1.1 Construction Phase**

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

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

Any broken solar panels or PV Modules will be sent back to the vendor as part of buyback arrangement. All the other domestic solid waste will be disposed at the nearest municipality dumpsite.

##### **2.15.1.2 Operation Phase**

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During operation phase, waste generated from the project will include domestic waste at site office, scrap

materials like scrap tools, damaged PPEs etc.; hazardous waste like waste oil, lubricants, used transformer oil; damaged batteries; electronic waste like damaged PV modules etc.

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

Any broken solar panels or PV Modules will be disposed by licensed waste handlers. All the other domestic solid waste will be disposed at the nearest municipality dumpsite.

## **2.15.2 Air Emissions**

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### **2.15.2.1 Construction Phase**

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

- Dust emissions from the dusty roads leading to the site.
- Increased vehicular emissions due to the high traffic of vehicles transporting construction materials, PV Modules, and accessories.
- Dust emissions from site clearing, material handling, piling and use of the construction machinery.
- Exhaust emissions from the diesel generator.

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

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

### **2.15.2.2 Operation Phase**

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

## **2.15.3 Waste Generation**

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### **2.15.3.1 Construction Phase**

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

### **2.15.3.2 Operation Phase**

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

### **2.15.4 Noise Emissions**

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#### **2.15.4.1 Construction Phase**

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

#### **2.15.4.2 Operation Phase**

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Under normal operations, none of the activities of solar power plant will generate noise. The only noise that can be generated at this phase is during the maintenance works and it will be restricted to daytime only. To make the power system reliable during cloudy days, a back-up generator will be used leading to noise pollution, however the noise from diesel generators will be minimized through provision of acoustic enclosures and occasional maintenance of the generator.

### **2.15.5 Decommissioning Phase**

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#### **2.15.5.1 Products and By-Products**

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During the decommissioning phase it is expected that there will be no product. However, the by-products during decommissioning phase will include:

- Metal generated from the decommissioning of Solar Mini-grid and associated infrastructure; and
- Foundation materials which can be donated to individuals for reuse

#### **2.15.5.2 Waste**

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During the decommissioning phase of the proposed project, several waste products are expected to be generated. These shall include:

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

#### **2.15.5.3 Dust**

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The activities that will occur particularly during the demolition process will generate a considerable amount of dust and other particulates that will be released into the atmosphere.

#### **2.15.5.4 Smoke Emissions**

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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.

#### **2.15.5.5 Safety of the facility**

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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.

#### **2.15.5.6 Hazard Risk Assessment**

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An emergency response procedure will be prepared by REREC and be communicated to the contractor. As a minimum requirement, the emergency management plan will cover the following aspects:

- Safety regulations
- Scope of the safety emergency plan
- Notification of local authorities
- Details of the proposed project
- Aim of the safety emergency plan
- Objectives of the study emergency plan
- Emergency arrangements, procedures and plans
- Roles and responsibilities in the event of an emergency
- Evacuation of people
- The role of local communities
- Regular testing of the safety emergency plan
- The risk assessment will include as a minimum:
  - A general process of the project being investigated
  - A description of the potential major incidents associated with that type of installation and the consequences of such incidents
  - An estimation of the probability of a major incident
  - A copy of the site emergency plan
  - An estimation of the damages in the case of an explosion or fire
  - An estimation of the effects of toxic gas releases.
  - The potential effect of an incident on the project or part thereof or an adjacent project or part thereof.
  - The potential effect of a major incident on any other installations, members of the public and residential areas.
  - Meteorological tendencies
  - The suitability of existing emergency procedures for the risks identified.
  - Any requirements laid down in the OSHA 2007 and EMCA 1999.
  - Recommendations regarding any organizational measures

## 3 ANALYSIS OF ALTERNATIVES AND PROJECT JUSTIFICATION

### 3.1 Introduction

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This section analyses the project alternatives in terms of site, technology and solid waste management. 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.

#### 3.1.1 Site Location Alternatives

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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:

- a) Geophysical Factors-Proximity to Hills-Shade effect, Soil erosion, Drainage of the area, Flooding etc.
- b) Land identified is free from any dispute on ownership or any other encumbrances
- c) Proximity to public utilities-Schools, Dispensaries, Places of worship and community settlements
- d) No squatters, encroachers or other claims to the land
- e) The Size of the Mini-grid to be constructed and the optimal coverage of a Mini-grid in terms of the number of people to be reached.
- f) The Land identified should be on spaces set aside for public use within the community centres.

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 Minigrad construction.

##### 3.1.1.1 Relocation Option

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Relocation option to different sites is an option available before the project implementation. At present the project proponent does not have alternative sites in the general direction of the proposed sites. This means that the project proponent has to look for the alternative lands. Looking for the lands to accommodate the scale and size of the proposed project and completing official transaction may take a long time although there is no guarantee that the land would be available.

In consideration of the above concerns and assessment of the current proposed sites, relocation of the projects is not a viable option.

#### 3.1.2 Technology Alternatives

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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).

There are three main PV technologies groups available in the market today; below is a brief introduction to each of these technology groups and a summary of their current market status.

- **Crystalline Silicon:** Crystalline silicon (c-Si) technologies are mainly represented by mono-crystalline (m-Si) and multi or poly-crystalline (p-Si) technologies. The mono-crystalline cells are made from very pure monocrystalline silicon.

- **Thin Film:** In these processes, photoactive semiconductors are applied in thin layers to a low cost substrate (in most cases glass). Among other technologies are Cadmium-Telluride (CdTe) is dominating the thin-film market.
- **Hybrid HIT Cells:** The HIT solar cell is a combination of a crystalline and a thin-film solar cell. HIT (hetero junction with intrinsic thin layer) refers to the structure of these hybrid solar cells. This structure comprises crystalline and amorphous silicon, which is bonded with an additional un-doped thin-film (intrinsic thin layer).

The technology selected for the project will be polycrystalline silicon (p-Si). The final selection of technology will however be decided based on the bids presented during the tendering process after consideration of economic as well as performance characteristics of each technology. In the past, the higher efficiencies of c-Si modules compared to thin film modules has been a decisive criterion where space is limited as they tend to yield a greater power output capacity per unit area. A better yield (kWh produced per kWp installed) can be expected from thin-film technologies at locations with low irradiation conditions (high diffuse component of the GHI) or in areas of high ambient temperatures.

The main difference between mono crystalline silicon (mono c-Si) and poly crystalline silicon (poly c-Si) cells is the manufacturing process, their specific technical characteristics and price. Mono c-Si ingots grow uniformly from an initial crystal (seed), leading to an almost perfect crystalline structure. Poly c-Si is manufactured from the discharge of molten silicon into a module; this means that the crystalline structure is not uniform and the electrical conversion or efficiency of poly c-Si cells is typically lower than that of mono c-Si cells what explains its difference in price.

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.

### 3.1.3 Alternative 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 neighboring 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 Bubisa 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 Bubisa.

The use of firewood and solid waste for electricity generation using thermal technology is another option. But the issue of air pollution and destruction of vegetative cover through firewood harvesting and charcoal burning already are environmental problems of serious concern which will further aggravate the natural environment. For these reasons, the thermal power options evaluated above seem inappropriate for Bubisa on environmental as well as economic grounds.

Solar energy was a desirable option because:

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

### **3.1.4 Solid Waste Management Alternatives**

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

### **3.1.5 Do Nothing Alternative**

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This option involves remaining on the status quo. The no construct/no project alternative will not achieve the objectives of the project since the listed benefits will not be achieved.

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

Kenya Vision 2030 is the country's development blueprint covering the period 2008-2030. It aims to transform Kenya into a newly industrialized, *'middle income' country providing a high-quality life to all its citizens by the year 2030.*

Vision 2030 is based on three key pillars namely: Economic, Social, and Political.

This policy recognizes that infrastructure, and in particular, a reliable power supply is vital in sparking economic growth. The challenges facing the power sector in Kenya include weak transmission and distribution infrastructure, high cost of power, low per capita power consumption, and low electricity access countrywide.

According to the Marsabit County Integrated Development plan (2018-2022), about 92.6 % of the county's population use fire wood as a source of energy for cooking purposes while 5.6% of the population use charcoal thus aggravating Environmental degradation. Electricity coverage is mostly restricted to urban centers of *Marsabit, Moyale, Sololo, and Laisamis*. The county is not served by electricity from the national grid but by diesel generators and solar energy.

The county government of Marsabit needs to invest in solar power which remains a sustainable option for lighting up rural and remote areas of the country and that the sector has the potential to drive economic development in the county. With an arid climate and a vast desert landmass, Marsabit is geographically optimal for harnessing the solar power.

Failure to construct and operate the minigrid will lead to the failure of achieving one of the Kenya's national long-term development policies that aims to transform Kenya into a newly industrializing, middle-income country, by providing a high quality of life to all its citizens by 2030 in a clean and secure environment.

The Project affected entities will be households, public and community institutions, enterprises and community facilities that cannot access electricity through the national grid and whose use of electricity will replace kerosene and other fuels for lighting and other activities like pumping water.

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 Bubisa area and North Horr 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.
- The local community members will not benefit socially from the employment opportunities and improved security.
- Continued aggravation of environmental degradation by use of firewood and charcoal as sources of energy
- Improved service delivery in the existing institutions i.e. school, dispensary, business center will not be actualized

### **3.1.6 Conclusion**

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The proposed project should be upheld to support the local community based in Bubisa.

## **4 APPLICABLE LEGISLATIVE AND REGULATORY FRAMEWORK**

### **4.1 Introduction**

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

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

Additionally, the section includes project frameworks that were developed by the Ministry of Energy informed by national laws and the applicable World Bank policies, to guide the implementation of specific E&S aspects on the projects. Finally, a summary of the World Bank (WB) Environmental and Social operational policies relevant to this Project are presented.

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

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

### **4.2 Environment Policy Framework**

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.

### **4.3 Institutional, Regulatory and Legal Framework**

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:

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

The objective and purpose for which NEMA was established is to exercise general supervision and coordinate 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:

**b) 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.

**c) 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.

**d) 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.

**e) 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.

**f) National Environment Tribunal**

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

**g) 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.*

**Table 5: National Legal Framework**

No	Legislation/ Guidelines	Description of the Legislation/Guideline	Relevance of the legislation/regulations in terms of license, permits, and other requirements
<b>NATIONAL POLICY FRAMEWORK</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 industrialised, middle-income country by 2030. The Vision is comprised of three key pillars (economic, social, and political), two of which are projected to be positively affected by project implementation.	Under Vision 2030, Energy is identified as one of the key sectors that form the foundation for 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 Energy Policy, 2014	<p>The Energy Policy sets out the national policies and strategies for the energy sector that align to the Constitution of Kenya and Kenya’s Vision 2030.</p> <p>The Energy Policy envisages promoting an energy mix that includes solar energy at both the household/institutional levels as well as large-scale solar energy generation. The Government of Kenya has initiated and has been promoting programs for the provision of electricity to institutions far from the grid through solar PV systems. The Government has also embarked on a programme to provide solar/diesel and solar/wind hybrid generation capacity to off-grid stations.</p> <p>The Policy strategizes the need to:</p> <ul style="list-style-type: none"> <li>✓ promote the widespread use of solar energy while enforcing existing regulations and standards.</li> <li>✓ provide incentives to promote the local production and use of efficient solar systems.</li> <li>✓ provide a framework for connecting electricity generated from solar energy to the national and isolated grids, through direct sale or net metering.</li> <li>✓ promote the use of hybrid power generation systems involving solar and other energy sources; and</li> <li>✓ facilitate the generation of electricity from solar energy by, among other things, funding, provision of land, fast-tracking issuance of permits and licenses, as well as acquisition of data and information to realize at least 100 MW from solar by 2017, 200 MW by 2022 and 500 MW by 2030.</li> </ul> <p>The Kenya Electricity Supply Industry (ESI) is one of the sub-sectors in the energy sector which the Ministry of Energy and Petroleum oversees on behalf</p>	

No	Legislation/ Guidelines	Description of the Legislation/Guideline	Relevance of the legislation/regulations in terms of license, permits, and other requirements
		of the Government of Kenya (GoK). Under the Energy Act of 2006, the Ministry is responsible for formulation and articulation of policies to provide an enabling environment for operators and other stakeholders in the energy sector. Relevant stakeholders in the ESI are briefly described below.	
3.	Policy paper on Environment and Development (Sessional Paper No. 6 of 1999)	The overall goal of this Sessional Paper is to ensure that environmental concerns are integrated into the national planning and management processes and provide guidelines for environmentally sustainable development. The objectives of the Paper are to conserve and manage the natural resources of Kenya including air, land, flora, and fauna and promote environmental conservation about soil fertility and conservation, biodiversity, to foster afforestation activities, and to protect water catchment areas. More importantly, the Policy emphasizes the enhancement of public awareness and appreciation of the essential linkages between development and environment, involving NGOs, private sector, and local communities in the management of natural resources and their living environment and ensures that an environmental impact assessment report is undertaken for all public and private projects and programmes.	The proposed solar plant facility must ensure that it promotes this integrated approach to environmental management and development, without compromising the livelihoods of the local community.
4.	National Policy on Water Resources Management and Development, 1999	While the National Policy on Water Resources Management and Development enhances a systematic development of water facilities in all sectors for promotion of the country's socio-economic progress, it also recognizes the by-products of this process as wastewater. The Policy therefore calls for development of appropriate sanitation systems to protect people's health and water resources from institutional pollution. This implies that industrial and business development activities should be accompanied by corresponding waste management systems to handle the wastewater and other waste emanating therefrom.	During construction, water will be required for concrete works and during the operational period water supply may be necessary for cleaning the PV modules. Appropriate water treatment and waste handling must be incorporated into the Project design to be in alignment with this policy
5.	Sessional Paper No. 10 of 2014 on the National Environmental Policy, 2014	<p>The overall goal of this Session Paper is to ensure better quality of life for present and future generations through sustainable management and use of the environment and natural resources. This Session Paper calls for the use of environmentally sound technologies based on the best available techniques and policies as a way of minimizing negative impacts to the environment.</p> <p>Section 5.6 of this Session Paper focusses on infrastructure development and environment and makes explicit policy statements to ensure sustainable management and use of the environment and natural resources during the construction and operation of infrastructure developments. These policy statements require the commitment of the government to:</p>	<p>In line with the above policy statements, this ESIA has been conducted for the proposed solar project (including the associated infrastructure) to ensure that environmental and social issues are appropriately addressed.</p> <p>Once approved by NEMA, the Project Proponent will also need to conduct periodic Environmental Audits to ensure continuous conformity with the overall goal of this Session Paper. In addition, this ESIA has considered analysis of alternatives</p>

No	Legislation/ Guidelines	Description of the Legislation/Guideline	Relevance of the legislation/regulations in terms of license, permits, and other requirements
		<ul style="list-style-type: none"> <li>✓ Ensure Strategic Environmental Assessment (SEA), Environmental Impact Assessment, Social Impact Assessment and Public participation in the planning and approval of infrastructural projects.</li> <li>✓ Develop and implement environmentally friendly national infrastructural development strategy and action plan.</li> <li>✓ Ensure that periodic Environmental Audits are carried out for all infrastructural projects</li> </ul>	including alternatives to technology to ensure that the best available and appropriate technology is used.
6.	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.	<ul style="list-style-type: none"> <li>• 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.</li> </ul>
7.	National Environmental Action Plan (NEAP) of 1994	The NEAP for Kenya was prepared in mid 1990s. It was a deliberate policy whose main effort is to integrate environmental considerations into the country 's economic and social development. The integration process was to be achieved through multi-sectoral approach to develop a comprehensive framework to ensure that environmental management and the conservation of natural resources forms an integral part of societal decision-making.	<ul style="list-style-type: none"> <li>• The NEMA does not approve a development project unless the impacts of the proposed project are evaluated and mitigation measures proposed for incorporation in the project 's development plan, which is in line with the requirements of the NEAP. The project will be reviewed by NEMA for approval before implementation.</li> </ul>
8.	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>
9.	The National Energy and Petroleum Policy 2015	The overall objective of the energy and petroleum policy is to ensure affordable, competitive, sustainable, and reliable supply of energy to meet national and county development needs at least cost, while protecting and conserving the environment. This policy stipulates the transformation of the Rural Electrification Authority (REA) to Rural Electrification and Renewable Energy Corporation (REREC) to be the lead agency for development of renewable energy resources.	The policy is relevant to the project in the sense that the project will provide sustainable and reliable energy supply and measures will be put in place to protect and conserve the environment during its development. REREC will oversee the development of the mini grid and maintenance.

No	Legislation/ Guidelines	Description of the Legislation/Guideline	Relevance of the legislation/regulations in terms of license, permits, and other requirements
10.	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.	<ul style="list-style-type: none"> <li>• 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: <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> </li> </ul>
11.	The HIV/AIDS Policy 2009	<p>In summary, the policy aims at:</p> <ul style="list-style-type: none"> <li>i. Establishing and promoting programmes to ensure non-discrimination and non- stigmatization of the infected.</li> <li>ii. Contributing to national efforts to minimize the spread and mitigate against the impact of HIV and AIDS.</li> <li>iii. Ensuring adequate allocation of resources to HIV and AIDS interventions;</li> </ul>	The proposed project is to be implemented in the rural setting at Bubisa area. The area is not economically empowered hence few HIV/AIDS prevention resources are available. This policy shall provide a framework to both the project proponent and contractor to address issues related to HIV/AIDS during the entire project phase.
12.	Workplace Policy on HIV/AIDS	The main objective of this Policy is to provide a framework to address HIV and AIDS in the workplace. The principles that guide the Policy are in accordance with international conventions, national laws, policies, guidelines and regulations. They include recognition of HIV/AIDS as a workplace issue; Non-discrimination; Gender equality, Safety and Health work Environment, Workplace ethics and Confidentiality.	The requirements of this policy are expected to be fulfilled by all contractors and their subcontractors, especially in regard to having an internal company HIV Policy and worker sensitization initiatives. This policy is of paramount relevance to the project as the implementation of the proposed mini-grid construction and operation is expected to spur substantial in-migration into the project area by people seeking employment opportunities. This, coupled with the expected economic growth, increased financial spending power and disruption of social / cultural norms may result in predisposing factors associated with the spread of HIV/AIDS such as prostitution and adultery.
<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.

No	Legislation/ Guidelines	Description of the Legislation/Guideline	Relevance of the legislation/regulations in terms of license, permits, and other requirements
2.	Environmental Management and Coordination Act, 1999 (And the Amendments Of 2015)	The EMCA is a framework environmental law in Kenya. This Act (assented to on January 14, 2000) provides a structured approach to environmental management in Kenya. With the EMCA coming into effect, the environmental provisions within the sectoral laws were not superseded; instead, the environmental provisions within those laws were reinforced to better manage Kenya's ailing environment.	The proposed project will be undertaken in accordance with relevant sections of the EMCA, specifically Clauses 58 – 63. These sections of the Act are operationalised by subsidiary legislation promulgated under the Act and specifically Legal Notice (L.N.) 101: Environment (Impact Assessment and Audit) Regulations, 2003.
3.	L.N. 101: EIA/EA Regulations, 2003 And 2016 Amendments	These regulations provide the framework for undertaking EIAs and EAs in Kenya by NEMA licensed Lead Experts and Firms of Experts. An EIA or EA Study in Kenya is to be undertaken by a firm duly licensed by the NEMA. The EIA/EA Regulations also provide information to project proponents on the requirements of either an EIA or EA as required by the EMCA.	The proposed project is subject to relevant provisions of these regulations and subsequently, the ESIA has been undertaken in accordance with the requirements.
4.	L.N. 120: Water Quality Regulations, 2006	This regulation provides for the sustainable management of water used for various purposes in Kenya. The regulation contains discharge limits for various environmental parameters into public sewers and the environment.	The contractor will be required to properly manage the effluent from construction activities in accordance with the above regulations prior to discharge into the environment.
5.	L.N. 121: Waste Management Regulations, 2006	Generally, it is a requirement under the regulations that a waste generator segregates waste (hazardous and non-hazardous) by type and then disposes them in an environmentally acceptable manner.	Waste to be disposed in accordance with these regulations.
6.	L.N. 61: Noise and Excessive Vibration Control Regulations, 2009	The general prohibition of these regulations states that no person shall make or cause to be made any loud, unreasonable, unnecessary, or unusual noise which annoys, disturbs, injures, or endangers the comfort, repose, health, or safety of others and the environment.	Rules 13 and 14 of the regulations define the permissible noise levels for construction sites. These noise limits will be applicable to the proposed project.
7.	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>✓ Waste Transport License under Legal Notice 121: The Environment Management and Coordination (Waste Management) Regulations 2006 for disposal of all types of wastes; and</li> </ul> Noise Permit under Legal Notice 61: The Environment Management and Coordination (Noise and Excessive Vibration Control) Regulations, 2009.

No	Legislation/ Guidelines	Description of the Legislation/Guideline	Relevance of the legislation/regulations in terms of license, permits, and other requirements
8.	Occupational Health and Safety Act, 2007	The Occupational Safety and Health Act (OSHA) was enacted to provide for the health, safety and welfare of persons employed in workplaces, and for matters incidental thereto and connected therewith.	The contractors will be required to fully comply with Legal Notice 40 titled: Building Operations and Works of Engineering Construction Rules, 1984 (BOWEC). Each contractor will develop and implement a formal construction health and safety plan.
9.	L.N. 31: The Safety and Health Committee Rules, 2004	These rules came into effect on April 28, 2004, and require that an Occupier formalise a S&H Committee if there is a minimum of 20 persons employed in the workplace. The size of the S&H Committee will depend on the number of workers employed at the place of work	The contractor will be required to constitute Health and Safety Committee to oversee safety and health at the construction site
10.	L.N. 24: Medical Examination Rules, 2005	These rules provide for Occupiers to mandatorily undertake pre-employment, periodic, and termination medical evaluations of workers whose occupations are stipulated in the Eighth Schedule to the OSHA and the First Schedule to this Rules. Workers that fall under the above two schedules are required to undergo medical evaluations by a registered medical health practitioner duly registered by the DOSHS.	The contractor should that the workers exposed to hazards and or accidents undergo requisite medical examinations as required by these rules
11.	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> </ul> <p>those employees that may be exposed to continuous noise levels of 85 dB(A) are medically examined as indicated in Regulation 16. If found unfit, the occupational hearing loss to the worker will be compensated as an occupational disease.</p>	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.
12.	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> </ul>	<p>The proponent is expected to comply with the requirements of L.N. 59: Fire Risk Reduction Rules, 2007 by</p> <ol 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> </ol> <p>Developing an emergency plan should a fire occur which includes evacuation procedures etc</p>

No	Legislation/ Guidelines	Description of the Legislation/Guideline	Relevance of the legislation/regulations in terms of license, permits, and other requirements
		<ul style="list-style-type: none"> <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> </ul> <p>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.</p>	
<b>13.</b>	NEMA Guidelines for E-Waste Management, 2010	<p>The E-waste Guidelines were developed to streamline the procedures of handling and disposal of e-waste generated by various sectors to enhance environmental conservation. The e-waste guidelines provide a framework for identification, collection, sorting, recycling and disposing of electrical and electronic waste (e-waste). The guidelines include approaches to enhance environmental protection, environmental awareness, categories of e-waste, e-waste treatment technologies and disposal procedures.</p>	<p>The Proponent and Contractor should put into use the e-waste guidelines in the handling and disposal of e-waste that will potentially be generated by the project i.e. solar array panels during all phases of the project.</p>
<b>14.</b>	Draft E-Waste Regulations, 2013	<p>These regulations were prepared in 2013 but are yet to be promulgated. Some sections of these regulations that apply to the proposed project include:</p> <ul style="list-style-type: none"> <li>• Regulation 13 stipulates proper transportation of e-waste</li> <li>• Regulation 16 requires all electrical and electronic equipment to bear labels indicating the year and country of manufacture</li> <li>• Regulation 17 states prohibitions on poor e-waste disposal</li> <li>• Regulation 18 requires Environmental Sound Management of e-waste</li> </ul> <p>Regulation 26 and 29 defines offences relating to false information, and general penalty, respectively.</p>	<p>The Proponent should ensure that procurement of equipment (electronic and electrical equipment) that will generate e-waste is done in accordance with the regulations.</p> <p>The Contractor should ensure that handling, storage and disposal of the e-waste in an environmentally sound manner</p>
<b>15.</b>	The Energy Act, 2019	<p>The Energy Act of 2019 deals with all matters relating to all forms of energy including the generation, transmission, distribution, supply and use of electrical energy as well as the legal basis for establishing the systems associated with these purposes. The Act also established the Energy and Petroleum Regulatory Authority (EPRA).</p>	<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> <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> </ul> <p>The proponent has conducted the necessary engagement with the community.</p>

No	Legislation/ Guidelines	Description of the Legislation/Guideline	Relevance of the legislation/regulations in terms of license, permits, and other requirements
16.	The Energy (Solar Photovoltaic Systems) Regulations, 2012	These regulations shall apply to a solar PV system manufacturer, importer, vendor, technician, contractor, system owner, a solar PV system installation and consumer devices. The Regulations prohibits any person from designing or installing any solar PV system unless he/she is licensed by EPRA.	The Regulations regulates the design and installation of PV systems. The persons engaged in the designing and installation of the Mini-Grid shall be licensed by EPRA
17.	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.
18.	Community Land Act, 2016	<p>This Act is critical for the proposed project is within community land. Section 6(1) of the Act provides that 'county governments shall hold in trust all unregistered community land on behalf of the communities for which it is held'. Furthermore, Section 6(2) maintains that 'the respective county government shall hold in trust for a community any monies payable as compensation for compulsory acquisition of any unregistered community land'.</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>(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 proposed project site falls on community land and the land belongs to the community pastoralist in Bubisa. The community has since offered to the land in kind for project use. The establishment of the mini grid will convert communal land to industrial use for long term. Further, based on community need assessment the proponent will undertake in kind development project to support the community water needs.</p> <p>The proponent should adhere to the provision of this legislation</p>

No	Legislation/ Guidelines	Description of the Legislation/Guideline	Relevance of the legislation/regulations in terms of license, permits, and other requirements
		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	
19.	The Land Act, 2012	The Land Act 2012 is the substantive law governing management of land in Kenya. It provides for the legal regime that will govern inter alia, the administration and management of public land and private land; contracts over land, leases, charges, compulsory acquisition, easements and related rights. The state organ responsible for land matters in Kenya is the National Land Commission (NLC).	Part VIII of the Land Act 2012 (Articles 107 – 133) describes the process that needs to be followed for compulsory acquisition of interests in public land. This part of the Land Act will be followed by the Proponent/Contractor for securing the and upon which the proposed solar power plant will be developed.
20.	Environment and Land Court Act, No. 19 of 2011	This Act gives effect to 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 project Grievance Redress Mechanism provides legal address as an option for alternative dispute resolution. The PAPs can seek redress on disputes relating to land and environment through the Environment and Land Court or if they are dissatisfied with NLC's decision in matters relating to compulsory land acquisition.
21.	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 – Marsabit County.
22.	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
23.	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.

No	Legislation/ Guidelines	Description of the Legislation/Guideline	Relevance of the legislation/regulations in terms of license, permits, and other requirements
24.	Children Act, 2012	This is an Act of Parliament to make provision for care and protection of children; to give effect to the principles of the Convention on the Rights of the Child and the African Charter on the Rights and Welfare of the Child for connected purposes	The Proponent and contractor will not employ children in any manner that is economically exploitative, or 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.
25.	Persons with Disability Act, Chapter 133	This Act provides for the protection of the rights of people with disabilities ensuring they are not marginalized and that they enjoy all the necessities of life without discrimination. The Act guarantees that (1) No person shall deny a person with a disability access to opportunities for suitable employment. (2) A qualified employee with a disability shall be subject to the same terms and conditions of employment and the same compensation, privileges, benefits, fringe benefits, incentives or allowances as qualified able-bodied employees. (3) An employee with a disability shall be entitled to exemption from tax on all income accruing from his employment.	The Act will be adhered to in order to ensure that persons with disability are included in all decision making that affects their lives and also monitored to make sure they are not excluded from project benefits and that negative impact of the project do not adversely affect them.
26.	The Sexual Offences Act,2006	This is a comprehensive law that criminalizes a wide range of behaviours including rape, sexual assault, defilement, compelled or induced indecent acts with child imbeciles or adults, gang rape, child pornography, child trafficking, child sex tourism, child prostitution, exploitation of prostitution, incest by male and female persons, sexual harassment, deliberate transmission of HIV or other life threatening sexually transmitted disease, stupefying with sexual intent, forced sexual acts for cultural or religious reasons among others. The Act also has orders for medical treatment for victims including free HIV prophylaxis, emergency pregnancy pill and counselling. The Act provides stiff penalties in which most of the crimes attract minimum of ten years imprisonment which can be enhanced to life imprisonment.	This Act mitigates the risk of GBV-SEA/SH foreseen in the mini grid project particularly during the construction and decommissioning phases due to labor influx.
27.	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

**Table 6: Electricity Supply Stakeholders**

Stakeholders	Role
<b>Kenya Power Company</b>	Responsible for distribution and retail supply of electrical energy to end users. Kenya Power purchases power in bulk from the Kenya Electricity Generating Company Limited (KenGen) and the Independent Power Producers (IPPs) through bilateral contracts or Power Purchase Agreements (PPAs) approved by the Energy Regulatory Commission (ERC) <sup>(1)</sup> .
<b>The Energy and Petroleum Regulatory Authority (EPRA)</b>	Established by the Energy Act of 2019. The EPRA's mandate extends beyond electricity and includes natural gas (including petroleum), renewables and all other forms of energy. The generation, transmission, distribution, supply, import and export of electricity can only be carried out by parties in possession of a license, or a permit issued by the EPRA. If the capacity involved is for own use and less than 1 MW, authorization is not required. Although the generated electricity is expected to be less than 1 MW (0.3 – 1 MW), the fact that the generated electricity is intended for use in a factory and sale of excess power to the government, The project requires a license from the EPRC to generate electricity as stipulated in the Energy Act, 2019.
<b>Ministry of Energy and Petroleum</b>	Aims to facilitate provision of clean, sustainable, affordable, reliable, and secure energy services for national development while protecting the environment.
<b>The Rural Electrification and Renewable Energy Corporation (REREC):</b>	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.
<b>The Geothermal Development Company (GDC):</b>	Is a 100% state-owned company, formed by the Government of Kenya as a Special Purpose Vehicle to fast track the development of geothermal resources in the country. The creation of GDC was based on the government's policy on energy - Sessional paper No. 4 of 2004, and the energy Act No. 12 of 2006.
<b>The Kenya Electricity Transmission Company (KETRACO):</b>	Was incorporated on 2 <sup>nd</sup> December 2008 and registered under the Companies Act, Cap 486 pursuant to Sessional paper No. 4 of 2004 on Energy. KETRACO's mandate is to design, construct, operate and maintain new high voltage electricity transmission infrastructure that will form the backbone of the National Transmission Grid, in line with Kenya Vision 2030.
<b>Energy and Petroleum Tribunal (EPT):</b>	The tribunal is established under section 25 of The Energy Act, 2019. The tribunal is established for the purpose of hearing and determining disputes and appeals in accordance with The Energy Act, 2019 or any other written law. In relation to the proposed Project, any disputes or appeals if they arise will need to be addressed by the EPT.

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

### 4.3.1 National Administrative Requirements

A brief description of the relevant enforcement agencies with respect to the institutional framework is described in table 6.

**Table 7: Relevant Enforcement Agencies**

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

## 4.4 Project Frameworks

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The project frameworks outlined in this section were developed by the Ministry of Energy informed by national laws and the applicable World Bank policies, to guide the implementation of specific E&S aspects on the sub-projects.

### 4.4.1 Environmental & Social Management Framework, 2017

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

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

### 4.4.2 Resettlement Policy Framework

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

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

*The Ministry of Energy has partnered with the community who are the owners of the land and the County government of Marsabit 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 were 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.*

### 4.4.3 Vulnerable and Marginalized Group Framework

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A Vulnerable and Marginalized Group Framework (VMGF) was prepared for use by the Ministry of Energy (MoE) and the implementing agencies KPLC and REREC and other stakeholders.

It is based on the findings and recommendations of the Social Assessment that was also conducted for the KOSAP project. Since the proposed project interventions will be implemented in areas where Indigenous Peoples (IPs) are present referred to in Kenya as Vulnerable and Marginalized Groups (VMGs) the World Bank (WB) safeguard policy OP/BP 4.10 has been triggered. However, at that stage of project preparation, the exact sub-project sites were not yet identified and the exact impacts of the project on the 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 (VMGs) during the development and operation of proposed sub projects and to ensure effective mitigation of potentially adverse impacts while enhancing sharing of benefits.

In regard to the Solar Mini-grid in Bubisa, the policy is applicable because the main inhabitants of Bubisa are the Gabbra community are classified as a VMGs in Kenya.

The ESIA did not identify any adverse impact on the Gabbra community therefore, a Vulnerable and Marginalized Group Plan (VMGP) will not be required. However, elements of the VGMP such as the Free, Prior, Informed Consent (FPIC), inclusion of Gabbra in the stakeholder engagement process as well as representation on the locational grievance redress committee will be incorporated into the ESMP, to ensure that the Gabbra access culturally appropriate project benefits and opportunities, in a gender sensitive and intergenerationally inclusive manner.

## 4.5 World Bank Environment 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 below shows the applicability of World Bank Operational Safeguards as it applies to the proposed project in Bubisa site.

**Table 8: World Bank Safeguards**

OP	TITLE	DESCRIPTION OF THE SAFEGUARD	APPLICABILITY
4.01	Environmental Assessment Applicable	The objective of OP 4.01 is to ensure that Bank-financed projects are environmentally sound and sustainable, and that decision-making is improved through appropriate environmental and social screening, analysis of actions and mitigation of their likely environmental and social impacts and monitoring.	The proposed project is likely to have potential environmental and social impacts.  This policy is applicable to this subproject because, there are environmental and social concerns associated with the construction and operation of the proposed project. In response, the proponent has commissioned and Environmental impact assessment in order to identify and address the potential impacts to a level that is acceptable.
4.04	Natural Habitats Applicable	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	The proposed project may be in or close to areas with natural unique flora and fauna though the component is unlikely to have significant negative impacts on natural habitat. Works will nevertheless be implemented in

		therefore supports the protection, management, and restoration of natural habitats in its project financing, as well as policy dialogue and economic and sector work. The Bank supports, and expects borrowers to apply, a precautionary approach to natural resource management to ensure opportunities for environmentally sustainable development. Natural habitats are land and water areas where most of the original native plant and animal species are still present. Natural habitats comprise many types of terrestrial, freshwater, coastal, and marine ecosystems. They include areas lightly modified by human activities but retaining their ecological functions and most native species.	an area in Bubisa that may not negatively affect diverse flora, fauna, and avifauna. The area is dependent on pastoralism.
4.10	Indigenous People Applicable	The objective of this policy is to (is) ensure that the development process fosters full respect for the dignity, human rights, and cultural uniqueness of indigenous peoples; (ii) ensure that adverse effects during the development process are avoided, or if not feasible, ensure that these are minimized, mitigated or compensated; and (iii) ensure that indigenous peoples receive culturally appropriate, gender and inter-generationally inclusive social and economic benefits.	The Gabbra community is included among people who meet the OP 4.10 criteria and to whom the policy requirements would apply. In addition, they are the overwhelming majority and the main Project Affected Persons (PAPs) of the project, so they do not qualify for additional benefits and so a vulnerable and marginalized group plan will not be necessary.
4.11	Physical Cultural Resources	The objective of this policy is to assist countries to avoid or mitigate adverse impacts of development projects on physical cultural resources. For purposes of this policy, "physical cultural resources" are defined as movable or immovable objects, sites, structures, and groups of structures, natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Physical cultural resources may be located in urban or rural settings, and may be above ground, underground, or underwater. The cultural interest may be at the local, provincial or national level, or within the international community.	This policy was not triggered under KOSAP hence it will not apply in Bubisa sub-project

4.12	Involuntary Resettlement Applicable	The objective of this policy is to (i) avoid or minimize involuntary resettlement where feasible, exploring all viable alternative project designs; (ii) assist displaced persons in improving their former living standards, income earning capacity, and production levels, or at least in restoring them; (iii) encourage community participation in planning and implementing resettlement; and (iv) provide assistance to affected people regardless of the legality of land tenure.	The proposed project will involve land take for construction purposes including, solar panels; generator rooms and distribution lines, as well as contractor yard and workers camp site
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**4.6 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 proposed a recommendation.

<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	<b>Similar</b> -both require screening	Screening has been done and the project is established as medium risk which requires and ESIA
ESIA is needed once determination has 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 has been established and should be prepared identifying all environmental and social impacts and mitigation measures proposed to address the impacts	<b>Similar</b> -both require ESIA depending on the project impacts	ESIA is prepared in line with EMCA /EIA regulations and refers to WB safeguard policies
O.P 4.12 Land Acquisition and Involuntary resettlement should be avoided wherever possible or minimized and exploring all alternatives	The Government and any other organization shall prevent internal displacement linked to development projects to the extent possible by exploring other alternatives.	<b>Similar</b> - displacement in projects should be avoided to the extent possible by exploring alternatives.	WB policy is more elaborate than the Kenyan Law

<p>O.P 4.10 on indigenous people seeks to promote the inclusions of these groups in development projects and especially through consultation to ensure they also share in the project benefits and ensure negative impacts do not disproportionately fall on them.</p> <p>The policy requires these groups to be consulted separately to enhance their participation.</p>	<p>The COK 2010, article 56 provides for the right of marginalized communities and the importance of their input in decision making that regards them.</p> <p>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.</p> <p>Emphasis is also on consulting with them.</p>	<p><b>Similar</b>-both seek to promote inclusion of these group so that they can share the project benefits and ensure that negative impacts of the project do not fall on them disproportionately</p>	<p>WB policy is more elaborate and the two are being used to complement each other.</p>
<p>Project Affected Persons (PAPs) should be meaningfully consulted and be given opportunities to participate in planning and implementing of projects especially where there is resettlement</p>	<p>EMCA requires that the project owner seeks the views of the people who are affected and explain the project information to them especially the impacts of the project and also obtain their opinions or comments.</p>	<p>Both are similar</p>	<p>Consultation has been done and will be progressed in line with the two WB policy and Kenya legislation</p>

## 4.7 Licences and permits for the project

No.	Relevant activity	Statute	Permit and License Requirement	Competent Authority	Responsible Agency for Obtaining Clearance	Date of Acquisition	Duration
<b>Pre-Construction Stage</b>							
1	Construction and operation	Environmental Management	Need to submit ESIA report	NEMA	Proponent	Upon approval of ESIA report	Max 90 Days from date of

No	Relevant activity	Statute	Permit and License Requirement	Competent Authority	Responsible Agency for Obtaining Clearance	Date of Acquisition	Duration
	of the solar mini grid	and Coordination Act (EMCA) Cap 387, Rev 2018	to obtain EIA license				submission of ESIA Report
2	Construction activities	Occupational Safety and Health Act (OSHA), 2007	Need to apply registration of premises	DOSHS	Contractor	Before commencement of construction	1 – 4 weeks
3	Setting up of construction camp sites	Environmental Management and Coordination Act (EMCA) Cap 387, Rev 2018	Need to submit Project report for the Camp Sites to obtain EIA License	NEMA	Contractor	Before commencement of construction	1– 1.5 months
6	Storage, transport and disposal of ordinary domestic and office waste	Environmental Management and Coordination Act (EMCA) Cap 387, Rev 2018	Need to obtain waste license through submission of Waste Management Plan	NEMA	Contractor	Before commencement of construction	1 – 1.5 months
7	Storage, transport and disposal of hazardous waste	Environmental Management and Coordination Act (EMCA) Cap 387, Rev 2018	Need to obtain hazardous waste license through submission of Waste Management Plan	NEMA	Contractor	Before commencement of construction	1 – 1.5 months
Construction stage							
1	Food handling in	Public Health Act	Obtain Food	County Government	Contractor	Before handling of	6 months

No .	Relevant activity	Statute	Permit and License Requirement	Competent Authority	Responsible Agency for Obtaining Clearance	Date of Acquisition	Duration
	the campsite		Handler Certificate			food in the campsite	
2	Workplace registration	Occupational Safety and Health Act, 2007	Apply for Registration of a Workplace	DOSHS	Contractor	Before utilizing the campsite	Annual

## 5 LAND REQUIREMENT AND PROCUREMENT

### 5.1 Land Tenure and Procurement

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Land ownership in Marsabit County is mainly community land except for a few adjudicated sections. The site for the proposed site is on unregistered community land measuring approximately 5 acres. The community has since offered the land to the project proponent establishment of the proposed project. However, the land is held in trust by the County Government of Marsabit (the trustee) on behalf of the community and therefore acquisition will be done from both the community and the County Government.

The Ministry of Energy has partnered with the community who are the owners of the land and the County government of Garissa 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. Therefore, the community in Bubisa were given an opportunity to identify one project within the Water, Education or Health sector that will be undertaken and implemented by the mini-grid Contractor.

### 5.2 Compensation Details

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Compensation for the land for the proposed project will be in kind; the Proponent will undertake some projects for the community. The community proposed the following projects as compensation:

1. Extra ward/unit at the Bubisa Health Center
2. Dining Hall at Bishop Cavalera School
3. Meeting hall at Bishop Cavalera School

## 6 BASELINE INFORMATION

### 6.1 Introduction

This chapter of the report provides a description of the existing physical, biological and socio-economic conditions of the Project Area which will directly or indirectly be affected by the proposed solar-mini grid project in Bubisa. It is essential that the baseline conditions of an environment are characterized in order to accurately predict the potential effects the project will have on the environment. The collection of baseline data therefore focused on providing information to support the assessment of any potential impact of the project. Information was therefore collected at the following levels:

- *County and sub-county level:* secondary information was collected at the county level aimed at providing a contextual overview of the host county and sub-county
- *Project Area:* Secondary and primary information was collected within the Project Area (Bubisa Village) and generally Bubisa Location. Primary project area baseline data was collected through Focus Group Discussions (FGDs), Key Informant Interviews with staff working in institutions present in the project area and transect walks through the project area.

### 6.2 General Overview

The proposed mini-grid falls under the North Horr sub-county of Marsabit County. It is situated within the area of jurisdiction of Bubisa sub-location, which falls under the Bubisa location in Turbi Ward on Latitude 2°42'4.00N and Longitude 38°5'31.86"E. The site area in which the proposed solar mini-grid will be located is called Bubisa Village. Neighbouring settlements to Bubisa village include Mudde, Segel, Orondere and Agargabo.

### 6.3 Physical Characteristics

#### 6.3.1 Topography

##### 6.3.1.1 County Level

Most of Marsabit County constitutes an extensive plain lying between 300m and 900m above sea level which gently slopes towards the south east. The plain is bordered by hills and mountain ranges and is broken by volcanic cones and calderas to the west and north of the county. The prominent topographical features of the county are Ol Donyo Ranges in the south west (2,066m above sea level), Mt. Marsabit (1,865m above sea level) in the central part of the county, Hurri Hills in the north eastern part of the county (1,685m above sea level), Mt. Kulal in the north west (2,235m above sea level) and the Sololo-Moyale escarpment in the north east (up to 1,400m above sea level).

The county has no permanent river, but has four drainage systems, covering an area of 948 sq. km. Chalbi Desert is the largest of these systems and it receives run-off from the surrounding lava and basement surfaces of Mt. Marsabit, Hurri Hills, Mt. Kulal and the Ethiopian plateau. In the south, the seasonal rivers of Milgis and Merille flows eastward and drain into the Sori Adio swamp. Other drainage systems include the Dida Galgallu plains which receive run-off from the eastern slopes of Hurri Hills and Lake Turkana into which seasonal rivers from Kulal and Nyiru mountains drains to. The county has three dryland forests, namely Mt. Marsabit, Hurri hills and Mt. Kulal.

North Horr sub-county, where the proposed project site falls under, has an altitude of about 550m above sea level.

##### 6.3.1.2 Project Area

Bubisa has an estimated terrain elevation above sea level of 539 metres. There are no water bodies i.e.

rivers/streams in the area apart from a rain fed dam and water pan.

The project site has a flat terrain with an altitude of 575 metres Above Sea Level (ASL). The ground surface at the site is flat lying with a very gentle slope towards east.

## **6.3.2 Soils**

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### **6.3.2.1 County Level**

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The county is often described as the giant arid, semi-arid and deserts surrounding two green islands – referring to Mt. Marsabit and Mt. Kulal forests and the open grassland of Hurri Hills.

Soils in Marsabit county are shallow and poor since volcanic rocks from the most dominant geological formation.

The county lies in four main ecological zones, namely; sub-humid, semi-dry (mainly woodlands), arid (predominantly bushlands) and very arid (scrublands). The sub-humid/forest zones have soils that are suitable for rain fed agriculture, while the soils in the arid areas are shallow and stony clay loams with rock outcrops.

Various forms of environmental threats are prevalent in Marsabit including land degradation and related soil degradation through pulverization, compaction, fertility loss, soil erosion, salinity and high soil acidity. This is mainly as a result of multiple effect of deforestation

### **6.3.2.2 Project Area**

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The soils in the project location are predominantly sandy soils with patches of clay soils. The soils have a high concentration of sand that quickly drain excess water and cannot hold significant amounts of water or nutrients for plants. This contributes to poor fertility hence restricting wide range of vegetation proliferation.

During the FGD with the women it was reported that a number of women in Bubisa practice agriculture through greenhouses although it has not been successful due to the types of soils in the area.

The soil strata in the proposed area is quite stable and the area is not prone to slide.

**Figure 6:Types of soils in the project area.**



### **6.3.3 Geology**

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#### **6.3.3.1 County Level**

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The geology of the general Marsabit area and its environs consists of a massive alkaline basaltic rock system that overlies Precambrian basement rock complex at depth. These volcanic rocks referred to as the Marsabit Shield cover the entire mountain forming basaltic rapilli breccia volcanic ash cones, and cinder cones interlayered with extensive olivine basalt flows. These miocene-oligocene basalts unconformably overlie undifferentiated basement rock system at depth.

The formation of the Marsabit Shield (evolution of Marsabit Mountain), took place in a series of volcanic eruptions. Volcanism in the Marsabit Shield commenced at the same time with the Rift system faulting in the Pliocene and continued into the Quaternary period according to the recorded basal basalt rock ages dated 2.5 and 0.5 million years respectively.

The volcanic centers comprising of cinder cones and block and ash cones (or maars) are concentrated trending northwest and northeast through the shield summit. The initial lava flows are uniformly thin and laterally extensive fissure controlled basal basalts erupted during the late Miocene to Pliocene periods.

Subsequent violent eruptions during the Quaternary period produced intervals of pyroclastic accumulations from cinder cones and maars with faulting accompanying volcanism. The major faults were concealed by later volcanic flows with eruptions of narrow lava tongues of olivine basalts emerging from the cones.

#### **6.3.3.2 Project Area**

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The eastern volcanic complex including the Marsabit town best describes the geology of the surveyed area. The Huri Shield and Marsabit shield being the main source of the widespread volcanic ashes and basaltic breccia. They share a basalt platform, the south end of the Huri Shield form a raised plateau abutting into the Chalbi playa. Elevated piles of Basalt blocks are separated by irregular hollows partly in filled by unconsolidated sediments.

The Marsabit shield has a more varied morphology caused by the different weathering characteristics of the assorted volcanic lithologies. The shield itself has a typical shallow dome shape profile with overall surface slope of less than 60. The Basal platform is exposed east of Maikona where its most distinguishing features are a massive concentration of dark circles on aerial photographs due to the abandoned rock foundations of the former Rendile settlements.

According to Charsley (1986), Basalts underlying the Huri shield were extruded from fissure sources during the late Miocene and stating that Volcanism of the Marsabit shield commenced in the Pliocene, 2.5 Ma. The Marsabit shield has an oval plan with a NE – SW long axis of about 90km. The volcanic centres are concentrated in two belts, about 15km wide, trending NW and NE through the summit of the shield. The Marsabit shield has a surface area of about 6300km<sup>2</sup> with a total volume of 910km<sup>3</sup> of basaltic material with a summit thickness of 1200m of intercalated basaltic lavas and pyroclasts. The individual flow units have thicknesses from about 5 to 20m whereas the various pyroclastic wedges may be up to 200m of maximum thickness.

The platform basalt exposed south east of Moikona is a homogenous well jointed and locally well-developed vertical columnar joints, aphanitic basalt weathering to shades of dark brown. Immediately north of Moikona the Huri Shield consists of several flows stacked on top of each other to define a scarp which is about 30m high. The basalts are well jointed, vesicular with a ferromagnesian phase weathering to orange brown against a dark brown background. Secondary carbonates are common along joint planes.

Most of the cinder cones consists of red brown weathering, thickly bedded lapilli breccia. The beds have radial dips of up to 400. Although basal beds tend to sub horizontal, i.e. the dip angles increase up the succession. Angular scoriaceous basalt lapilli are the principal component of breccias with minor convoluted bombs and blocks of the same material up to 40cm in length. A secondary carbonate cement is ubiquitous: a friable red brown matrix is confined to discrete beds.

The largest intrusive is the discordant vertical granite sheet cropping out on the northern summit of Halisurwa. This is a massive, pink weathering, feldspathic rock with euhedral quartz grains visible in hand specimen. Minor intrusives include quartz reefs and stringers, carbonate veins in marbles, white mica bearing felsic veins quartzofeldspathic pegmatites and grey microgranite dykes. The latter are relatively common, especially to the east of Korr Mission. They have sharply discordant contacts with the host gneisses and are 1m thick.

### **6.3.4 Ground Water Development**

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#### **6.3.4.1 County Level**

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The most predominant geological formation in the county is volcanic rock. Only in a few areas these volcanic rocks are interrupted by pockets of quaternary sediments. Nevertheless, many parts of Marsabit County are known to have productive deep aquifers. The borehole database (which is currently being updated with the data provided within the Rapid program by the counties) shows that Mt. Kulal has productive boreholes. On the high altitude area surrounding Marsabit Town, borehole siting and drilling can be challenging due to unstable volcanic formations, and deep groundwater levels (>200 meters below ground level). On the lower slopes groundwater appears to have a higher potential, as many good yielding deep boreholes are present with water strikes generally between 50 to 150 mbgl, and with boreholes with a yield of up to 20 m<sup>3</sup>/h present. Most productive boreholes appear to be related to water bearing fractured bedrock. Generally the water quality is reported to be good, but some of these aquifers have water quality problems due to high salinity, while the omnipresent volcanic rocks are associated with presence of high fluoride levels in the groundwater.

The large depression between the hills of Mount Marsabit, Mount Kulal, Hurri Hills and the Ethiopian plateau, is the Chalbi Desert and forms the largest drainage system in Marsabit County, covering an area of 948 km<sup>2</sup>. The depression receives run-off from the lava and basement surfaces of the surrounding mountains

and hills. The lowest part of this depression is seasonal (Old) Lake Chalbi (the 'grey' area south and west from Kalach Dida in the figure above), which is covered by recent sediments. Although, groundwater potential in the depression of (Old) Lake Chalbi is currently still unknown in terms of volumes and annual recharge, high yielding boreholes can be found here, especially south of the Marsabit – North Horr ridge and around North Horr town.

The rest of the county is covered by rocky, stony and rugged lava plains with poor soil development. Some of these soils in the western part of the county have acidic moisture and are saline in the Chalbi Desert. The groundwater potential in the sedimentary areas of these plains is expected to be low. Generally the bedrock in the lowland areas is varying from 20 and 80 mbgl. The larger area around the depression, which is still considered the Old Chalbi Lake aquifer (the brown filled area in the figure above), has limited rainfall in the Chalbi desert and presence of saline soils, especially the area between North Horr and Lake Turkana. The recharge and quality aspects of groundwater are therefore not expected to be advantageous for efficient groundwater abstraction. Moreover, the low success rate of boreholes in the sedimentary areas appears very often also related to inadequate hydrogeological assessments and poor application of geophysics.

#### **6.3.4.2 Project Area**

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There are four boreholes that serve the project area. It was reported by the community members in the FGDs that the water is used to cater to all their domestic needs i.e. cleaning, cooking, drinking and watering of livestock.

Three of the boreholes were constructed Government; one by the colonial Government in 1956. Water from the boreholes is saline while and is only good for domestic chores. However, the PACIDA (Pastoralist Community Initiative Development Assistance) an organization that empowers pastoralist communities through sustainable community driven development interventions has constructed a borehole for the Bubisa community and in conjunction with other organizations has and set up a solar-powered brackish groundwater desalination system that is meant to produce 11 cubic metres (11,000 liters) of potable water, hourly with a capacity to supply over 30,000 community members with fully automated water ATMs. The quality of this water is good and is fit for human consumption.

Generally, the water is safe for consumption if treated. However, the consultants were not able to establish the capacity of the boreholes.

There is also one water pan and two dams which are rain fed.

### **6.3.5 Climatic Conditions**

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#### **6.3.5.1 County Level**

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The climate in Marsabit is referred to as a local steppe climate.

The county has arid climatic condition with the exception of the areas around Mt. Marsabit, Mt. Kulal, Hurri Hills and the Moyale-Sololo escarpment which represents typical semi-arid condition. The temperatures go from a low of 15oC to a high of 26oC, with an annual average of 20.50C (World Weather and Climate Information, 2015). An average of 12 hours of sunshine is received per day.

The county has a bi-modal rainfall pattern. The long rain season falls between April and May while the short rain season falls between November and December. Rainfall ranges between 200mm and 1,000mm per annum and its duration, amount and reliability increases with rise in altitude.

Climate change has tremendous influence on the county's bimodal rainfall pattern. It's difficult to predict the onset of the short or the long rains. This has affected farming activities in regard to land preparation and increased crop failures, hence impacting negatively on agriculture dependent livelihood. Water resources have also been affected as many springs that previously flowed from the forest are drying up. Prolonged and recurrent drought has led to reduced forage, degradation of the environment and an increase in destitution.

North Horr region is mainly arid and represents ASAL (Arid and Semi-Arid Land) with an exception of the areas around Mt. Marsabit and Mt. Kulal. North Horr (550m) has a mean annual rainfall of 150mm; Mt. Marsabit and Mt. Kulal experience 800mm.

The rainfall in the sub-county is variable and the evaporation rate exceeds ten times the rainfall amount.

A sequence of extreme weather events has affected and continue to affect the livelihoods of the people at large. Drought frequencies have increased to every 1-3 years during which pastoralists can lose up to 50% of their herds. Floods on the other hand have also ravaged the county.

For example, in January 17th, 2022, heavy downpour accompanied by hail storms left a trail of destruction in North Horr sub-county leaving over 5,000 sheep and goats dead. The affected were herders in regions within Bulluk, Ndare, Chalbi Ndogo in Dukana and illeret wards. The downpour occurred following a prolonged drought in the region that hit in May 2021.

### **6.3.5.2 Project Area**

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The project area can be characterized under Ecological Zone VI which is described as very arid/dwarf scrubland zone. These areas have extremely short grazing season, mostly lasting not more than two months after the rain seasons.

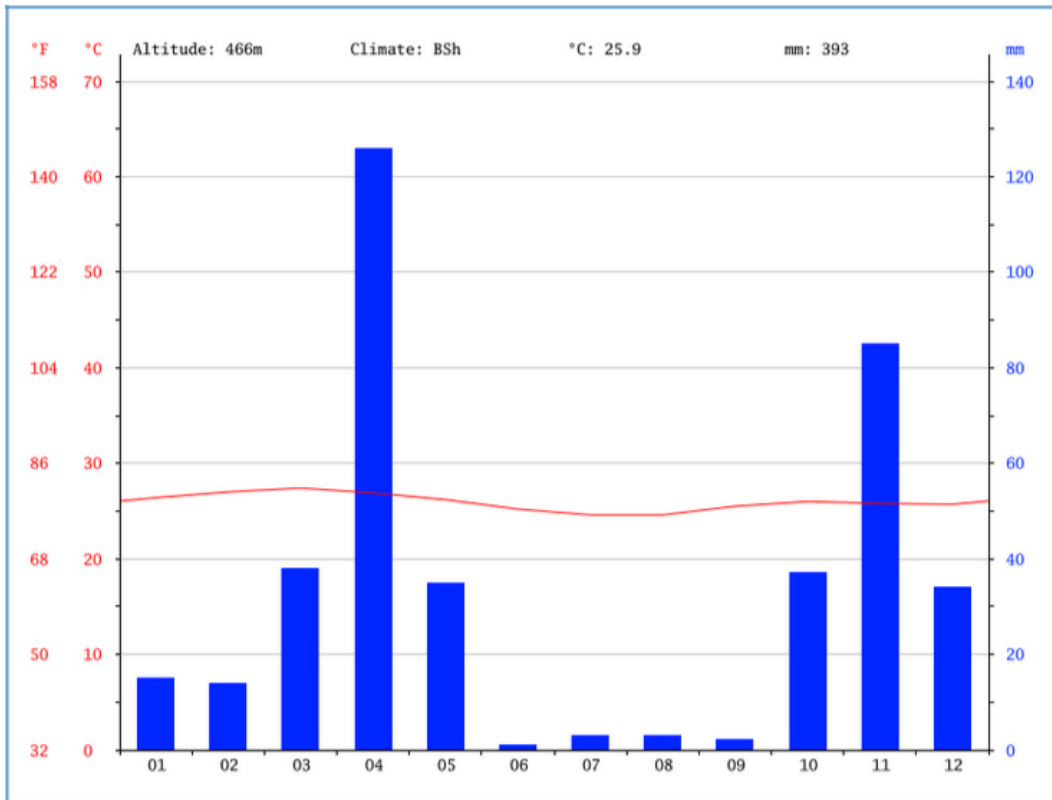
The area experiences harsh climate. Due to the harsh climate the area suffers water scarcity and food security.

The least amount of rainfall occurs in June. The average in this month is 1 mm. Most of the precipitation here falls in April, averaging 126 mm.

The temperatures are highest on average in March, at around 27.4 °C. July is the coldest month, with temperatures averaging 24.6 °C. The variation in the precipitation between the driest and wettest months is 125 mm. Throughout the year, temperatures vary by 2.8 °C.

The average rainfall and temperature are 33mm and 26°C, respectively.

**Figure 7: Climatic Graph of the Project Area**



**Figure 8: Annual Climate Averages of the project area**

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature (°C)	26.4	27	27.4	26.9	26.2	25.2	24.6	24.6	25.5	26	25.8	25.7
Min. Temperature (°C)	18.3	18.6	19.3	19.6	18.8	17.9	17.3	17.2	17.5	18.2	18.5	18
Max. Temperature (°C)	34.6	35.5	35.5	34.2	33.6	32.6	31.9	32.1	33.5	33.9	33.2	33.4
Avg. Temperature (°F)	79.5	80.6	81.3	80.4	79.2	77.4	76.3	76.3	77.9	78.8	78.4	78.3
Min. Temperature (°F)	64.9	65.5	66.7	67.3	65.8	64.2	63.1	63.0	63.5	64.8	65.3	64.4
Max. Temperature (°F)	94.3	95.9	95.9	93.6	92.5	90.7	89.4	89.8	92.3	93.0	91.8	92.1
Precipitation / Rainfall (mm)	15	14	38	126	35	1	3	3	2	37	85	34

Bubisa community members graze their livestock close to settlement areas during rainy season and move far away from their homes with their livestock in search for pastures and water during the dry season in areas around Dankarsa in Shurr, Gorr-Gorr in Bubisa and Burgabo in Torbi sub-location.

Some of the Bubisa community members lost their livestock from the hailstorms that occurred on January 17<sup>th</sup>, 2022 while the herders were out grazing their animals in other sections of the sub-county (North-Horr).

## **6.4 Biological Characteristics/Ecological Conditions**

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### **6.4.1.1 County Level**

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The county is often described as the giant arid, semi-arid and deserts surrounding two green islands – referring to Mt. Marsabit and Mt. Kulal forests and the open grassland of Hurri Hills.

Marsabit County lies in four main ecological zones, namely, sub-humid, semi-arid (mainly woodlands), arid (predominantly bushlands) and very arid (scrublands):

#### **Sub-Humid/Forest Zones - Ecological Zone II:**

Sub-humid zone which includes parts of Mt. Marsabit (1,500m ASL) and Mt. Kulal (1,700m ASL) supports dense evergreen forests and is characterized by high rainfall of up to 1,000mm per annum, low evapo-transpiration. This zone mainly supports agro-pastoral livelihood systems and have soils that are suitable for rain-fed agriculture. Although, it covers just about one per cent of the county, this is an important water catchment area.

#### **Semi-Arid areas/Woodland Zone - Ecological Zone IV:**

The semi-arid areas has a medium potential for supporting both pastoralism and agriculture. These comprise areas that constitutes the lower slopes of Mt. Marsabit, the middle slopes of Mt. Kulal and the top of Huri Hills which has increasingly become an area of sedentarized agro-pastoral production. Some pockets within Sololo and Moyale fall in this zone as well.

#### **Arid areas/Bushland Zone - Ecological Zone V:**

The arid areas includes the lower slopes of volcanic and basement piles lying between 700m and 1,000m above sea level. The soils are shallow and stony clay loams with rock outcrops while the flatter areas are covered by grass. The zone consists of the plains of Diid Galgallo, Bule Dera, Milgis and parts of the slope of Mt. Marsabit and Huri Hills. These areas are characterized by steeper slopes which may favour greater surface run-off and hence exposed to greater sheet erosion.

#### **Very Arid/Dwarf Scrubland Zone - Ecological Zone VI**

This zone comprises the most extensive in the county and includes all the hills and plains below 700m above sea level. The typical vegetation is dwarf-shrub grassland or a very dry form of bushy grassland. These areas have extremely short grazing season, mostly lasting not more than two months after the rain seasons. In extreme period of rainfall failure, the only vegetation available in this area is dwarf-shrub, which mainly supports goats and camels.

The county lowland environment consists of about 20% arid and semi-arid land (ASAL), predominantly under bushland and shrublands. Bushland is dominated by high woody bushes mixed with trees, whereas the shrubland is shorter, continuous shrubs of about 6m in height. The bushlands cover slopes of Mt. Marsabit, Kulal, Kalacha, Maikona, Ngurnit and others while the shrublands occur around Sololo, Funanyatta, Illeret, Sibilo, Hedad, Korole and others.

The main forest products are charcoal, timber, stones, wood fuel and non-timber forest products such as water, medicinal herbs and grass. The main tree species include olea Africana, croton spp, leucaena spp, cassia spp, moringa spp, jacaranda, and acacia spp and cordia sp; the main shrub species include psychotria kirti, clausesena anisat and rytigynia neglecta while the most common grass species include oplismenus hirtelus and schoenoxiphium lehmanni.

The county is very rich in wildlife diversity. In fact, before 1990s, only a few species were not found in the county. The wildlife species found in the county includes; rhinoceros, elephant, lion, leopard, cheetah, buffalos, Oryx, Thomson's gazelle, Ostrich, Spotted Hyena, Gerenuk, Kudu, Giraffe, Zebra and baboons.

The bird species found in the county include African olive pigeon, bearded vulture, hartlaub's turaco, Heuglin's bustard, little grebe, masked lark, peregrine falcon, purple heron, Somali courser among others.

The main livestock types are cattle, goats, sheep, camels, donkeys, poultry,

#### 6.4.1.2 Project Area

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The project area can be characterized under Ecological Zone VI which is described as very arid/dwarf scrubland zone. This is because the site lies at an altitude of about 575m ASL and is sparsely populated with low trees and shrubs. The main tree species in the area include Acacia tortillis), Warra & Agarsu (Commiphora sp.), Mader (Cordia sp.), Ogomdi (Grewia sp.), Sukela (Delonix sp.), Dumasho (Maerua sp.), Tiile (Lansea sp.), Badan (Balanites sp.), Sigirso (Acacia reficiens), Adde (Salvadora persica), Wolena (Erythrina sp.), Garse (Dobera glabra), Lokho (Diospyros sp.), Karari (Sterculia africana), Harken (Euphorbia sp.).

The key wildlife species in the project area includes reticulated giraffes, elephants, Beisa Oryx, Grant's gazelles, gerenuk, Grevy's zebras, baboons, lions, leopards, greater kudu, buffalos, ostrich, spotted hyena, bat-eared fox, African wild dogs among others.

The project site has minimal flora and fauna. It is sparsely populated with low trees and shrubs. The tree species observed on the project site were Acacia trees. There were no animals or birds that were observed at the site at the time of the site visit.

**Table 9: Types of vegetation found in the project site**





## 6.5 Socio-economic Characteristics

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This section provides a socio-economic profile of the project affected area with the objective of understanding the demographic trends and economic performance of the area.

### 6.5.1 Community Profile

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The proposed solar mini-grid project falls under North Horr sub-county of Marsabit County. It is situated within the area of jurisdiction of Bubisa sub-location which falls under the Bubisa location in Turbi County Assembly Ward. The Bubisa location is in North Horr constituency. The location has two sub-locations mainly Bubisa and Oronder sub-locations.

Bubisa village is in Bubisa sub-location, Bubisa location, North Horr sub-county in Marsabit County. It is located 47 km from Marsabit town. The primary ethnic group is Gabbra. Islam is the dominant religion. Below is a summary of demographic profile of Bubisa.

The top community development priorities are 1st Health, 2nd Education and 3rd Water % Sanitation in that order. Houses in the community are temporary structures made of sticks/straws and fabric for the walls, the roofs are made of sticks/sisal while the floors are earthen floors.

The community support mechanism includes the **Inua Jamii Programme** which includes Older Persons Cash Transfer Programme (OPCT) and emergency relief food/feed sponsored by the Hunger Safety Net Programme (HSNP) which is managed by the National Drought Management Authority (NDMA) Administrative Structure.

### 6.5.2 Demographic Profile

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#### 6.5.2.1 County level

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County level information was mainly obtained from the Marsabit County Integrated Development Plan (2018-2022).

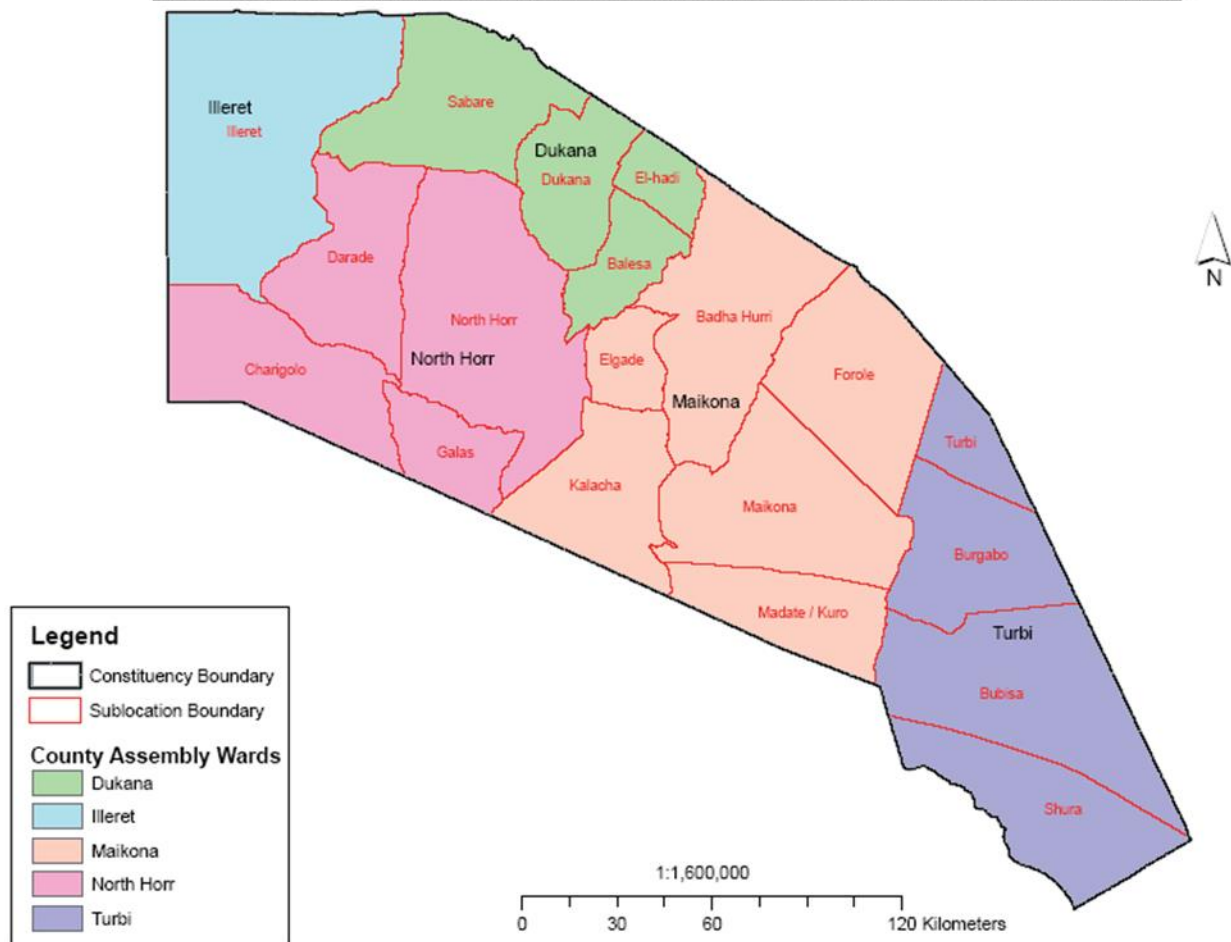
Marsabit County is one of the forty-seven counties in Kenya and occupies the extreme part of northern Kenya. It shares an international boundary with Ethiopia to the north, borders Lake Turkana to the west, Samburu County to the south and Wajir and Isiolo counties to the east. It is located between Longitudes 37° 57' and 39° 21' East and Latitudes 02° 45' and 04° 27' North.

Marsabit County is divided into four sub-counties (also referred to as constituencies), namely, Saku, Laisamis, North Horr and Moyale.

Table 1.1 shows the area in sq. km of the county and the sub-counties

Sub-County	Area in Sq. Km	No. Wards	of	No. of Locations	No. of Sub-Locations
Saku	2052	3		11	22
Laisamis	20,290.5	5		11	30
North Horr	39,248	5		13	18
Moyale	9,370.7	7		23	42
Total	70,961.2	20		58	112

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According to the Kenya Population and Housing Census (KPHC) 2019, the population demographics for the proposed project’s jurisdiction is as follows:

Area	Male	Female	Total	No. of HHs	Land Area Km <sup>2</sup>	Density (Persons per Km <sup>2</sup> )
Marsabit County	243548	216,219	459,758	77,495	70,944	6

North Horr Sub-County	41719	29,726	71,447	9,789	19,377	4
Turbi Ward	11,665	9,485	21,151	3044	13,344	2
Bubisa Location	4,354	3316	7,671	1058	5,640	1
Bubisa Sub-Location	3624	2682	6,307	885	2952.5	2

### 6.5.2.2 Project Level

According to the Kenya Population and Housing Census (KPHC) 2019, Bubisa location has a population of approximately 7,671 and 1,058 households with an average of 1 person per square kilometer. The gender ration at the location level is currently estimated to be 57% male and 43% female.

According to the community profile, Bubisa has a population of approximately 6000 and with about 1000 households with an average of 6 people per household. The gender ration at Bubisa is currently estimated to be about 45% male and 55% female.

**Table 10: Demographic profile of Bubisa**

Attribute	Magnitude/Number
Approx. population	6000
Households	1000
Gender.	Male – 45% Female – 55%
Ave. No. per household	6 per household
Indigenous	90%
Settlers	10%
Vulnerable classes	Elderly-200 Households PLWDs-50 Households Female Headed HHs-150 Households Child Headed HH-3Households
Dominant ethnic group	Gabbara
Primary religion	Islam and Christianity
Other groups	None
Employment (formal/Informal)	Formal – 1% Informal – 99%

### 6.5.3 Ethnicity

#### 6.5.3.1 County Level

Marsabit County is inhabited by Cushitic-speaking people. They include tribes such as the Gabbara, Oromo, Rendille, Borana. Most of the communities within the county practice nomadic pastoralism.

#### 6.5.3.2 Project Area

Bubisa village is occupied by the Gabbara community. Gabbara community is organized according to patrilineal descent and its basic unit is the clan. There are around 40 clans in Gabbara society, composing five phratries. The aspect of phratry is important to Gabbara daily life because each phratry has its own territory. Each clan has its own cattle ear-mark and brand. Gabbara society is a gerontocracy with elders being the decision makers at the camp level, the clan level and the phratry level where the assembly serves as a mobile judicial, administrative and spiritual center.

The Gabbara are an Eastern Cushitic people related to the Somali-Rendille in their historical origins. The Gabbara first settled just south of the Ethiopian border. However, recurrent attacks from the Ethiopian soldiers and

the Daseenach led to their relocation to near the Hurri Hills area farther south of the border. The Gabra share the Oromo clan identities with their Borana neighbors, but retain older Somali-Rendille identities. This yields a complicated pattern of clans and "moieties". There is a complicated Oromo generational system called "gada" which includes all people born with successive 7-year periods. The five sections of the Gabra are the Algana, the Gona, the Gara, the Galbo and the Odol.

The Gabra are closely related with the Borana. They speak the same language and have a very similar social organization, religious and moral ethos. However, their ceremonies and calendar are quite different from those followed by Borana. Moreover, the Gabra rely much more on camels and are therefore able to live in much drier areas. Their ability to survive in such a harsh environment, their extremely exact way of reckoning time with their two independent calendars, one Solar and one Lunar, their traditional chronology – purely oral but very accurate, which records events of every single year back to 1850, their distinctive ceremonies full of symbolism and performed with collective involvement make their culture one of the most interesting among the nomads of East Africa.

The roles of the women in Bubisa is Fetching of firewood and water, taking care of children, cleaning cooking and looking after the homestead whereas the roles of the men is looking after livestock, fetching water for the livestock and watering them. Men also provide for the family by having businesses.

## **6.5.4 Educational Infrastructure**

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### **6.5.4.1 County Level**

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Marsabit County has 252 public ECDE centres and 64 private ones. The ECDE enrolments are estimated at 19,239 while the total number of ECDE teachers are 413. The teacher pupil ratio in the pre-primary school is 1:29. The total enrolment in the public and private ECDEs is 16,005. The pre-primary retention rate is 99 percent with a drop-out rate of 0.2 per cent while the transition rate is 99 per cent

There are 231 primary schools of which 181 are public and 50 private. The primary school age population is estimated at 46,178. Therefore, there is a strain on existing facilities with some public primary schools and their respective pre-primary units sharing some facilities. With the population projected to grow to 61,300 in 2017, the county must set aside adequate resources to expand school infrastructure to meet present and future demand.

The county has 43 secondary schools with the number of students standing at about 6028. Mixed schools make up 44 per cent of these, boy schools 31 per cent and girls schools 25 per cent. The number of secondary schools is inadequate hence the low primary to secondary transition rate.

The county has four youth polytechnics, no colleges and no universities. This means that majority of youths cannot acquire technical skills within the county.

### **6.5.4.2 Project Area**

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The village has only two primary schools – Bubisa Primary School, Bishop Cavallera Primary School and one secondary school- Hon. Isacko Memorial Boys High School located approximately 400 metres, 600 metres and 500 metres away from the project site, respectively. There are no tertiary institutions in the area.

Bishop Cavallera Primary School is a Government sponsored institution. It has a total of 413 pupils (145 boys and 268 girls) with a sex ratio of 2:1. It runs from ECDE to Standard 8. There is a total of 8 teachers. Majority of the teachers are paid by the Teacher's Service Commission while the rest are paid by the Board of Management (BOM). The average walking distance of the students to the school is 5-6 kilometers. This sometimes affects the student's school attendance

The primary school attendance rates for males are 98% for each level while the attendance rates for the females is 97% for each level. The completion rates are 99% for both boys and girls. 30% of the students

who complete their primary education at the school proceed to higher institutions of learning.

The main challenges faced by the school include lack of reliable power supply, overcrowding due to inadequate classrooms, insecurity due to a damaged fence, lack of boarding facilities such as a dining hall. Additionally, students had not been provided with meals for the past two months.

The performance of the school is fairly good as mentioned by the Head Teacher who was interviewed. While it was observed that the existing infrastructure was in good condition, the school is however in need of facilities such as a fence, a dining hall, a kitchen and additional classrooms.

**Figure 9: Image of Bishop Cavallera Primary School**



Hon. Isacko Memorial Boys High School is a Government sponsored boys only secondary boarding school. The Head Teacher, the interviewee, has worked at the school for the past 7 years. It has a total of. It runs from ECDE to Standard 8. There is a total of 18 teachers in the school who are paid by the Teacher's Service Commission through banks which are accessible in Marsabit town, approximately 42 km away from the school.

The primary school attendance rates are 100% for all levels. The completion rate for the students is 100%. 30% of the students who complete their primary education at the school proceed to higher institutions of learning. The challenges faced by the students is financial constraint which hinders them from raising school fees since most of them come from humble backgrounds.

The main challenges faced by the school include lack of reliable water and power supply. He suggested that the project should probably drill a borehole to serve the water needs of the school. The school receives support from NGOs in form of food donations as well as textbooks from Kenya Literature Board (KLB) through the Ministry of Education.

The performance of the school is very good. It is one of the top best performing schools in the county.

**Figure 10: Image of the entrance to Hon. Isacko Memorial Boys High School**



**Figure 11: Image of the Administration Block at Hon. Isacko Memorial Boys High School**



During the FGDs with the men, women and youth the male participants reported that accessibility to education for the children within the area is generally good but not as good as compared to other parts of the country. They reported that the primary schools are located far from the settlements, approximately 6 kms. Most of the boys take up livestock keeping once they finish their primary level education. The factors preventing men from accessing further education is the domestic responsibility of livestock rearing/herding. The men and boys have a generally low ability to read and write as most only have primary level of education.

40% of the youth respondents in the FGD had completed secondary education while a further 30% had

completed Vocational/College level education. The women reported that the boys and girls have equal opportunities to education and most of the women in the community can read and write including the young adults and children that have attended school. The women also attend adult education classes commonly known as "Gumbaru".

## **6.5.5 Occupation and Livelihood Profile**

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### **6.5.5.1 County Level**

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Livelihood activities in the county include livestock keeping, crop farming, fishing, forestry, and trade with minimal mining and tourism. The population is 81% pastoralist and 16% agro-pastoralist. Fishermen constitute 2% of the population and are mostly concentrated in the surroundings of Lake Turkana especially Loiyangalani where fishing is the sole livelihood.

Agriculture is the main economic activity in Marsabit County. It involves crop production, livestock keeping, bee keeping, fishing and agroforestry. Agricultural production in the county is predominantly livestock based. Approximately 81, 16, and 3 % of the population is engaged in pastoralism, agropastoralism, and other livelihoods respectively. Crop production is limited to a few areas given the low and erratic rainfall in most parts of the county.

The livestock types reared in the county include cattle, goats, sheep, camels, donkeys, and poultry. The crops grown are maize, green grams, wheat, teff, beans, millet, vegetables (kales) and fruits (mangoes, oranges and avocados). Fruit trees are considered as part of agroforestry, a practice limited to areas around Mt. Marsabit and Sessi.

Marsabit County Government has put up market structures in all major trading centres.

The main traded goods in urban centres and local markets are livestock and livestock products, fruits, vegetables, maize, beans, wheat, millet and teff - a cereal cultivated almost exclusively in Ethiopia. Most of the maize and beans comes from other counties whereas some fruits and vegetables come from Ethiopia through Moyale border town.

There is only one large Industry in the county (LTWP) with a capacity to produce 350 MW of electric power, but no major manufacturing or agro-processing industries despite its abundant and high potential for livestock products.

Business enterprises are mainly concentrated in the towns and market centres throughout the county. The main commercial enterprises include retail and wholesale, sale of livestock products like meat, milk, hides and skins, transport services, car and motor cycle garages and spare shops, hotels and restaurants among others. The actual statistics of the businesses is currently being compiled.

Marsabit has relatively low number of persons gainfully employed in formal sector wage based employment. There are only 7% of individuals in wage-earning category in the county. This is partly due to low literacy levels and lack of industries as well as low proportion of skilled labour due to lack of technical and vocational training institutions in the county.

About 10 per cent of people in urban and 18% of people are in rural self-employment. This pretty low and reflects low rate of business growth, lack of business skills among the population, lack of start-up capital and business management skills.

The labour force constitutes 49.1% of the county population, which is almost half of the entire population. The labour market has potential to absorb more people but due to limited opportunities, the rate of unemployment remains high, with most of skilled labour force unutilized

The level of unemployment in Marsabit stands at 65 per cent, which is mainly among the youths. Although in an effort to address the skills gap among the youth, the county government has in the last two years

put up four youth polytechnics (one in each sub-county) and with one coming up in Saku sub-county, the rate of enrolment still remains low.

#### **6.5.5.2 Project Area**

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Bubisa community are mainly pastoralists who keep large herds of livestock and move from one place to another in search of pasture and water. Major livestock kept are camels, cattle, sheep, goats, chicken and donkeys. The community rely on livestock products for food at the household level and for income generation. The community sometimes sell their livestock to supplement their income.

Formal employment is at 1%. These are people who are employed at the Schools, the local health center, by the Kenya Defense Forces and the National Government Administrative Authority (NGAO) officers such as the Chief and the Sub-Chief. Other sources of income in the society include small-scale retail businesses of selling clothes. The businesses are mostly run by the women and are funded through group loans.

Due to the aridity of the area and poor soil condition, the community does not engage in food production (crop growing)

The income-generating activities pre-dominant among youth in Bubisa include selling and buying of livestock. The rate of unemployment is high among the youth in the area which can be attributed to lack of employment opportunities and to a small extent, low levels of formal education. However, some of the youth have ventured into retail business to sustain their livelihoods while a few have full time salaried jobs. The youth stated during the FGD that more education opportunities to acquire skills such as welding, and electrical works that would then enable them to secure jobs with the solar mini-grid project.

There are no there are no major credit facilities within the area and community members rely primarily on their savings through M-Pesa. However, the women reported that they have access to banking facilities and also use M-Pesa services for saving. Both the men and women claimed to contribute more to the household income.

**Figure 12: Image of pastoral activities in Bubisa Village**



### 6.5.6 Land Use

Land is a primary factor of production in the economy and has aesthetic, cultural and traditional values. Land types in the County is broadly classified as game reserve, townships, agriculture and grazing lands, with largest proportion under communal grazing areas. The absence of the national land use policy and spatial plan has encouraged the proliferation of informal settlement, inadequate infrastructure services, congestion, environmental degradation, unplanned urban centres, pressure on agriculture and grazing land and inter-tribal conflicts among others. Out of the total area of 70,082 sq. km, Marsabit County, only 2,082 sq. km within the mountain area of Marsabit sub-county has potential for farming. This is where adjudication is ongoing and some lands already registered and title deeds issued to the land owners. However, the land records inherited from the defunct Local Authorities, are still manually managed, hence storage, security and access is a challenge. There is need for an effective Land Information Management system.

Most of the land in the county is owned communally except a few adjudicated sections in Saku and Moyale constituency. The mean holding size of adjudicated sections is 0.8ha, which is slightly low compared to the national mean holding of 0.97ha per household. Land adjudication has started in some areas and plans are underway to roll out the adjudication exercise countywide. The transition to a sedentary livelihood away from pastoral systems has created pressure on grazing land. In the recent past, there is also an increase in the numbers of conservancies, which may significantly change the land use going forward.

**Table 11: Land Categories in Km<sup>2</sup>**

Land category	Surface area Km <sup>2</sup>
Arable Land	15,828

Rangeland (non-arable land)	51,008
Water Mass	4,126
Total	70,961

Only about 2% of the land in the county is registered. So far, the land registration covered Marsabit mountain areas, particularly, the Marsabit Township and Dakabaricha in Saku Constituency, where, so far 4,841 title deeds have been issued to land owners. This represent paltry 2 % of all land owners. The

Due to the communal ownership of land in Marsabit county, individual rights are not guaranteed. Absence of clear land rights remains primary disincentive for communities to embrace best land use practices in some areas and is a key driver of weak land governance. In addition, lack of title deeds is a constraining factor in the promotion of small-scale business because they cannot access credit facilities due to absence of collaterals. Since majority of the land is owned and managed communally, cases of landlessness is not prevalent. Due to frequent conflict, communities get displaced but normally return to their land after the situation revert to normalcy. The conflicts are usually fuelled by competition for grazing land and water sources but mostly politically instigated.

#### **6.5.6.1 Project Area**

Land in Bubisa is communally owned. The land is mainly used for pastoralism i.e. grazing activities. The animals reared in the community include sheep, goats, camels, cows and donkeys. The animals are kept for both subsistence use and income generation. Community members move approximately 200-500km away, temporarily, with their livestock and households in search of water and pasture as reported in the FGD with the men in Bubisa.

The community does not practice agriculture, however, in the FGD with the women it was reported that some of the women had tried out greenhouse farming but it was unsuccessful due to the poor conditions of soil in the area. The women also collect natural resources such as firewood for domestic use. Other resources collected includes stones, sand, water, wild fruits and berries.

The land is also used for setting up homesteads, business premises and public institutions namely; the local health center and the three schools. The community members also get their water supply from 4 boreholes, 1 water pan and 1 dam that are within the village. The proposed project site has been offered by the community and is currently unutilized. The community agreed to be compensated in kind for the land.

**Figure 13: Residential structures in Bubisa Village**



Bubisa location is part of what is known as the Shurr Community Conservancy. The conservancy was registered as a Community Based Organization (CBO) in 2013. The conservancy is 364Km<sup>2</sup> of rocky-lava terrain of grassland savannah. The community also consists of Shurr and Turbi locations all under the Turbi-Bubisa Ward. The conservancy is managed by the Northern Rangeland Trust (NRT) which is a membership organization owned and led by 43 community conservancies it serves in Northern and Coastal Kenya.

The goals of the conservancy is to:

1. Improve services for community development: (healthcare, water, sanitation and hygiene, education etc.)
2. Build peace and security; peaceful co-existence of neighbouring communities in Shurr conservancy
3. Conserve wildlife and improve the rangelands; reduce human-wildlife conflict, reduce poaching etc.
4. Grow and diversify the economy; increase income for youth and women enterprises etc.

## **6.5.7 Health and Healthcare facilities**

### **6.5.7.1 County Level**

The county has 1 referral hospital and three sub-county hospitals, 2 FBO Hospitals, 1 Private hospital, 20 health centres 63 dispensaries, 4 Nursing homes, 12 private clinics spread across the four sub-counties of Moyale, Saku, Laisamis and North Horr.

The county government has started a flagship project to elevate Marsabit County Hospital to referral status. A two-storey complex is being constructed and, alongside it, the World Bank is constructing a Kshs. 40 million reference laboratory to be fitted with modern equipment.

The county government has started a flagship project to elevate Marsabit County Hospital to referral status. A two-storey complex is being constructed and, alongside it, the World Bank is constructing a Kshs. 40 million reference laboratory to be fitted with modern equipment.

In terms of health personnel, the county inherited from the national government 330 health personnel and in the last two years this figure has gone up to 623. This still is one-third of the required total workforce as

the number needed to provide service effectively is about 1,800 in relation to the current number of facilities. There is only 1 specialist doctor in Marsabit, but the county is in the process of recruiting all cadres of medical and surgical specialists.

Medical supplies had been erratic in the past but this has been streamlined with the increased allocation of adequate resources to establish timely and dependable supplies.

The top five causes of morbidity are respiratory tract infection, diarrhoea, pneumonia and skin diseases.

The HIV/AIDs prevalence rates has been constant between 2013 and 2015 but gradually grew by 0.02 in 2016 and 2017.

### **6.5.7.2 Project Area**

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Bubisa village has only one public health center located approximately 500m from the nearest settlement with 3 nurses, and 1 clinical officer. It offers free service delivery. It operates on a 24hour basis (7.00am-6.00pm for staff on duty and 6.30pm to 7.00am for staff on night duty) basis and provides both in-patient and out-patient services such as antenatal services, lab/testing services, first aid services and maternity.

Other services include outreach and educational services provided in relation to health such as immunization, nutrition, family planning and integrated services. In addition, the health center in conjunction with its partners undertake educational services on exclusive breastfeeding, how to take care of newborn babies

The nurse, who was the interviewee during the KII indicated that the infrastructure is at a fairly good condition, however it is inadequate. The facility lacks adequate beds and emergency vehicles. The health center would therefore like support in procuring more beds, refrigerator for lab samples and vaccines, trolleys, a weighing machine and blood pressure machines. There is also insufficient supply of medical drugs and there is also need to expand the outpatient and maternity facility. More nurses, a nutritionist and community health assistants are also required.

However, the most urgent need for the facility is electricity.

The predominant ailments in the community include:

- In children; malnutrition, diarrhoea and pneumonia
- In women; gynecological issues, UTIs and brucellosis . During the FGD with the women, they mentioned chest pains, arthritis, ulcers and terminal illnesses such as cancer
- In men; pneumonia, brucellosis, and UTIs. The men reported in the FGD that other dominant ailments include high blood pressure, Cancer, Diabetes and blindness.

Generally, the most prevalent health issues in the area is malnutrition due to food insecurity while sexual health issues are the least common. Mental health cases are also very rare.

According to the nurse the most vulnerable groups within the community are the children under 5 years and the women. There are cases of domestic/sexual violence such as rape arising from drug abuse among the men who commit the acts.

The men and women reported that the services offered at Bubisa Health Center are not satisfactory.

**Figure 14: Image of Bubisa Health Center**



## **6.5.8 Security**

### **6.5.8.1 County Level**

The main conflict in Marsabit result from ethnic rivalry, cultural identity and fight for supremacy and political incitement as well as access to education and employment. Retrogressive cultural practices like cattle rustling, poaching, human killing as a sign of bravery and revenge is also another reason for conflict. Conflicts over resources and land boundaries is also another factor for conflicts. The following are the areas prone to conflicts and crimes within North Horr sub-county: Galas, Korqa, Sarimo, Darade, Buluk, Illeret, Garwole, Sabare, Bales Arbale, Bales Saru, Dukana, Arap trees, Kubi Adi, El Hadi, Marime, Sibilo Karsa, Chari Ashe, Forole, Elle Dimtu, Idhidho, Torbi, Demo Sotowesa, Yamicha, Lalesa, Shurr, Bales bura, Olom, Kuro and Medate

Marsabit County has experienced a wave of violent conflicts, mainly between the Gabra and Borana communities. Conflicts persist in this County, often having spread from across the border in Ethiopia. Traditionally, the majority of conflicts in the county have been caused by competition over grazing space and water for livestock and sporadic cases of cattle rustling and revenge killings

However, more recently, the nature of the conflict has changed, influenced by political developments in the county. Marsabit has been politically and economically dominated by members of the Borana community for a number of years. This dominance has created growing resentment from smaller communities such as the Rendille, Gabra and Burji. The Gabra and the Borana have traditionally been seen as one community, sharing settlements and pasture. However, the perception of dominance and inferiority within members of the Gabra led to a gradual and increasingly assertive challenge to notions of Borana 'supremacy' in the county socially, politically, and economically.

In December 2013, these tensions broke out into open violence. Political incitement was behind the outbreak of violence, which lasted until February 2014. At least 23 people were reported to have been killed, 100 homes destroyed, and 8,521 households displaced. The intensity of the hatred and mistrust affects every aspect of the social and economic lives of people in Marsabit.

The breakdown in social relations and the increased animosity and mistrust between the Borana and Gabra communities in particular is so acute that members of the respective communities reported expectations

on them to publicly demonstrate loyalty to their ethnic community regardless of their feelings about the violent conflict.

Conflicts between members of the Borana and Gabra communities have wider consequences in the county. For instance, when people are killed in one village, repercussions can be felt almost instantaneously, firstly in nearby villages, then in neighbouring major towns, across the county, and finally across the border with Ethiopia

Drivers of the Conflict include:

1. Political Incitement; Political incitement continues to fuel local conflicts and was believed by many to have been the trigger for hostilities between December 2013 and February 2014.
2. Land and Boundary Disputes; Contestation over administrative boundaries in Marsabit County continues to fuel conflict.
3. Perceptions of ethnic expansionism; Following the elections and subsequent installation of a county government, there emerged a lot of rumours and fears around ethnic expansionism. What was once considered as normal migration by pastoralist communities in search of water and pasture is now perceived with a lot of suspicion.
4. Resource access and control; Perceptions of the control and management of resources have contributed significantly to conflict. Some non-governmental development and humanitarian interventions are believed to have demonstrated bias in their implementation or been misconstrued by the parties as favouring one side or the other, thus aggravating the tension
5. Environmental Degradation; Environmental degradation and human activity have dramatically altered and damaged much of Marsabit County's ground cover, reducing the carrying capacity of the land and reducing the availability of water and pasture resources. Predictably, this has led to an increase in communal conflict over access to increasingly scarce pasture
6. Inadequate state response to conflict; Kenya's frontier counties, including Marsabit, have historically lacked effective state security services including police services. This has served to drive tensions into open violence as it has allowed communities to 'manage' their own security, including by taking advantage of readily accessible light weapons and resorting to violence.

#### **6.5.8.2 Project Area**

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During the FGDs with men and women, both groups reported that they feel safe in the community. However, they indicated that they have experienced conflict in the past with the Borana community over competition for water and pasture.

The population in Bubisa has increased over the past two years due to in-migration of people from other areas within the sub-county fleeing from conflicts between the Borana and Gabbra communities. The village has not experienced conflicts in the near past, however there is conflict between the Gabra and Borana where the location borders Marsabit Central.

At the time of the study there were ongoing conflicts between the communities especially in Marsabit town which had led to a dusk-dawn curfew.

On the morning of 12 January 2005, what is known as the Turbi Massacre occurred when raiders attacked Turbi village in Marsabit. Afterwards, nine people were killed in **Bubisa** in revenge for the killings in Turbi. This killing of nine people is commonly referred to as **Bubisa Massacre**.

The Bubisa Massacres were numerous resource-based conflicts between the Borana and Gabbra communities. About 95 people were killed, including 12 children who were killed at Turbi Primary School. Both massacres were ethnic-based and politically motivated. They occurred partly as a result of the failure of the state to provide security for the people of Marsabit and particularly the victims and survivors of the massacres. While there were early warnings of looming violence in Marsabit, the government security apparatus failed to respond in good time. The massacres had severe impact on the communities living in

Marsabit, especially the Gabras and Boranas. No one was ever identified as responsible or held to account for the Turbi and Bubisa Massacres. A criminal trial was against 3 people allegedly responsible for the Bubisa Massacre but the case was later withdrawn.

In November, 2021 there were clashes that took place on the Isiolo-Marsabit-Moyale highway that claimed 9 lives. During the same period, a vehicle with 15 occupants was sprayed with bullets by unknown assailants.

Security facilities in the area include the Bubisa AP camp.

## **6.5.9 Water and Sanitation**

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### **6.5.9.1 County Level**

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The people and livestock in Marsabit County rely on surface or ground water since there are no permanent rivers. There are three water catchments in the county i.e. the upper horizon of mountains and hills, over 1,500m to the summits of Mt Marsabit and Mt Kulal where there are a number of springs. The second catchment is 1,200m to 1,500m, still on Mt. Marsabit are springs like Badassa, Songa and Balesa Bongole. The rest of the county, which generally lies between 400 and 460m, depends mostly on underground water (i.e. boreholes and shallow wells). In these areas, the ground water table varies greatly.

Marsabit County is water insecure because it lacks reliable/permanent surface water sources like rivers and lakes. Hydrological status indicates that ground water is adequate in the lowlands but quality is poor, with many places having concentration of salts above permissible levels for human and livestock consumptions. Water accessibility is also a challenge, with 50% of rural population and 60% of urban population accessing water from boreholes, shallow wells, pans and lake. This is against increasing demand for water in Marsabit County, estimated at 6,750,000 litres per day against a daily production of 4,050,000 litre per day.

The source of the public water system is Bakuli springs, with unstable discharge and is also on decline due to human activity in the catchment. During drought, the flow reduces by over 80 per cent. During the rainy season, the flow ranges from 9 to 11 litres per second while during the dry season is 3.1 to 2 litres per second. For Marsabit township, the demand is 3,000,000 litres/day compared to a daily production of 300,000 litres per day. This places Marsabit as one of the most water scarce area.

The water coverage is estimated at about 15 per cent, with the average water produced at 600 cubic metres per day against water demand of about 3,795 cubic metres per day. This situation is expected to worsen with increasing urban population.

Households in urban areas with latrines account for 34.3 per cent of the population. The sanitation facilities used include pit latrines which account for 25.8 per cent, uncovered pit latrines (13.5 per cent), covered pit latrines (12.3 per cent), VIP (6.5 per cent) and 0.2 per cent flush toilets. Waste/garbage disposal is done by public garbage heap burning which accounts for 19.7 per cent, garbage pit (12.1 per cent), farm garden (8.9 per cent), public garbage heap (1.9 per cent) and 0.4 per cent disposed by local authority. (Population and Housing Census, 2009).

### **6.5.9.2 Project Area**

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The proposed project site is also characterized as a very arid area with dry climatic conditions. This means that access to water is a big challenge.

Water used in the area is obtained from groundwater sources. The main sources of water in the project area are boreholes. There are no rivers/streams present. There are four boreholes in total. One of the boreholes was constructed by the PACIDA organization where the water is desalinated and is fit for human consumption.

The rest of the boreholes were drilled by the Government. Out of the three boreholes drilled by the Government, 1 was built by the in 1956 by the Colonial and keeps malfunctioning. The quality of water from the three boreholes was reported to be turbid and partially salty (brackish).

Water from the boreholes is used for domestic purposes i.e. cleaning, drinking, cooking, watering of livestock etc.

Water tanks have been erected where water from the boreholes is pumped to and stored. Desalinated water from the PACIDA borehole is pumped to an elevated steel water tank using a solar power. Water from the Government boreholes are pumped to the water tanks using diesel generators where the community members come to fetch the water.

Water is fetched in jerry cans and transported using donkeys or carried on people's backs.

The boreholes (apart from the borehole under PACIDA) are managed by a Water User Committee, with the assistance of PACIDA, who are responsible for repairs and maintenance of the borehole and the day to day operations.

Alternative sources of water for the community in Bubisa are 2 dams and a water pan. One of the dams is located within the village and the other is a man-made dam that is approximately 6kms away from the village. The water pan is approximately 3kms from the project site. The dams and the water pan are rain-fed.

**Figure 15: Concreted water tank near the project site**



**Figure 17: Jerry cans used to fetch water**



**Figure 16: Community members fetching water**



**Figure 18: Diesel powered generator for pumping water**



As mentioned earlier, water from one of the boreholes in Bubisa undergoes desalination to make it potable both for humans and livestock. The Bubisa Water Kiosk Solar Desalination Project, as it is known, was launched in September 2021. The new brackish groundwater desalination system was installed by WaterKiosk Africa, which is working in partnership with Boreal Light.

The project is a collaboration between Cargo Human Cares, Caritas Germany, Pacida Kenya, Boreal Light GmbH and Water Kiosk Africa.

**Boreal Light GmbH:** Boreal Light GmbH is a Berlin-based company specialized in renewable energy solutions for water treatment facilities. The company designs and manufactures affordable solar water desalination systems for off-grid communities around the globe. Systems manufactured by Boreal Light are

capable of delivering high-quality hygiene drinking, irrigation, fish farm, and sanitation water from any kind of high saline and polluted water resources. Powered fully by solar, simplicity of the design, and affordability of the cost of the systems manufactured by Boreal Light are the three great competencies the company is proud of.

**WaterKiosk Ltd:** WaterKiosk Ltd is a registered entity specialized in renewable sources of energy solutions for water treatment facilities. The company installs, operates, and maintains solar water desalination systems for off-grid communities around Africa.

**Caritas Germany:** Caritas is a confederation of 16 catholic relief, development and social service organizations operating in over 200 countries and territories worldwide. Collectively and individually, their missions are to work to build a better world, especially for the poor and oppressed.

**Cargo Human Care:** Cargo Human Care is a humanitarian and medical aid project, which was brought to life by employees of Lufthansa Cargo and doctors from Germany in 2007. Core commitment is to provide immediate medical assistance to people in need and to give destitute orphans and young people a home and prospects for a good future.

**PACIDA Kenya:** The Pastoralist Community Initiative and Development Assistance (PACIDA) is a development and relief organization that empowers pastoralist communities through sustainable community-driven development interventions.

PACIDA was founded in 2008 by local scholars and development practitioners who were concerned about the huge and widening humanitarian needs, deepening vulnerabilities and huge development gap in its target region.

The plant is powered by a 62 kWh solar photovoltaic energy and equipped with an automatic water dispenser to serve the population. A total of 30,000 people will benefit within a 5km radius of the water points and through 24 vending machines. It will provide 11 m<sup>3</sup> (11,000litres) of water per hour.

In line with the principles of a circular economy, two hectares of saline water farming is integrated into the project utilizing the desalination plant's waste water. The system also runs on 100% solar energy and is totally off-grid; providing clean water, hunger relief, and job opportunities for locals.

The concept of producing clean and safe drinking water with the help of a desalination plant will not only be a significant improvement to the health of the people in Bubisa but also an improvement to the infrastructure of this village.

This is the largest water desalination system Boreal Light has designed for the African continent. This project is also a reaffirmation of the company's commitment to the development of unconventional water resources, a necessity in this arid climate and water-stressed area. The phenomenon is a consequence of climate change.

**Figure 19: Bubisa Water Desalination Plant**



Most of the households in the project area have no toilets and ventilated pit latrines are only available at the schools and dispensary. The community members reported that they defecate in the bush. Waste disposal is done in the open and later burned. At the time of the assessment, waste dumped in the open in the village was observed.

## **6.5.10 Roads and Transportation**

### **6.5.10.1 County Level**

The current road network in the county is approximately 5,000 km. This comprises of 312 km tarmacked, 580 km gravel surface and 4,108 km earth surface. However, most of the roads are impassable during rainy seasons. The completion of the north-south highway linking Isiolo - Marsabit and Ethiopia has opened up the area to investments and greatly improve connectivity and lower the costs of transporting goods and services to the County, in addition to boosting cross-border trade between Kenya and Ethiopia. The highway construction also had a number of social responsibility projects such as construction of roads within the town which covered almost 11 km and improved drainage within the town, in addition to the improved aesthetic value of the town.

Marsabit County has eighteen airstrips located in all sub-counties. All the airstrips are in good condition and currently in use. There is no railway line, port or jetty in the county. However, railway transport is expected to develop once the Lamu Port - South Sudan - Ethiopia Transport Corridor (LAPSSET) project is completed. The county has already benefited from the project through the tarmacking of the Isiolo - Moyale highway.

### **6.5.10.2 Project Area**

Bubisa can be accessed using the Marsabit-Moyale tarmac road which is part of the 500km Isiolo-Marsabit-Moyale highway that terminates at the international border with Ethiopia. The road is a component of the Lamu Port and Lamu-Southern Sudan-Ethiopia Transport Corridor (LAPSSET). The highway is under the mandate of the Kenya National Highways Authority (KeNHA)

Access/feeder roads within the villages are dirt/earth roads. Some of these roads are not passable during the rainy season due to flooding or muddiness. The internal access road to the site is a dirt road that is also used to access Bubisa Primary School.

The main forms of transport within the area are public vehicles (matatus) that ply from Marsabit to Moyale as well as motorcycles. The community reported that the transport system is adequate.

The nearest airport is the Marsabit Airport which is located 40 km away.

**Figure 20: State of the access road to the project site**



## **6.5.11 Energy Power and Supply**

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### **6.5.11.1 County level**

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Like in most parts of Kenya, the main source of energy in Marsabit County is wood fuel which is used both for cooking and lighting, while kerosene is predominantly used for lighting. The main type of fuel used by households is both a factor of the socio-economic status of households and availability of alternative low cost energy. As a result, the proportion of households using firewood as main source of cooking fuel is 92.6%, charcoal is 5.6%, and paraffin is 1.4% while biomass residue is 0.2%. Electricity coverage is mostly restricted to urban centres of Marsabit, Moyale, Sololo and Laisamis. The county is not served by electricity from the national grid but by diesel generators and solar energy. Moyale and Sololo are connected with electricity from Ethiopia. Despite massive gains in electricity connectivity in rural Kenya, majority of the households in Marsabit still use firewood as their main source of lighting energy.

The total number of households with electricity connection is estimated at 1,273 while the proportion of households using firewood as the main source of cooking fuel is 92.6%, charcoal is approximately 5.6 per cent, paraffin is 1.4 per cent and biomass residue is 0.2%. Households using firewood for lighting comprise 57.2%, paraffin 27.5 % and those using electricity is 3.6%.

Marsabit County has a major wind power project located at the shores of the Lake Turkana. It comprises 365 wind turbines, each with 850kw and high voltage sub-station that will be connected to the national grid. On completion, the wind farm will provide 310 MW of reliable and low cost energy to the national grid. This is approximately 15% of the country's installed capacity.

### **6.5.11.2 Project level**

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The main sources of energy in the area include firewood, charcoal and solar. The firewood is collected from the bush and is used for cooking, keeping warm and heating water. The majority of the household use

battery powered torches for lighting while charging of mobile phones is done at the business center at a fee in shops that are connected with D-Light solar power.

Accessibility to electricity can be described as limited.

The Kenyan diaspora-owned company, Gitson Energy, got a favorable ruling in 2021, after five years of legal proceedings over the construction of a **300 MW wind farm** in Bubisa.

The clean energy project was approved in 2010, with the Kenyan government authorizing Gitson Energy to build a 300 MW wind farm and 50 MW solar photovoltaic plant in Bubisa. Since then, the project has been delayed due to land issues. Through court intervention, the company has resolved the land classification issues. The developers intend to put up the wind farm in Bubisa since it has the best wind regime in Kenya and among the very best in the world

The construction of the Bubisa wind farm is expected to further diversify Kenya's electricity mix, one of the most attractive on the African continent.

The power generated by the wind farm will enable the Bubisa community to mine underground water resources and set up irrigation points to ensure all-year-round supply of pasture.

### **6.5.12 Telecommunications**

The county is served by three mobile phone service providers, with coverage of 62%. However, a large section of the county still has no network coverage.

The project area has a good telecommunication network (3G) provided by Safaricom service providers. which is available at a 20km radius. There are two Safaricom booster masts in the village.

**Figure 21: Telecommunication Booster masts in the village**



Men in Bubisa reported that they generally receive information through radio, phones and T. V's. while the women receive information through the radio, the chiefs and village elders.

## **6.5.13 Vulnerable groups**

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### **6.5.13.1 County Level**

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People living with disabilities in the county are part of the vulnerable groups and most of them suffer discrimination. They have not been well represented in decision-making processes in the various spheres of socio-economic development. At household levels, they are stigmatized and still viewed as a curse to the family. This limits the opportunities to develop their skills to facilitate effective participation in development processes. Their concerns are therefore not adequately addressed or taken into consideration in the planning process.

Although poverty affects both men and women, women, youth and people with disabilities are worst affected in the county.

There are approximately 40,000 Orphans and Vulnerable children in Marsabit who are also considered vulnerable.

### **6.5.13.2 Project level**

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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.

Article 21 (3) of Bill of Rights under the Constitution of Kenya 2010, recognizes vulnerable persons to include women, older members of society, persons with disabilities, children, youth, members of minority communities, and members of particular ethnic, religious or cultural communities. The Constitution provides for the recognition, protection and safeguarding of the rights of these communities in the social, political and economic life of Kenya (Article 56)

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

1. Women; are exposed to social ills such as sexual harassment, rape and domestic violence from their partners
2. Orphans; Orphans and other vulnerable children are often left unprotected after loss of their parents or loss of contact with primary caregivers. In times of family or societal conflict, these children experience increased risk of exposure to violence, physical and sexual abuse, exploitation and emotional neglect, along with an increased risk for death
3. The elderly (80 years and above); The elderly in the community are unable to work and depend on well-wishers for their daily bread.

## **6.5.14 Gender based vulnerability**

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### **6.5.14.1 County Level**

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The legal and normative framework for Gender Equality and Women Empowerment (GEWE) in Kenya is guided by the Constitution of Kenya 2010, national legislations & frameworks and general rules of international law and treaties ratified by Kenya. Kenya's recent commitment to the SDGs and its alignment with Vision 2030 provides an additional normative framework for tracking the achievement of gender equality. The 34 gender indicators identified by KNBS as part of tracking the government's commitment to fulfilling the Sustainable Development Goals remains a key reference point for accountability for Marsabit County towards achieving substantive gender equality.

The Gender Inequality Index of Marsabit County is high at 0.69 compared to the national average at 0.62 as of 2012. Evidence has shown that where development plans, budgets and policies incorporate gender equality, have strong institutional structures with adequate financial and skilled human resources, and are

accompanied by accountability mechanisms, gender mainstreaming initiatives are successful and sustainable. It is imperative that all organs within the county Government structure are sensitized on the application of the 2/3rds gender principle by engaging key actors in the County Government and community leaders including religious and cultural leaders. The enactment of the public participation, gender balance and diversity bills and policies will be fast tracked to provide an enabling environment and implementation of inclusivity principles across all sectors.

#### **6.5.14.2 Project Area**

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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 child marriage and minimal participation in household or economic decision making. During the Female Focus Group Discussion, 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 and the decision making authority is the man.

The women however have economic freedom and are engaged in retail business where they sell clothes, sugar etc. The men only practice pastoralism which is an income generating activity. Although the women in the community contribute more to household income, they have no decision making power.

Additionally, the women on the other hand are responsible for household activities such as fetching water, cooking, cleaning and taking care of the children. However, the roles of women and men in the community are changing as women nowadays pay school fees for their children and look after their livestock. The women are also allowed to attend community development meetings unlike before when they were prohibited to.

Female literacy was reported to be low among women over the age of 18 and higher among the younger girls.

In the FGD with the women, they reported that they do not have equal opportunities with the men in workplaces and to some extent in education as well (it was noted that there is only a Boys High school in the area).

#### **6.5.15 Gender Based Violence**

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Intimate partner violence is the most common form of GBV in Bubisa as reported by the women in the FGD. The local health center also handles rape victims and the perpetrators are usually under the influence of drugs. i.e. miraa/khat and alcohol

The community receives support against GBV from organizations such as Concern Worldwide and Food for the Hungry (FH). Most of the intimate partner violence occurs between married couples and are usually resolved through dialogue between the two parties.

#### **6.5.16 Religion, Culture and Heritage**

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The dominant religion in the project area is Islam and Christianity. There is one Catholic Church in the area known as Good Shepherd Catholic Church where the Christians go to worship. There is one mosque in the project area where the community members go for prayers and religious teachings. Children also attend Madrassa classes where they are taught the basics of the Islamic religion.

The main festivals that take place in this area are Almado, Korma, Somo, prayer- thanksgiving and marriage ceremonies.

No cultural site of significance was reported/observed within the project area. Bubisa is predominantly made up of the Gabbra community a semi-nomadic community that values keeping of cattle, sheep and goats.

The Gabbra community in the project area are a patriarchal society; men typically speak for women and make decisions in the family. The community practices polygamy and encourages early marriages for young girls.

## 6.5.17 Community Organizations and NGOs

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### 6.5.17.1 County Level

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There are 480 self-help groups, 310 women groups and 504 youth groups in the county. Out of these only 60 per cent of the youth groups, 40 per cent of the self-help groups and 55 per cent of women groups are active. Most of these groups are involved in socio-economic activities like goat-keeping, Beekeeping, poultry-rearing and small micro enterprises.

There are about 20 NGOs supplementing the government's efforts in offering services to the community. These NGOs have programmes in water and sanitation, agriculture and food security, pastoral livelihoods, health and nutrition, HIV/AIDS, conflict mitigation and peace building, advocacy and, more importantly, drought mitigation and emergency relief. There are also several CBOs and FBOs operating in the county.

### 6.5.17.2 Project Area

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Discussions with the men, women and youth revealed that there are a number of NGOs that are active in the area. The NGOs operate in the community and are involved in various development. These NGOs include

1. **The Pastoralist Community Initiative and Development Assistance (PACIDA):** The Pastoralist Community Initiative and Development Assistance (PACIDA) is a development and relief organization that empowers pastoralist communities through sustainable community-driven development interventions.

Role in the Community: Provides water solutions i.e. boreholes and funding water projects/borehole maintenance in Bubisa. The organization has provided employment opportunities to the youth for the maintenance of the water desalination project

2. **Food for the Hungry International (FHI):** An organization that provides emergency supplies and relief in response to draught in Marsabit County

Role in the community: Provides food donations and education sponsorship (paying of school fees). Also assists in handling GBV issues.

3. **Concern Worldwide:** A humanitarian organization that delivers lifesaving interventions to the world's poorest and most vulnerable people

Role in the community: Provides food and healthcare interventions (vaccines and immunization). Also assists in handling GBV issues.

4. **Greater Organization:** provides funding for businesses

There are no active CBOs in the village. However, there are men's traditional groups include Dabela and Hayu which are tasked with leading prayers and marriage ceremonies.

## 7 STAKEHOLDER ENGAGEMENT

### 7.1 Introduction

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This section discusses the stakeholder engagement activities undertaken by the ESIA team for the proposed Bubisa mini-grid solar power plant project. It also outlines the objectives of undertaking stakeholder consultation and identification of the stakeholders. The section further discusses the national and international framework for undertaking stakeholder consultation. Subsequently, it outlines the process followed for undertaking the public meetings and identifies the key issues, concerns and expectations that the stakeholders raised. Finally, the section concludes by suggesting the next steps following the stakeholder engagement associated with this ESIA Study.

### 7.2 Legal requirements for stakeholder engagement

#### 7.2.1 National Requirements

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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 Bubisa Project information was shared with different stakeholders mainly government officers and also community/project affected persons/beneficiaries. 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.

#### 7.2.2 World Bank Requirements

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The World Bank Environmental Social Safeguards 10 (ESS 10) emphasizes on engagement in meaningful consultations with all stakeholders. The stakeholders with timely, relevant, understandable, and accessible information, and consult with them in a culturally appropriate manner, which is free of manipulation, interference, coercion, discrimination, and intimidation.

ESS10 emphasizes stakeholder engagement throughout the project life-cycle, and requires a Stakeholder Engagement Plan (SEP). It encourages early identification of stakeholders, both project-affected parties and other interested parties.

Under ESS10, engagement must be proportionate to the nature, scale, risks and impacts of the project, and appropriate to stakeholders' interests. It specifies process and criteria for information disclosure and meaningful consultation. It also requires an accessible and inclusive grievance mechanism, proportionate to risks and impacts

A documented record of stakeholder engagement, including a description of the stakeholders consulted,

a summary of the feedback received, and a brief explanation of how the feedback was considered is in place.

### **7.3 Objectives of Stakeholder Engagement**

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Stakeholder engagement refers to a process of sharing information and knowledge, seeking to understand the concerns of others and building relationships based on collaboration and partnership. It is a long-term process that requires the building of trust through open dialogue and the delivery of commitments.

The most important objective of stakeholder consultation is to provide sufficient and accessible information to potential Interested and Affected Parties (I&APs) in an objective manner and to provide a platform for constructive participation in the application process thereby assisting I&APs to:

- Gain an understanding of the project, the various components and the potential impacts (positive and negative);
- Raise issues of concern and suggestions for enhanced benefits and commenting on reasonable alternatives;
- Verify that their issues have been recorded (Stakeholder Engagement Logs) and considered in investigations; and
- Contribute relevant local information and traditional knowledge to the process.

The MOE, REREC and Kenya Power recognizes that open and transparent communication is essential due to the importance of activities in which it is engaged and the impact on the local, regional and national economies and individuals.

For the proposed Bubisa Solar Mini-grid, REREC seconded their Environmental and Social Specialist Officer to the ESIA team to participate in the public participation meetings

### **7.4 Overview of the Stakeholder Engagement**

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Following a review of the baseline scoping outcomes as well as a stakeholder analysis process, various stakeholder engagement activities were carried out for public consultation and disclosure for the proposed project. The minutes and registration logs for the stakeholder disclosure and consultation meetings are appended to this report. The purpose of stakeholder engagement was to establish and maintain a constructive relationship with a variety of stakeholders throughout the lifetime of the project.

The Stakeholder engagement for this project has taken into account the following elements:

- i. Stakeholder identification and analysis
- ii. Planning how the engagement with stakeholders will take place.
- iii. Disclosure of information.
- iv. Consultation with stakeholders
- v. Addressing and responding to grievances; and
- vi. Reporting to stakeholders

### **7.5 Stakeholder Characterization and Identification**

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

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

the project.

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

### 7.5.1 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 Bubisa the stakeholders have been identified and listed in the table given below.

**Table 12: Identified Stakeholders**

Stakeholders		Consultation Tool
Primary stakeholders	Project Affected Persons i.e., Residents of Bumburi	<p><b>Public Meeting</b></p> <ul style="list-style-type: none"> <li>✓ 2 public meetings were held in Bubisa on 18/10/2021 and 17/01/2022.</li> <li>✓ The first meeting was held with an attendance of 69 people while the second one had 35 people in attendance.</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 in the two rounds of consultations</li> </ul> <p><b>Key Informant Interviews (KII)</b></p> <ul style="list-style-type: none"> <li>✓ During the second round of consultations, the KII for Bumburi Primary school was conducted through a one-on-one interview.</li> <li>✓ The chief was also interviewed on the Community Profile of Bubisa.</li> </ul>
Secondary stakeholders	Interested Parties: <ul style="list-style-type: none"> <li>• County Government of Marsabit</li> </ul>	<p><b>Meeting</b></p> <p>During the first consultation a meeting was held with the County Governor and county officials</p>

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

medium, and high. The overall significance of the stakeholder group is assessed as per the matrix provided in Table below.

**Table 13: Stakeholder Significance Matrix**

		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

## 7.6 Stakeholder Analysis

The table below has been used to classify the identified stakeholders (directly or indirectly impacting the project) in accordance with their levels of influence on the project. The influence and priority have both been primarily rated as:

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

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

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

**Table 14: Stakeholder Mapping**

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

## 7.7 Stakeholder Engagement During the Land Identification Process

A Consultative meeting was held with the community in Bubisa on October 18<sup>th</sup>, 2021, to discuss the details of the proposed mini-grid project, the project's land requirements, the impacts of the project (both positive and negative) and proposed mitigation measures 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.

The outcome of the community meeting and the FGDs included the following:

- The community was informed of the proposed mini-grid project and its benefits
- The environmental and social impacts of the project were discussed and the proposed mitigation measures including public safety in regard to electricity
- There were discussions on the project's land requirements for the minigrid project and the need to screen the land identified for its suitability i.e., should not have any occupants to avoid displacement and should be offered willingly by the community
- A locational Grievance Resolution Committee (GRC) was constituted with representation of men, women and the youth. Additionally, the implementing agency representatives were informed of

the community's existing grievance redress mechanism which will be integrated with the project's redress mechanism'

- Feedback in form of questions, opinions and recommendations was obtained from the community and responses were provided by the project team

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

The following are the issues that were raised by the community members and the responses provided by the project team:

<b>QUESTION/COMMENTS</b>	<b>ANSWER/REMARKS</b>
<p><b>Zillo A. Shiko</b></p> <p>7 years ago a solar company informed us that we would get solar power. Is this the same company?</p>	<p>This is a follow up, we have come to ascertain and verify about land availability</p>
<p><b>Gollo Wario</b></p> <p>1. We currently have solar power which doesn't have any side effects. What kind of solar power are you referring to?</p> <p>2. If we give you land, when does this project start?</p>	<p>This is a minigrid, and although the power is primarily tapped from the sun, it is more powerful. It is like the normal electricity from the grid</p> <p>After bidding and award of contract is done</p>
<p><b>Stephen Shamoo</b></p> <p>1. Project has started and finished. Are you going to employ locals?</p> <p>2. This power can it serve Manyatta houses?</p>	<p>Locals will be employed in unskilled labour category and project security like guards</p> <p>Yes. It will serve the Manyatta houses.</p>
<p><b>Phillip Chebe</b></p> <p>Your project harnesses power from the sun, are its consumption charges similar to the grid consumers?</p>	<p>Yes, charges are uniform and standardised</p>
<p><b>Ali Malicha</b></p> <p>1. We are pastoralists who keep cattle, sheep, goats and camel. During the rainy season camels traverse the whole area, they are also tall and may reach the overhead lines and cause calamities.</p> <p>2. When do you want response to land issue?</p> <p>3. There is lot of wind here and might blow down poles.</p>	<p>The project land will be fenced off. Conductors will be placed at a height that's beyond the reach of animals</p> <p>When the community is ready</p> <p>There shall be staff stationed at the project 24/7 for operation and maintenance.</p>
<p><b>Sori Mollu</b></p> <p>Will the this solar mini-grid be similar to other solar plants?</p>	<p>This is a larger power project which shall convert solar power into normal grid like electricity</p>

<b>Rusoya Adano</b>	
Can this power be used for borehole?	Yes
Will it be enough for all our needs?	Yes

Minutes of the meeting are appended at the end of this report.

**Figure 22: Photo of the community Baraza Meeting**



## **7.8 Stakeholder Engagement Activities During the Assessment Phase**

### **7.8.1 Preliminary Consultations**

Norken and Centric team had a brief kick-off meeting with the Ministry of Energy 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.

### **7.8.2 Consultative Public Participation and Community Engagement**

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

A detailed CPP and community engagement session for Bubisa Solar Mini Grid was held at Bubisa village on 17<sup>th</sup> January, 2022 chaired by the area Chiefs where 19 men and 16 women were in attendance. The community meeting point (under a big acacia tree) within Bubisa Village where the community engagement meeting was held was an ideal venue because it was a convenient congregation point for majority of the targeted stakeholders.

The Consultants' Team (Environmental and Social Specialists) and the REREC Senior Environmentalist were in attendance to provide information to the public and to receive and address comments. Through verbal discussions, the community was presented with information on:

- Description of the project (project design and location);
- The requirements of the EMCA for new projects in Kenya;
- The Environmental Assessment Process;
- Potential environmental and social impacts associated with the proposed project and proposed mitigation measures.

The verbal discussions were done in Swahili language and translated to Gabbra language with the help of the Bubisa Chief as it had been established through the Chief that the audience would be most comfortable with the Gabbra language.

### **7.8.2.1 Project Presentation and Remarks**

The Chief and the Assistant chief of the Area, after having mobilized the community members, gathered everyone at the community meeting point. The Chief then briefly informed the gathering about KOSAP projects and its importance. He then welcomed the ESIA consultant's representatives to give a presentation of the potential environmental and social impacts. He also urged the participants to give their views/comments/concerns on the project when given the opportunity to.

The REREC representative Ms. Irene Mate, gave a detailed presentation on the project detailing on the project activities, previous stakeholder engagements and the land acquisition process. The Consultant representative Ms. Hottensia Kabuki elaborated on the ESIA Process, possible environmental and socio-economic impacts of the project and mitigation measures to the residents of Bubisa. After the presentation on the proposed project by the consultants, the community members were provided with an opportunity to comment and give views on their perceptions of the proposed project.

The respondents were able to comment on the project, highlight the potential positive and negative impacts of the project and if they are for or against the project.

All substantive issues raised with the Consultants/Proponent during the CPP were noted and responded to. The issues were then recorded and minuted.

### **7.8.2.2 Key Feedback Received During the Stakeholder Consultation Process**

During the consultative forum, there were remarks/questions from various community members as highlighted below:

**Table 15: Stakeholder Concerns/Issues**

<b>Subject</b>	<b>Issue</b>	<b>Response</b>
<b>Impacts of the project</b>	The community wanted to know what mitigation measures had been put in place to curb accidents, fire, property damage and loss of life.	It was confirmed that proper procedures shall be followed to ascertain the cause of the damage/fire and if it is as a result of REREC's shortcoming then the affected party shall be duly compensated  However, if it is determined that it was as a result of poor workmanship in electrical wiring of the structure/house then the responsibility will lie with the owner

Subject	Issue	Response
		<p>She urged the community members to ensure that all electrical wiring of their houses/businesses are done by a competent person.</p> <p>A completion certificate shall also be issued prior to installation and supply of power.</p>
<b>Project Timeline</b>	The community requested to know when the project is likely to start.	<p>It was confirmed that the project had already started.</p> <p>The project will take approximately 6 months to complete from the start date of construction activities.</p> <p>Organizations and independent contractors are already have bidding for contract awarding to construct the mini-grid.</p>
<b>Benefit of the project to other households.</b>	They enquired on the benefits of the project for households found outside the 3km range.	The community was informed that there would be a second project for providing alternative solar solutions through provision of solar items/equipment's at affordable prices.

### 7.8.2.3 Consent

The Consultant's ESIA Lead representative inquired from the community members whether they had given and allowed the Ministry of Energy/REREC to utilize the identified piece of land for the solar mini-grid plant. The community members confirmed that the proposed site is community land which was given freely for setting up the mini-grid plant. They confirmed that they had also given the list of projects, mentioned during the presentation by the REREC representative for compensation (in kind).

The Community members present agreed unanimously accepted the Project Proposal.

**Figure 23: Public Participation "Baraza" Session**



### 7.8.3 Focused Group Discussions Analysis

FGDs are important when gauging with a particular group of stakeholder on issues related to the project activities. It is used to understand the needs, perceptions and concerns of the group. The discussion will give space for the members to voice their concerns and suggestions.

Focus group discussions for the assessment phase were carried out with the men, women and youth. The FGDs were carried out immediately after the community public participation meeting was concluded. Structured questionnaires/guides were used to undertake the focus group discussions to elicit their expectations and suggestions for the proposed project. The discussions were focused the project on their roles in society, economic activities, community development, land use, education, healthcare etc.

In addition, it provided an opportunity to the participants to raise their fears and concerns as well as make recommendation as pertains to the project.

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

**NB:** *The information collected from the FGDs has been provided as part of the project area baseline.*

The FGDs had a wide representation as follows:

**Table 16: List of Attendance**

Category	Date	Attendance	Venue
Men	19 <sup>th</sup> October 2021	14 (incl. of Chief and Asst. Chief)	Bubisa Village
Women	19 <sup>th</sup> October 2021	16	Bubisa Village
Youth	19 <sup>th</sup> October 2021	7	Bubisa Village
<b>TOTAL</b>		<b>37</b>	

### **7.8.3.1 Feedback from the women in Bubisa**

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There were 16 female participants in the FGD who were between 18-70 years of age. There were 6 female headed households represented in the meeting. The following were their responses:

#### **The project perception**

The women indicated that they had heard about the project last year and that it would have a positive impact in the whole community and specifically will improve security in the area, provide employment opportunities, light their households as well as enable them to charge their phones.

The women requested for regular servicing incase defaults took place in the solar panels.

The women enquired on who would be responsible for correcting defaults and they suggested that a certified electrician should be contracted to avoid any defaults.

**Figure 24: Focus Group Discussion with women**



### **7.8.3.2 Feedback from the men in Bubisa**

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The male participants were 14 in number over 30 years of age. The male participants are household heads.

#### **The project perception**

The men indicated that they had heard about the project and understood that it was going to install the solar and provide electricity to the community.

According to the men, the project is a good initiative and would have positive impact such as powering the water pumps, cooking, lighting, watching TV and heating water.

They also noted that there are also negative impacts such as additional bills to pay, damages in case of a fire and maintenance.

They pointed out that only certified electricians should be allowed to install power, the locals should be trained to continue providing services to the community and the bills should be cheap.

**Figure 25: Image of Male FGD**



### **7.8.3.3 Summary of feedback from the youth in Bubisa**

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The youth participants were 7 in number; 0 female and 7 males. The following opinions were provided by the youth participants during the FGD.

#### **The project perception**

- ✓ The youth disclosed that they were aware and understood the importance of the project to the community.
- ✓ They stated that the project will have a positive impact since power will be available for lighting, which will then create more business opportunities
- ✓ There will also be creation of employment opportunities especially during construction of the solar plant.
- ✓ They also noted that there would be improved service delivery in healthcare.
- ✓ They also noted that security in the area will improve greatly.
- ✓ They however noted that negative impact as possible fire breakouts that would cause damage to property. They suggested that preventive measures be put in place.
- ✓ They also noted that conflict could arise with households which are 3km away which will not have access to power. They also pointed out that there could be property damage from power failure.
- ✓ They also mentioned that communities 3km away should be provided with power sockets at subsidized cost. They suggested that the payment method be token instead of being subjected to charges once they default payment.

**Figure 26: Image of Youth FGD**



#### **7.8.4 Key Informant Interviews (KIIs)**

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The target groups for the KIIs were the CBOs, Vocational Colleges, NGOs, Health sector, as well as the Education sector. During the baseline data collection exercise, it was determined that there are no Vocational Colleges and no active CBOs active in the area.

KIIs were undertaken with Educators/School heads of Bishop Cavallera Primary School and Hon. Isacko Memorial Boys High School and Health Practitioner (Nurse) at Bubisa Health Center

A community profile checklist was also filled with the assistance of the area Chief who was deemed to be most knowledgeable on the Bubisa's location and sub-location profile.

##### **7.8.4.1 Summary of Feedback from Health Practitioner in Bubisa**

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The following was the health worker's perception of the project as discussed during the KII.

###### **The project perception**

- ✓ He was aware of the implementation of the project
- ✓ He noted that the project shall have positive impact to Bubisa Health Centre as it would provide good lighting in the facility, help in immunization activities such as vaccines, energy for refrigeration and 24hrs maternity services.

##### **7.8.4.2 Summary of feedback from Education Stakeholders' Consultation and Participation**

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The education interviewees for both the primary and secondary schools were the Head teachers at Bubisa and which are both government sponsored institution.

###### **The project perception- Head Teacher/ Hon. Isacko Memorial Boys High School**

The head teacher has worked at the school for 7 years

- ✓ He indicated that the project would have a positive impact to the school through access of electricity that will provide light especially in the evening for students for reading.
- ✓ He also mentioned that it would improve the security of the area.

- ✓ He noted that the project would also help in the preservation of food in the area i.e. refrigeration of perishables
- ✓ He mentioned that day scholars will have an easy time studying at night from home.
- ✓ He suggested as installation of security lights on the streets.

### **The project perception- Head Teacher/ Bishop Cavallera Primary School**

The head teacher has worked at the school for 5 years.

- ✓ He indicated that the project would have a positive impact to the school through creation of job opportunities and will make life easier since lighting will make it easier to carry out daily duties.
- ✓ He pointed out that ICT will be promoted as well as the cost of fuelling the pump will be significantly reduced. The pump is what they use to pump water for their livestock and domestic use.
- ✓ He suggested that the operators should be thoroughly trained so as to avoid accidents and break downs.

## **7.9 Grievance Redress**

### **7.9.1 Introduction**

The proposed solar mini-grid project may lead to some grievances. A Grievance Redress Mechanism (GRM) provides access to remedy and identifies procedures to effectively address grievances arising from project implementation. Persons affected by the project must have an avenue where they can formally lodge their complaints and grievances and have them properly considered and addressed. Potential sources of grievances and conflicts as a result of administration of the mini-grid project include:

- Inadequate or lack of consultation.
- Concern over exclusion in decision-making.
- Poor communication and facilitation.
- Dissatisfaction with levels of representation in the various project committees.
- Discontentment regarding performance of mitigation measures (e.g. support from alternative livelihoods).
- Lack of transparency and accountability through the citizen engagement.

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

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

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

## **7.9.2 Grievance Redress Committees**

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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 (acquisition and compensation) 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.

### **7.9.2.1 National Grievances Redress Committee (NGRC)**

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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)-KP 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-dependng on the matter at hand; Land or Environment
6. Representative from Gender and Social Development Office who will be responsible for ensuring gender issues are well addressed.
7. Representative from NEMA to handle environmental issues
8. County Surveyor/Physical planner from the county Lands office
9. Project Affected Person's-to represent the matter before the committee

#### **Functions of the National Grievances Redress Committee**

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

### **7.9.2.2 County Grievance Redress Committees (CGRC)**

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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.

### **7.9.2.3 Locational Grievance Redress Committee (LGRC)**

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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:

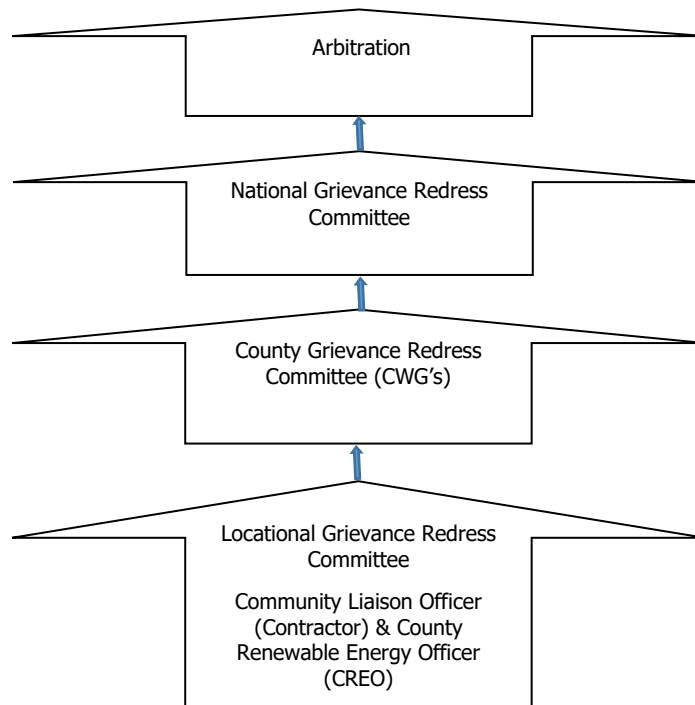
1. The locational Chief, who is the Government administrative representative at the locational unit and who deals with community disputes will represent the Government in LGRC
2. Assistant Chiefs, who supports the locational Chief and Government in managing local community disputes in village units will 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



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

#### **7.9.2.4 Grievance Management at the Bubisa Village**

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The Bubisa LGRC is composed of 6 members exclusive of the Area Chief; two males, two females and two youths. The following are the names of the members of the GRC:

<b>No.</b>	<b>Name</b>	<b>Category</b>
1.	Doke Roba	Women
2.	Jillo Adano Kivo	Women
3.	Aboi Sora Wario	Youth
4.	Galgallo Bagasa Sharamo	Youth
5.	Yattani Dokata Chachu	Men
6.	Mamo Sharamo Demo	Men

The committee was constituted to handle project related grievances. The members were informed that their responsibilities will commence when construction of the mini-grid begins.

However, the GRC is yet to hold their first meeting.

Community grievances are currently resolved at household levels. Each Manyatta (a Manyatta is made up of a number of households) has a Manyatta Elder. Grievances are reported to the Manyatta Elder who will try and mediate the issue. If the Manyatta elder is not able to resolve the issue between the concerned parties, he will escalate the issue to all the Manyatta elders in the area for arbitration.

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

#### **7.9.2.5 Grievance redress committee capacity building**

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The Bubisa GRC will need to be oriented to the grievance redress mechanism set with the community. The capacities of the Grievance Committee members will also need to be built to ensure they are able to operationalize the GRM. The GRC should also be oriented on their roles and responsibilities.

### **7.9.3 World Bank Grievance Redress (GRS)**

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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.

The Complaints brought to the GRS cover a wide spectrum of project-related issues, including harm to people's livelihoods, environmental degradation, involuntary resettlement, occupational health and safety concerns, violation of indigenous peoples' rights, or rights of affected communities to meaningful consultation.

The complaints can be sent to the GRS in the following ways:

- ✓ ONLINE – through the GRS website at [www.worldbank.org/grs](http://www.worldbank.org/grs)
- ✓ BY EMAIL at [grievances@worldbank.org](mailto:grievances@worldbank.org)
- ✓ BY LETTER or BY HAND delivery to any World Bank Country Office

- ✓ BY LETTER to the World Bank Headquarters in Washington at The World Bank Grievance Redress Service (GRS) MSN MC 10-1018 1818 H St NW Washington DC 20433, USA)

### **World Bank Inspection Panel**

The Inspection Panel is a complaints mechanism that assesses allegations of harm to people or the environment and reviews whether the World Bank followed its operational policies and procedures.

The Panel is independent from the World Bank management and staff and reports directly to the Board of Executive Directors.

### **7.9.4 Third Level Mechanism (Legal Redress Options)**

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Environmental and Land Court and the Land Acquisition Compensation Tribunal will provide opportunity for appeal when a solution will not be found using the established local mechanisms.

The Environment and Land Court is the superior court that will deal with disputes relating to land and environment while the Tribunal, which is chaired by the Judicial Service Commission, has jurisdiction to hear and determine appeals from the decision of the National Land Commission (NLC) on the process of compulsory acquisition of land.

Appeals on land acquisition and compensation will be referred to the Tribunal but if the aggrieved party is dissatisfied with the Tribunal's decisions, they may appeal to the Environment and Land Court.

However, the Land Act 2012 and Environment and Land Court Act 2011 advocates for Alternative Dispute Resolution (ADR) methods in tackling land related disputes. Alternative dispute resolution approaches will be given preference and based on customary rules, arbitration, or third-party mediation. ADR will be promoted or defended as a resolution to disputes related to land

### **7.9.5 Project Level Grievance Redress Mechanism**

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A Grievance Mechanism procedure will be prepared to allow stakeholders to raise questions or concerns with the Company and have them addressed in a prompt and respectful manner.

The procedure will aim to address all complaints received, regardless of whether they stem from real or perceived issues and whether the Grievant/Complainant is named or anonymous. Any stakeholder who considers themselves affected by solar Mini-grid's activities will have access to the procedure at no cost. The statutory rights of the Complainant to undertake legal proceedings remain unaffected by participation in the process.

The MOE will seek to foster trust in the process and its outcomes. To this end it will communicate this Procedure in an understandable manner to affected stakeholder groups. Confidentiality will be respected and the company will take all reasonable steps to protect parties to the process from retaliation.

The grievance mechanism should be focused on communities and other stakeholders and should not incorporate employee-related grievances, which should be addressed through other channels.

The GM is a dynamic document that shall be revised and updated periodically (annually at minimum) based on experience and feedback from stakeholders.

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.

#### **7.9.5.1 Principles of the GRM**

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Some GRM principles have been developed with the consultations that have taken place so far that will be used in the proposed project. The principles may be developed further as more consultations take place with the VMGs. The following are the principles:

1. Equity – VMGs will have a chance to be heard even in situations that require them to write their complaints when some cannot write. The project will put in place mechanisms to allow proxies draft complaints for VMG members who cannot write;
2. Transparency – grievances or complaints will be dealt with openly before elders or other formal institutions with facts being disclosed as and when required without favour;
3. Language – the language of discussion in the process of handling grievances shall be that that is used by the VMGs namely, Gabbra. When VMG members shall not read or write in this language they will be assisted by the project to grasp what is written that affects them;
4. Participation – VMGs and their representatives will be allowed to understand matters under discussion and to help actors in disputes understand where community members stand with regard to disputes being discussed. This approach will allow implications of disputes and grievances for project progress will be disclosed to VMG communities;
5. Options – parties to any dispute or any person with a grievance will be given options openly to follow customary procedures or formal procedures. If they begin with customary procedures and are not happy with outcomes they will be allowed to proceed to formal processes. These options and courses of action will be made known to them beforehand; and
6. Monitoring – grievances and complaints will be monitored with a view to having them settled within the shortest possible time. The project will to the extent possible facilitate speedy resolution of grievances.

#### **7.9.5.2 Structure of the GRM**

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Given below is a synopsis of what the sections in the GRM should contain

- **Section 1:** Overview of the Grievance Mechanism- This section highlights the purpose, objectives, scope and principles of the GM
- **Section 2:** Roles and responsibilities-This section provides details regarding specific roles, responsibilities and steps that need to be followed by Proponent staff and contractors to manage grievances
- **Section 3:** Accessibility- This section highlights the strategies that the Proponent will employ to ensure there are no barriers to access by stakeholders
- **Section 4:** Public sensitization campaign- this section highlights the strategies that the Proponent will use to run a public sensitization campaign as part of community roll-out for the Grievance Mechanism
- **Section 5:** Workflow- This section highlights the process flowchart that the Proponent will use for receiving, recording, investigating and resolving a grievance.
- **Section 6:** Grievance resolution approach- This section highlights the grievance resolution approach that will be used by the Proponent

- **Section 7:** Procedures for resolving complaints- This section highlights the steps that will be used in resolving conflicts which will include; receipt, registration, eligibility screening, acknowledgement, assessment, formulation and close out.
- **Section 8:** Confidentiality- This section highlights the measures that will be taken to protecting the identity of the Complainant and to handling personal information in accordance with legal requirements.
- **Section 9:** Grievance Mechanism performance monitoring- This section highlights the methods that will be used to assess the performance of the GRM which will include; monitoring and evaluation, key performance indicators, performance reporting
- **Section 10:** Resource Requirements-This section highlights the resources that will be required to ensure the effective implementation of the GRM which will include personnel, infrastructure, system resources and financial resources
- **Section 11:** Roll out and communication of the Grievance Redress Mechanism- This section highlights how the GM will be rolled out through various programs
- **Section 12:** Appendices-contains the appendices which include the tracking mechanisms.

### 7.9.5.3 Grievance Procedures

- 1) **Grievance Receipt:** The Contractor will have a Public Grievance form to be completed by anyone who wishes to lodge a grievance. REREC should also provide a “hotline” for registering a grievance.

**Table 17: Complaint/Grievance Form**

Details	
Name of Complainant:	
Complainant’s contact address:	
Phone Number:	
E-mail:	
Complaint received by:	
Date received:	
Details of Complaint/Grievance: (What happened? Where did it happen? Who did it happen to? What is the result of the problem?)	(attach extra sheets if necessary)
Date of Incident/Grievance:	

- 2) **Receiving and Documentation of Grievance:** receiving and documentation of the grievance.
- 3) **Clarification of case on site** –clarify the case on site and perform required analysis
- 4) **Decide:** Qualify the grievance (minor or major). Major grievances will be addressed according to the process described in 7.8.4.1 below.
- 5) **Implement the corrective measure:** make all the diligences to implement the solution decided during the previous stage and document the grievance closure
- 6) **Track and Feedback:** Implemented approaches are tracked regarding the successful implementation, resolve of grievance and possibilities to improve the implemented approach.

Follow up Action/Review	
Action:	
Action taken by: (Name):	
Results:	
Date action/review completed:	
Signature:	

#### 7.9.5.4 Major Grievance Procedure

For major grievances, when solving the claims involves important resources, a longer period of time (more than 30 days) or project/project schedule changes, the grievance mechanism will consist of the following steps:

- a) Screening for eligibility: The grievance is assessed for eligibility; is the complaint project related? Are there any other procedures more appropriate to address the issue? Does the complaint fall within the scope of issues the grievance mechanism is authorized to address?
- b) Grievance acknowledgment to the complainant stating whether the grievance is accepted or rejected, along with the reasons for rejection
- c) Grievance investigation/assessment: This will include taking the grievances through review and investigation. It could involve: interviewing the Complainant, site visit to investigate the grievance, documenting evidence where possible etc.
- d) Response formulation and implementation: It involves a process on how the person in charge comes up with a response to a complaint and how it will be forwarded to the Complainant.
- e) Grievance Resolution: Different resolution approaches include:
  - ✓ Contractor/MOE proposes a resolution;
  - ✓ Contractor/MOE and the complainant jointly decide;
  - ✓ Contractor/MOE and the Complainant use traditional practices
- f) Close out: The Proponent will close the process and give the closure status; Resolved or unresolved

#### 7.10 Stakeholder Engagement Post ESIA

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 REREC 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 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.

### **7.10.1 Capacity Building for Stakeholder Engagement and Grievance Management**

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Effective stakeholder engagement requires a set of competencies, expertise and skills that need to be acquired through training, recruitment, or the hiring of consultants. REREC and the Contractor will make deliberate effort to recruit personnel with the relevant skills and qualifications to undertake the stakeholder engagement work i.e., Social Specialist and CLO. Where appropriate, recruitment priority will be given to members of the local community. REREC will also ensure continuous skill and internal capacity building for effective implementation of SE activities.

Capacity building for SE and GM should not be limited to the Project personnel. In order to empower stakeholders, enrich their participation and ensure a shared vision, REREC should include capacity building strategies for key stakeholder groups.

The approach to strengthening capacities for stakeholder engagement is geared towards:

- Ensuring organizational ability to respond to stakeholders in relation to the internal enablers such as systems, governance, management commitment
- Considering and addressing Stakeholder resource limitations and requirements that may impede their effective participation
- Strengthening the skills of required individuals (from within the company and key stakeholder groups)

For Grievance Management the ESHS Team (REREC Environment and Social Specialist, Contractor's EHS Officer, Social Specialist) should be trained in conducting receipt and registration, referral processes, service provision, quality control, monitoring and record keeping, the grievance mechanism ethics, problem-solving skills and conflict resolution. The team should also be cognizant of the project Environmental and Social Management Plan (ESMP) and align the GM to this.

### **7.10.2 Monitoring and Reporting**

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Continuous monitoring and evaluation of the stakeholder engagement process is vital to ensure REREC can respond to identified issues promptly, learn from lessons, and adapt the SEP strategy to ensure it remains relevant and effective. Allowing stakeholders to provide comments and participate holds strategic value since stakeholder and project risks can be identified and addressed early.

Adherence to the following commitments/activities will assist in achieving successful engagement:

- ✓ Sufficient resources to undertake the engagement
- ✓ Use of participatory approaches
- ✓ Clearly defined approaches
- ✓ Clearly defined timelines
- ✓ Inclusivity (inclusion of key groups) of interactions with stakeholders
- ✓ Promotion of stakeholder involvement
- ✓ A sense of trust between REREC and stakeholders

- ✓ Transparency in all activities

### **7.10.2.1 Stakeholder Involvement in SEP Monitoring**

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The Stakeholder Engagement Plan will provide opportunities where stakeholders, particularly affected communities, can partake in discussions about project progress throughout the project lifecycle. This is mainly through open channels for the stakeholders to express their views and concerns. Such channels include structured feedback mechanisms like:

- Grievance mechanism including the establishment of a Locational GRC comprising of community members
- Access to project offices
- Regular stakeholder consultation forums
- Social media channels
- Suggestion boxes

### **7.10.2.2 Reporting to Stakeholders**

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REREC and Contractor to provide various opportunities for feedback to stakeholders throughout the project lifecycle. This is vital to ensure integrity of the stakeholder engagement process.

Various reporting mechanisms will be employed including:

- Regular community/public briefing forums
- Annual monitoring reports
- Website and social media updates
- Company corporate sustainability report
- Company newsletter
- ESIA report and subsequent updates
- Grievance mechanism updates

While REREC will endeavor towards a firm commitment to reporting to stakeholders, the principle of responsiveness does not require that REREC agrees or complies with all stakeholder concerns and interests, but that it responds coherently and consistently to them. Thus adequate responses should include acknowledgement of the key concerns, a prioritization of issues (including how this was determined), what has taken place since the dialogue, benchmarks, and next steps within a fixed timeframe.

It is critical that REREC defines and discloses clear reporting parameters to manage stakeholder expectations. These include:

- Reporting cycle (monthly, biannual, annual etc.)

- The types of reports to be expected
- How reports can be accessed and
- Contact point for questions regarding reports or their contents

REREC should also ensure that reports are easily accessible by the intended stakeholders/recipient. Deliberate effort should be made to ensure vulnerable stakeholder groups are able to access reports and other pertinent information. Additionally, report formats should take into consideration the language, culture and literacy levels of the different stakeholder groups. Where necessary, translation of key documents into the Gabbra/Swahili language should be considered. Where literacy levels are known to be significantly low, strategies for verbal reporting should be considered. These include public meetings and focus groups.

## 8 IMPACT ASSESSMENT AND MITIGATION MEASURES

### 8.1 Introduction

This Section identifies and discusses both negative and positive Environmental and Social impacts associated with the proposed micro-grid in Bubisa. The impacts are identified according to Phases namely: Construction Phase, Operational Phase and Decommissioning Phase.

#### 8.1.1 Impact Assessment Methodology

The principal Impact assessment process comprises of the following steps.

- **Impact prediction:** to determine what could potentially happen to resources/receptors because of the projects and its associated activities.
- **Impact evaluation:** to evaluate the significance of the predicted impacts by considering their magnitude and likelihood of occurrence, and the sensitivity, value and/or importance of the affected resource/receptor.
- **Mitigation and enhancement:** to identify appropriate and justified measures to mitigate negative impacts and enhance positive impacts.
- **Residual impact evaluation:** to evaluate the significance of impacts assuming effective implementation of mitigation and enhancement measures.

##### 8.1.1.1 Prediction of Impacts

Prediction of impacts was carried out with an objective to determine what is likely to happen to the environment because of the Project and its associated activities. From the potentially significant interactions identified in scoping, the impacts to the various resources/receptors were elaborated and evaluated

##### 8.1.1.2 Evaluation of Impacts

Each impact was described in terms of its various relevance characteristics (e.g., type, scale, duration, frequency, extent). The terminology used to describe impact characteristics is as shown in Table 10.

**Table 18: Impact characteristic terminology**

Characteristic	Definition	Designation
<b>Type</b>	A descriptor indicating the relationship of the impact of the project (in terms of cause and effect)	<ul style="list-style-type: none"><li>• Direct</li><li>• Indirect</li><li>• Induced</li></ul>
<b>Extent</b>	The 'reach' of the impact (e.g., confined to a small area around the Project Footprint, projected for several kilometers, etc.)	<ul style="list-style-type: none"><li>• Local</li><li>• National</li><li>• Global</li></ul>
<b>Duration</b>	The period over which a resource/receptor is affected	<ul style="list-style-type: none"><li>• Temporary</li><li>• Short term</li><li>• Long term</li><li>• Permanent</li></ul>
<b>Scale</b>	The size of the impact (e.g., the size of the area damaged or impacted, the	(No fixed designations; intended to be numerical value or a qualitative description)

Characteristic	Definition	Designation
<b>Frequency</b>	A measure of the constancy or periodicity of the impact	(No fixed designations; intended to be numerical value or a qualitative description)

The definitions for the type designations are given in Table 11. Definitions for the other designations are resource/receptor specific.

**Table 19: Impact type definitions**

Type	Definitions
<b>Direct</b>	Impacts that result from a direct interaction between the project and a resource/receptor
<b>Indirect</b>	Impacts that follow on from the direct interactions between the project and its environment because of subsequent interactions within the environment
<b>Induced</b>	Impacts that result from other activities (which are not part of the project) that happen because of the project.

The above characteristics and definitions apply to planned and unplanned events. An additional characteristic that pertains only to unplanned events is likelihood. The likelihood of an unplanned event occurring was designated using a qualitative scale, as described in the table 12 below.

**Table 20: Impact qualitative scale**

Likelihood	Definition
<b>Unlikely</b>	The event is unlikely but may occur at some time during normal operating conditions (probability less than 20%)
<b>Possible</b>	The event is likely to occur at some time during normal operating conditions (probability less than 20%)
<b>Likely</b>	The event will occur during normal operating conditions (probability greater than 50%)

Once an impact's characteristics were defined, each impact was assigned a 'magnitude'. Magnitude is typically a function of a combination (depending on the resource/receptor in question) of the following impact characteristics:

- Extent
- Duration
- Scale
- Frequency

In case of unplanned events only, magnitude incorporates the 'likelihood' factor discussed above.

Magnitude essentially describes the intensity of the change that was predicted to occur in the resource/receptor because of the impact. As discussed above, the magnitude designations themselves are universally consistent, but the descriptions for these designations vary on a resource/receptor-by-resource/receptor basis. The universal magnitude designations are:

- Positive

- Negligible
- Small
- Medium
- Large

In the case of a positive impact, no magnitude designation (aside from 'positive') was assigned. It was considered sufficient for the purpose of the IA to indicate that the Project was expected to result in a positive impact, without characterizing the exact degree of positive change likely to occur. In the case of impacts resulting from unplanned events, the same resource/ receptor-specific approach to concluding a magnitude designation was followed, but the 'likelihood' factor was considered, together with the other impact characteristics, when assigning a magnitude designation.

In addition to characterizing the magnitude of impact, the other principal impact evaluation step was definition of the sensitivity/ vulnerability/ importance of the impacted resource/receptor. There are a range of factors that was considered when defining the sensitivity/ vulnerability/ importance of the resource/receptor, which may be physical, biological, cultural, or human. Other factors were also considered when characterizing sensitivity/ vulnerability/importance, such as legal protection, government policy, stakeholder views and economic value. The sensitivity/ vulnerability/importance designations used herein for all resources/receptors are:

- Low
- Medium
- High

Once magnitude of impact and sensitivity/ vulnerability/ importance of resource/ receptor have been characterized, the significance was assigned for each impact. Impact significance is designated using the matrix shown in table 13 Impact Significance.

**Table 21: Impact Significance**

		Sensitivity/vulnerability/importance of resource/receptor		
		Low	Medium	High
Magnitude of impact	Negligible	Negligible	Negligible	Negligible
	Small	Negligible	Minor	Moderate
	Medium	Minor	Moderate	Major
	Large	Moderate	Major	Major

The matrix applies universally to all resources/receptors, and all impacts to these resources/receptors, as the resource/receptor-specific considerations are factored into the assignment of magnitude and sensitivity/ vulnerability/ importance designations that enter the matrix.

**Context of impact significance**

An impact of **negligible significance** is one where a resource/ receptor (including people) will essentially not be affected in any way by a particular activity, or the predicted effect is deemed to be 'imperceptible' or is indistinguishable from natural background variations.

An impact of **minor significance** is one where a resource/ receptor will experience a noticeable effect, but the impact magnitude is sufficiently small and/or the resource/receptor is of low sensitivity/ vulnerability/ importance.

In either case, the magnitude should be well within applicable standards/ guidelines.

An impact of moderate significance has an impact magnitude that is within applicable standards/guidelines but falls somewhere in the 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.

This does not necessarily mean that impacts of moderate significance must be reduced to minor, but that moderate impacts are being managed effectively and efficiently.

An impact of major significance 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 IA 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. An example might be the visual impact of a facility. It is then the function of regulators and stakeholders to weigh such negative factors against the positive ones, such as employment, in coming to a decision on the Project.

### **Identification of Mitigation and Enhancement Measures**

Once the significance of an impact has been characterized, the next step was to evaluate what mitigation and enhancement measures are warranted. For the purposes of this ESIA, the consultant adopted the following Mitigation Hierarchy:

- Avoid at Source, Reduce at Source: avoiding or reducing at source through the design of the Project.
- Abate on Site: add something to the design to abate the impact.
- Abate at Receptor: if an impact cannot be abated on-site then control measures can be implemented off-site.
- Repair or Remedy: some impacts involve unavoidable damage to a resource (e.g., agricultural land and forestry due to creating access, work camps or materials storage areas) and these impacts can be addressed through repair, restoration, or reinstatement measures.
- Compensate in Kind, Compensate Through Other Means: where other mitigation approaches are not possible or fully effective, then compensation for loss, damage and disturbance might be appropriate (e.g., planting to replace damaged vegetation, financial compensation for damaged crops or providing community facilities for loss of fisheries, access, recreation, and amenity space).

The priority in mitigation was to first apply mitigation measures to the source of the impact (i.e., to avoid or reduce the magnitude of the impact from the associated Project activity), and then to address the resultant effect to the resource/receptor via abatement or compensatory measures or offsets (i.e., to reduce the significance of the effect once all reasonably practicable mitigations have been applied to reduce the impact magnitude).

### **Management and Monitoring**

The final stage in the IA Process is the definition of the basic management and monitoring measures that are needed to identify whether:

- a) impacts or their associated Project components remain in conformance with applicable standards/guidelines; and
- b) mitigation measures are effectively addressing impacts and compensatory measures and offsets are reducing effects to the extent predicted. This is covered in Section 10 under Environmental and Social Management Plan (ESMP).

### **Impact Assessment Criteria**

To this assessment the following sections define the criteria against which the impacts associated with the proposed solar project have been assessed. The impact assessment criteria are general criteria and not specifically associated with the project? Interactions that are likely to lead to significant impacts, as identified during the scoping exercise and baseline conditions are presented in **Table 20**.

**Table 22: Interactions identified that are likely to result in significant impacts**

Resource/Receptor	Potentially significant impacts
Land use	<ul style="list-style-type: none"> <li>• Permanent changes in land use due to installation of the minigrid</li> <li>• Temporary changes in land use due to temporary site office and material storage yard</li> </ul>
Topography and drainage	<ul style="list-style-type: none"> <li>• Alteration of topography and micro drainage channel due to construction of project site approach road</li> </ul>
Soil environment	<ul style="list-style-type: none"> <li>• Decrease of soil quality due to loss of vegetation cover</li> <li>• Soil erosion during rainy season and windy periods</li> <li>• Sedimentation into nearby water bodies due to soil erosion and run-off.</li> <li>• Storage and handling of hazardous materials (e.g., fuel and lubricant) and waste generated from operation of construction equipment and machinery</li> <li>• and their maintenance may lead to soil contamination due to leaks/ spillage; and</li> <li>• Impact on soil and land environment due to improper management of domestic solid waste generated.</li> </ul>
Ambient air quality	<ul style="list-style-type: none"> <li>• Fugitive dust emissions due to movement of machinery and vehicles.</li> <li>• Fugitive emission due to operation of pile drivers; and</li> <li>• Air emissions due to operations of generator sets and machinery.</li> </ul>
Water environment	<ul style="list-style-type: none"> <li>• Usage of ground water for construction activities and cleaning of PV modules.</li> <li>• Surface and ground water contamination due to improper disposal of sewage at site; and</li> <li>• Surface and ground water contamination due to spillage of oil, lubricant, and hazardous waste.</li> </ul>
Ambient noise quality	<ul style="list-style-type: none"> <li>• Noise generation due to movement of vehicles and machineries.</li> <li>• Noise generation due to operation of pile drivers; and</li> <li>• Noise generation due to operation of generator set.</li> </ul>
Occupational health and safety	<ul style="list-style-type: none"> <li>• Occupational health hazards due to dust and noise pollution.</li> <li>• Safety risk due to wrong handling of construction machinery, working at heights; and</li> <li>• Exposure of workers to electromagnetic field (EMF) while working in proximity to charged electric power lines during operation and maintenance.</li> </ul>

## 8.2 Key Social Impacts- Pre-Construction

### 8.2.1 Land Acquisition

The proposed project will entail the acquisition of a 1.388 hectares land parcel for setting up the mini-grid. The land acquired may also be used to develop contractor facilities, worker's camps and other ancillary facilities e.g., storage and sanitary facilities. Loss of land used by the communities for livestock grazing and farming may trigger land disputes. New settlements may arise due to migration of people to the centres near the mini grid disrupting the existing community settlement patterns. The project proponents will use existing access road reserve to set up the low-voltage power distribution lines and will seek access from the PAPs and clients in whose property they will undertake electricity connection to the power grid.

During the consultation, it was also reported that the community is not entirely dependent on the land for income. The land has minimal vegetation cover. After implementing the embedded controls, the impact magnitude is assessed to be minor

#### 8.2.1.1 Embedded/In-built Control

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

### **8.2.1.2 Significance of Impact**

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

### **8.2.1.3 Proposed Mitigation Measures**

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The following additional measures may be recommended to minimize 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. During the public meetings the community identified these projects; Extra ward/unit at the Bubisa Health Center, dining Hall at Bishop Cavalera School and construction of a meeting hall at Bishop Cavalera School.

## **8.2.2 Impacts on Wayleaves**

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The project proponent will use existing access road reserves 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 6.78 km of LV circuit will be constructed.

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

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

### **8.2.2.2 Significance of Impact**

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

### **8.2.2.3 Proposed Mitigation Measures**

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

### **8.2.2.4 Risks Related to Stakeholder identification and consultations**

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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 sub-project phase*

### **Mitigation Measures**

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- 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 sub-project 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 to 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.

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

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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.

### **8.2.2.6 Significance of Impact**

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

## **8.3 Key Environmental Impacts – Construction phase**

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

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The project site is located on a generally flat terrain. 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 minored and associated structures and further during operations. The solar power Project is the first major solar power Project in the vicinity of project area and the new development will have impact on the surrounding area.

The project area is primarily a rural area and with pastoralism as a primary activity. Although the solar panels, inverter, transformers, and associated components would be manufactured off site and the construction phase would be relatively short-term in duration (less than one year), it would still require large number of equipment or infrastructure when being erected such as cranes, dumpers, transportation vehicles on site. Additionally, the presence of bare soil along the access roads would increase the potential of 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 and other natural attributes. The erection of the solar PV panels and the resulting glare from the sun will make it a standout feature from the natural surroundings and this would the lower the visual appeal of the area.

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

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

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Proper siting decisions can help to avoid aesthetic impacts to the landscape.

#### **8.3.1.2 Significance of Impact**

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The extent of the visual impacts will be localized. The overall impact significance change in visual landscape during construction phase is assessed as moderate.

#### **8.3.1.3 Proposed Mitigation Measures**

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

- The extent of the labor 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; and
- After completion of construction work, areas utilized for labor camp, storage area to be restored to original form.

#### **8.3.1.4 Residual Impact Significance**

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After implementation of mitigation measures, the significance of residual impacts will be reduced to minimal.

#### **8.3.2 Land Use**

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The study area consists of communal land with patches of open scrubland. The internal distribution lines will be laid by Kenya Power. Considering the land use of Bubisa, the land procured for the project site is uncultivated, and undeveloped. There is no major dependency for grazing on the land procured for the project. Thus, receptor sensitivity is assessed as **low**.

During consultation, it was established that the land did belong to the community. The community has since offered to the land in kind for project use. The establishment of the minigrid will convert communal land to industrial use for long term. Changes in land use are also envisaged for material store yard and temporary site office. However, those changes in land use will take place only during construction period.

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

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

The land use receptor sensitivity criteria will be low. This is due to the fact that there will be visual change upon installation of the minigrid. 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.

Thus, magnitude of the impact has been assessed to be **medium**.

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

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The actual area of land use impact would be limited to the footprint of 1.388 Hectares of communal land and immediate vicinity of the minigrid site. After construction work, any land taken for a temporary basis for storage of material will be restored to their original form. Existing roads will be developed for access to the project site.

##### **8.3.2.2 Significance of Impact**

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*The overall impact significance will therefore be moderate.*

##### **8.3.2.3 Proposed Mitigation Measures**

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

##### **8.3.2.4 Residual Impact Significance**

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Direct changes in land use during construction and operation are negative in nature but temporary. Indirect changes in land use are positive in nature and permanent. The direct impacts shall be limited to project site and associated facilities. The resource receptor sensitivity is moderate.

The residual impact significance will remain moderate as changes in land use will be for long term for majority of the project component (installation of minigrid).

### **8.3.3 Impact on Topography**

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The topography of the project site is an open area with gentle slope. There are no water bodies that pass through the proposed project site. Typically, solar power projects do not undertake levelling of topography and since the proposed project, along with the access road, is mostly on a flat terrain the receptor sensitivity has been assessed to be low. Due to undulating topography, study area may exhibit presence of micro drainage channels. Therefore, the impact magnitude has therefore been assessed as minor.

#### **8.3.3.1 Embedded/In built Control**

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

#### **8.3.3.2 Significance of Impact**

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Significance of impact is assessed to be minor.

#### **8.3.3.3 Additional Mitigation Measures**

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

#### **8.3.3.4 Residual Impact Significance**

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The residual impact significance will be reduced to negligible after implementing above mentioned mitigation measures

### **8.3.4 Impact on Soil Environment**

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The following are the anticipated impacts on the soil environment during the construction phase:

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

#### **8.3.4.1 Soil Compaction, Erosion and Contamination**

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The project area has sandy type of soil that is easily eroded. Preparation of the site for the establishment of PV arrays, internal access road(s), temporary laydown area and buildings (control and accommodation) during the construction phase will require vegetation clearance, ground levelling, grading and soil compaction. The construction activities will result in loss of vegetation cover which includes trees, grass and shrubs and topsoil within the site boundary.

The entire project site would be cleared and graded to prepare the site then levelled or contoured with bulldozers and land graders. Relatively small volumes of borrow material, including sand and gravel aggregate, may be required for site grading and foundation construction, but these materials would be obtained from local off-site sources.

Further, the transport of materials and equipment will involve additional movement of vehicles; construction machinery which will also lead to some degree of compaction within the site premises. No adverse impact on soil in the surrounding area is anticipated. However, in order to minimize such impacts, appropriate soil erosion control measures would be undertaken by developers to appease the chances of soil erosion.

The creation of new impervious surface would also result in an increase in storm water runoff and potential soil erosion.

The receptor sensitivity has been assessed as medium because of the preponderance of pastoralism as a source of livelihood in the area. The site clearance, excavation for foundation will largely affect the top layers of the soil.

Loss of topsoil quality would have an impact on the productivity of the land, but the effects can be reversed over time. Further, site clearance will be restricted only in the project site. Pastoralist land close to the project site will not be disturbed.

The usage of existing roads by vehicles and minimal access road improvement will reduce the impact from soil compaction in the area. The impact magnitude therefore has been assessed to be small.

The potential sources of soil contamination during construction phase are oil /fuel leaks or spills from machinery used in site preparation and trucks used in transporting construction materials. Depending on the size and source of the spill, liquid and gaseous state, petroleum hydrocarbons may remain mobile for long periods of time, threatening to contaminate the soil.

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

Vehicles will utilize existing roads to access the site.

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#### **8.3.4.3 Significance of Impact**

The overall impact significance on soil erosion, compaction and contamination has been assessed as **minor**.

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#### **8.3.4.4 Additional Mitigation Measures**

Site clearance, piling and excavation is not carried out during the windy period/season to minimize erosion and run-off.

The Contractor should develop and implement a comprehensive construction plan to the extent possible that will ensure construction activities involving earth works are scheduled to avoid rainfall seasons

The Contractor should employ sound construction techniques, including use of effective soil erosion and sediment control BMPs e.g. areas under excavation should be hoarded and shored to prevent soil erosion.

Waste/used oil generated from generators and construction machinery and equipment will be stored on paved surface in a secure location at the project site. The waste oil, will be sold to licensed waste handler at frequent intervals. Empty fuel containers will also be stored at a secured area designated for scrap and sold to authorized vendors.

Control and reduce at source the production of wastes and hazardous waste e.g. hazardous materials must be stored in a manner that prevents interaction with each other or with the soil or from being tampered accidentally.

Adherence to existing laws and regulations including: L.N 121 Environment Management and Coordination (Waste Management) Regulations

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#### **8.3.4.5 Residual Impact Significance**

The significance of residual impacts has been reduced to negligible considering the recommended mitigation measures.

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### **8.3.5 Impacts on Water and Water Environment**

During construction, excavation activities will involve soil exposure which results in soil erosion due to wind and surface runoff due to rains. Bare ground after site clearing could expose the soil to the storm water runoff which in turn could increase flow speed on the existing earth road drainage resulting in additional

erosion and potentially increase probability of flooding. Water quality could be further degraded through increased turbidity and siltation from soil erosion, runoff, and resuspension of sediments.

The installation of the solar panel will result in an impervious surface that will not be allowing water to percolate down as with natural surfaces. This is expected to result in increased run-off during the rains..

Contaminant runoff from installation and construction equipment, waste management and materials may also adversely affect water quality.

The project site is relatively flat and therefore the subsurface water can be polluted in case of any major soil pollution emanating from the construction processes e.g. spill of chemicals, leaks from the chemical storage area and improper management of both sanitary and construction waste.

For the proposed project, no hazardous materials that could potentially contaminate groundwater would be used or stored at the site. However, during installation and construction, there would be a small chance of a spill of diesel fuel or hydraulic fluid from installation and construction equipment.

The following is a summary of the proposed impacts on Water:

Aspect	Potential Impact
Water	<ul style="list-style-type: none"> <li>• Increased sedimentation of the surface run-off due to removal of vegetation cover and cutting of soil during construction</li> <li>• Contamination of the surface runoff from the site due to poor waste management, fugitive spills on the soils and soils contaminated by construction chemicals.</li> <li>• Contamination of subsurface water due to poor management of sanitation waste.</li> <li>• Flooding risk</li> </ul>

### 8.3.5.1 Embedded/in-built control

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Sound construction techniques will be employed including use of effective soil erosion and sediment control best management practices (BMPs) e.g. areas under excavation will be hoarded and shored to prevent soil erosion

### 8.3.5.2 Significance of Impact

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The overall significance of the impact is assessed to be **minor**.

### 8.3.5.3 Additional Mitigation Measures

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- The Project Contractor will develop and implement a waste management plan for proper management of all types of wastes in order to prevent contamination of surface or groundwater
- The Project Contractor will develop and implement emergency response procedures for accidental spills that may occur and end up contaminating surface or groundwater
- Adherence to existing laws and regulations including
  - ✓ LN 120 Environment Management and Coordination (Water Quality) Regulation
  - ✓ L.N 121 Environment Management and Coordination (Waste Management) Regulations

### 8.3.6 Impacts on Waste Generation

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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 wastepaper will also be generated by the construction workforce. A small proportion of the waste generated during construction

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

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

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#### **8.3.6.1 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.

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#### **8.3.6.2 Significance of Impact**

The impact significance for waste generation and soil contamination has been assessed as **minor**.

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#### **8.3.6.3 Additional Mitigation Measures**

- Contractor should ensure that no unauthorized dumping of used oil and other hazardous waste is undertaken at the site.
- Designated areas should be provided for Solid Waste and daily collection and period disposal should be ensured.
- Construction and Demolition Waste should be stored separately and be periodically collected by an authorized treatment and storage facility.
- All waste should be stored in a shed that is protected from the elements (wind, rain, storms, etc.) and away from natural drainage channels.
- A logbook 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.

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#### **8.3.6.4 Residual Impact Significance**

- The significance of impacts due to waste generation during the construction phase after implementation of mitigation measures has been considered as negligible.

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### **8.3.7 Impact on Air Quality**

The construction activities at the Mini grid sites can potentially lead to decrease in the ambient air quality due to fugitive dust emissions from site clearance, piling work, handling of construction materials, emissions due to movement of vehicles on unpaved roads and vehicular emissions and exhaust emissions from construction machinery.

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.

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

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

### **8.3.7.2 Significance of Impact**

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The significance of air quality impacts is determined based on professional judgement considering the sensitivity of the receiving environment.

Sensitive receptors of air and emissions were identified by observation during field visit to project site. They were noted to be mainly residential, commercial and public institutions i.e. school and dispensary. 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.

Sensitive receptors within 800 meters of key construction areas have been identified using observation and satellite imagery. Based on the observations made during walk through of the project area, all structures identified within this distance have been assumed to be residential or commercial.

### **8.3.7.3 Additional Mitigation Measures**

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- 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 30 km/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 for construction workers.
- All construction materials will be transported in designated trucks which will be covered.

### **8.3.7.4 Residual Impact Significance**

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As presented above, it is evident that with the implementation of the proposed mitigation measures, it is expected that the overall significance of dust impacts will reduce further to range from low to negligible levels.

## **8.3.8 Impact on Ambient Noise**

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

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

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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.

### **8.3.8.2 Significance of Impact**

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

### **8.3.8.3 Additional Mitigation Measures**

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- Only well-maintained equipment should be operated on-site.
- Use of noise-suppression techniques to minimize the impact of construction noise at the project site.
- Install portable barriers to shield compactors thereby reducing noise levels
- Use equipment designed with noise control elements
- If it is noticed that any 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
- Set and observe speed limits and avoid revving of engines
- The Contractor shall ensure that construction activities are limited to working hours (i.e. between 8am and 5pm daily) from Monday to Saturday, or as required in terms of legislation.
- Minimal use of vehicle horns and heavy engine breaking in the area needs to be encouraged.
- Compliance with Noise and Vibration regulations of 2009 is expected

### **8.3.8.4 Residual Impact Significance**

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Significance of residual impact is assessed to be negligible to minor taking into consideration above mentioned mitigation measures.

### **8.3.9 Impacts from Hazardous Materials:**

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

#### **8.3.9.1 Significance of Impact**

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

#### **8.3.9.2 Mitigation Measures**

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

### **8.3.10 Fire hazards**

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

### **8.3.10.1 Significance of Impact**

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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.

### **8.3.10.2 Mitigation Measures**

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

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

## **8.4 Key Occupational Health and Safety Impacts- Construction Phase**

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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
- Exposure of workers to electro-magnetic field (EMF) during operation and maintenance of the mini grids
- Risks of road accidents during the transportation of material and equipment to the project sites owing to the poor road network and insecurity in some of the KOSAP counties.

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

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

### **8.4.1.2 Significance of Impacts**

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The impact on occupational health and safety during the construction phase is evaluated to be of minor significance, as the installation of minigrid will be done through experienced and trained workers.

### **8.4.1.3 Proposed mitigation measures**

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

during the operation stage.

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

#### **8.4.1.4 Residual impact significance**

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Significance of residual impact is assessed to be negligible considering above mentioned mitigation measures.

## **8.5 Key Social Impacts – Construction Phase**

### **8.5.1 Land Uptake-Communal Land**

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The proposed project will entail the acquisition of a 1.15 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 centers near the mini grid disrupting the existing community settlement patterns. The project proponents will use existing access roads to set up the low-voltage power distribution lines and will seek access from Project Affected Persons and clients in whose property they will undertake electricity connection to the power grid.

During the consultation, it was also reported that the community is not dependent on the land for income. After implementing the embedded controls, the impact magnitude is assessed to be minor.

#### **8.5.1.1 Embedded/In-built controls**

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

#### **8.5.1.2 Significance of the Impact**

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

#### **8.5.1.3 Suggested Mitigation Measures**

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Considering that the procurement of land will have only a minor implication on the economy of the sellers, the following additional measures may be recommended to minimize this impact:

- Providing skills-based training interventions, especially for self-employment to the young and unemployed in the families who will be selling land to project. This will enhance their employability and create potential for income generation through self-employment.
- Providing preference to members of the families who will be selling land to the project for livelihood opportunities in Construction phase.
- Procuring resources from the local sources to induce more employment in the supply chain.

#### **8.5.1.4 Residual Impact Significance**

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After implementation of mitigation measures, the significance of residual impacts will be reduced to negligible.

## **8.5.2 Impacts on Water Sources**

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The survey of the study area shows that the main source of water in the community is water from the boreholes located a few hundred meters from the project site. The water is used for all domestic uses including drinking.

Consultations with the local community revealed that the water from the boreholes is limited.

In this respect, the Contractor/Proponent is advised to source water from the area water vendors, as opposed to abstracting water from the boreholes which could potentially lead to depletion of water used by the community. As at the time of the study, there was no information on the estimates of the project's water use during the construction phase, however the estimated water usage per person per day in Kenya is 50 liters.

### **8.5.2.1 Embedded/ in-built controls**

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The Project contractor to establish a sustainable source of water for the construction activities and construction workers i.e. purchase from local water vendors.

### **8.5.2.2 Significance of Impact**

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The impact on water sources is evaluated to be of minor significance since the Contractor is advised to source water for construction from local vendors and avoid abstracting from the existing boreholes.

### **8.5.2.3 Suggested Mitigation Measures**

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- The contractor to establish a sustainable source of water for the construction activities and construction workers i.e. drilling of a borehole
- The proponent has been advised to instigate a water supply scheme for the neighbouring communities which will ensure a reliable water supply resulting in a positive impact for the community.

## **8.5.3 Impacts on Traffic and Movement Patterns**

---

An increase in traffic due to construction vehicles and heavy vehicles could create short term disruptions and safety hazards for current road users. Transportation of project components and equipment to the proposed site will be by vehicular trucking transport. Increased traffic due to construction vehicles and heavy vehicles could cause disruptions to road users and increase safety hazards. The use of local roads and transport systems may cause road deterioration on the access road, which is an earth road.

The number of construction vehicles, increased public transport vehicles and project-related traffic may change the movement patterns of other road users in such a way that their movement patterns are disrupted and their safety levels are impacted on.

An increase in traffic from the rise in construction vehicles is a safety concern for other road users. The community members use access road is used to access some of the homesteads, the Bu the watering area and the business center. Pupils from Bubisa primary school, located approximately 400 m from the project site, use the internal access road to the school.

### **8.5.3.1 Significance of Impacts**

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The impact is rated moderate due to the high impact magnitude and the low receptor sensitivity.

### **8.5.3.2 Suggested Mitigation Measures**

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- Public awareness programs should be developed by the Contractor with the community to identify areas of particular risk and approaches to reduce risk. This is expected to include awareness programs along roads leading to the site to frequent users on traffic dangers.
- Traffic calming and speed control measures should be instigated in consultation with the relevant authorities.

- The Project Contractor will develop a Traffic management plan for the construction phase of the project
- The Project Contractor will regularly inspect the access roads conditions and whenever necessary, promptly repair damages related to construction traffic
- Prepare detailed plan for signage along the Construction Area to facilitate traffic movement, provide directions to various components of the Works, and provide safety advice and warnings. Details regarding maximum permissible vehicular speed on each section of road. All signs will be in both Swahili and Gabbra language

#### **8.5.4 Impacts on Security**

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As mentioned in section 6.4.8 the area has experienced clashes with the Borana community. The construction activities may therefore be targeted if the clashes erupt in a bid to sabotage the project.

The perceived decline of security during the construction phase of the proposed project given the attacks by the Borana community in the past may have indirect effects such as decreased safety and security risk for human lives, neighbouring private properties and damage to property.

On the other hand, security concerns could likely arise from the community towards the project. If the commitments made to the community by the Proponent are not honoured i.e. priorities in provision of job opportunities, participation in community development etc. it may lead to distrust between the Proponent and the community and subsequently chances of vandalism of the plant due to the hostility.

##### **8.5.4.1 Embedded/In-built controls**

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The perimeter of the construction site will be appropriately secured to prevent any unauthorized access to the site; the fencing of the site should be maintained throughout the construction periods.

The appointed Project contractor will appoint a security company and appropriate security procedures and measures are to be implemented.

##### **8.5.4.2 Significance of Impact**

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The overall impact on security is evaluated to be of moderate significance.

##### **8.5.4.3 Suggested Mitigation Measures**

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- Working hours should be kept within daylight hours during the construction phase
- Security personnel should be trained on how to deal with the community to avoid confrontations
- Access in and out of the site should be strictly controlled by a security company
- The contractor should provide workers with identity tags and prohibit access of unauthorized people to the construction site.
- A method of communication should be implemented whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process
- A Security Management Plan that involves a threat assessment and analysis should be developed by the Contractor and the Proponent. The plan should address security threats such as Terrorism, bomb threats, workplace violence and vandalism etc. of the solar plant.
- The Project Contractor should also be guided by the Voluntary Principles on Security and Human Rights in managing security during the construction phase.

#### **8.5.5 Impact on Local economy and employment**

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The construction, operation and maintenance of the mini grids will provide employment opportunities for skilled and unskilled labor. 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 basic education. This will be a source of income for the labourer's. Where possible, water and other construction materials will be sourced locally to promote local businesses.

Thus, anticipated benefits of the Project include Direct employment opportunities mainly during construction of the mini grid; indirect employment generated by the procurement of goods and services for the Project; induced employment related to jobs ensuing from the expenditure of incomes associated with direct and indirect Project related jobs; and Direct and indirect business opportunities to the local population. Individual and small businesses are expected to benefit from selling goods and services to workers. The local community is likely to benefit from the economic opportunities to be created from the following:

- Civil works during construction phase including, construction of solar PV module mounting area, transformer yard, inverter room, internal roads, laydown areas and labor camp.
- Self- employment options for individuals possessing vocational or technical training skills like electricians, welders, fitters etc.
- Contracting opportunities for locals possessing construction equipment which would be needed
- Creation of indirect employment for local community through establishing small shops like stalls, kiosks supply of intermediate raw materials, repair outlets, hardware stores etc. However, these are likely to be temporary.

#### **8.5.5.1 Enhancement Measures**

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A significant segment of labor requirement during the construction phase will be sourced locally. While the significance of the impact on economy and employment opportunities during the construction phase is understood to be positive, the following measures should be put in place to ensure that the local community receives maximum benefit from the presence of the project:

- Preference should be provided to local labor, sub-contractors, or suppliers to pass on maximum economic benefit locally.
- Preference should be provided to the vulnerable population in the Study Area.
- The project proponent will establish a mechanism to audit sub-contractors and suppliers with respect to compliance of utilizing local labor and resources.

#### **8.5.5.2 Impact Significance**

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The impacts have been assessed as positive due to employment opportunities for locals.

#### **8.5.6 Community Health and Safety**

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The receptors for impacts on community health and safety include project site workers, settlements in the 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 substations and movement of material and personnel may result in impacts on the health and safety of the community. As mentioned earlier in the report, the internal distribution line will pass through a hamlet of Bubisa village and will thus lead to significant impact on community health and safety during construction phase. Construction activities will involve the use of heavy machinery.

Furthermore, the movement of material and personnel via the access roads may result in damage to human life or livestock due to accidents. The major community health and safety risks include structural failure of project infrastructure, life and fire safety, public accessibility, and management of emergency situations. As per WB ESS guidelines, the occupational and community health and safety hazards during the construction, operation, and decommissioning of solar power projects are generally like those of largest

infrastructure projects.

Based on the above analysis, the impact magnitude is assessed to be medium.

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

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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 to prevent against ground water contamination
- The truck drivers carrying construction machinery and materials will be instructed to drive within speed limits with careful consideration for village traffic.
- Movement of heavy equipment and construction materials will be regulated during peak hours (09:00 AM to 06:00 PM).

#### **8.5.6.2 Significance of Impact**

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The impact to community health and safety during the construction phase is evaluated to be of minor to moderate significance due to proximity of low voltage distribution line to the nearest homesteads. However, the significance of impact decreases because the Project site consists of low density of population and most of the unskilled labour will be engaged from the local habitation.

#### **8.5.6.3 Additional Mitigation Measures**

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

- Developing an onsite ESMS and EHS Policy by the developer.
- Ensuring that the sub-contractor agreements that the developer enters 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
- Developing a grievance redress mechanism

#### **8.5.6.4 Residual Impact Significance**

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- After the implementation of the above mitigation measures, the residual impact significance.

#### **8.5.7 Labor Influx**

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

Engagement of migrant labourers might lead to an increase of issues with the local population if proper orientation is not provided.

The in-migration of people to the area as either non-local workforce/ or job seekers could result in pressure on economic and social infrastructure such as water, housing, public services (health, education), transport facilities etc.

Other basic issues related with migrant labour may include:

- Conflict amongst workers, and between workers and local community, based on cultural, religious or behavioral practices.
- Discontent amongst local community on engagement of outsiders
- Mild outbreaks of certain infectious diseases due to interactions between the local and migrant populations. The most common of these are respiratory (Tuberculosis and COVID 19), vector borne (Malaria and Dengue), water borne (Stomach infections, typhoid) and sexually transmitted diseases (HIV, Syphilis and Hepatitis)
- Security issues/ gender violence especially to local women from migrant workforce

The influx of people into the area could further lead to a temporary increase in the level of crime and cause social disruption. This could then lead to rise in social conflicts and change in social dynamics. The high unemployment rate and expectations of job creation is already a source of competition among the locals and could be exacerbated through outsiders coming into the area resulting into conflict.

Similarly, there will be an influx of people seeking to provide goods and services to the construction workers, and this may cause tension with the local people and raise potential for competition over the same.

The local people who feel that the "imported" labour will reduce their chances of getting employment consider the impact significant. They strongly feel that more of their people should be given the jobs in order to include them and raise their income.

The degree to which societies are disrupted largely depends on the level of local employment achievable and in the case of this project a significant portion of the workforce is expected to be sourced locally.

#### **8.5.7.1 Significance of Impact**

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

#### **8.5.7.2 Suggested Mitigation Measures**

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- In contract documents for the Contractor, MOE/KP 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.
- Adopt a 'locals first' policy for construction employment opportunities especially for semi and low skilled categories. Community expectations for employment and other local benefits should be addressed and managed. Regular updates on opportunities and skill requirements shall be provided to the community.
- The Project Contractor shall ensure possible sourcing of construction labour from the local region to the extent possible
- The EPC Contractor to ensure local contracting and vendor opportunities as far as possible.
- The EPC contractor is required to be responsible for arranging and providing amenities such as water, ablution facilities etc.
- Regular checks by MOE/KP should be undertaken to ensure the relevant labour laws and occupational health and safety plans are adhered to at all times.
- All project workers should, as part of their induction, receive training on health and safety.
- The contractor should put in place mechanism to ensure no employee or job applicant is not discriminated against on the basis of his or her gender, marital status, nationality, ethnicity, age, religion or sexual orientation.
- The Contractor will put in place a worker grievance redress mechanism accessible to all workers,

whether permanent or casual, directly or indirectly employed. The Proponent worker grievance mechanism shall be open to the Contractor workforce in the event that their grievance is not adequately resolved by their direct employer. The Proponent will then have the authority to act to resolve this grievance.

- All project workers should have access to training on communicable diseases and STDs and community interactions in general. This training will be developed in collaboration with local health institutions.

## **8.5.8 Child Labour & Forced Labour**

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Implementation of the Bubisa solar power 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.

Forced labor is only foreseen in the manufacturing supply/distribution of, e.g., solar panels.

### **8.5.8.1 Significance of Impact**

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

### **8.5.8.2 Suggested Mitigation Measures**

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- 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 should carry out surveillance to ensure that no children are employed in the project, and to the extent possible by third parties related to the project and primary suppliers where such risk may exist
- Measures will be instituted by the Proponent to guide Contractors in the procurement process that will ensure that the production of solar panels used in the construction of the minigrad does not involve forced labour. i.e.
  - ✓ Signed contracts between the Contractor and Workers
  - ✓ Records and evidence of wage payment to the worker by the Contractor
  - ✓

## **8.5.9 Gender Based Violence (GBV)**

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

Sexual Exploitation and Abuse (SEA) is any actual or attempted abuse of a position of vulnerability, differential power, or trust, for sexual purposes, including but not limited to, profiting monetarily and socially from the sexual exploitation of another. Sexual abuse is further defined as "the actual or threatened

physical intrusion of a sexual nature, whether by force or under unequal or coercive conditions.” Women, girls, boys and men can experience SEA.

During the FGD with the women, it was reported that the most common form of GBV intimate partner violence. There are also rape cases that occur in Bubisa and the perpetrators are usually under the influence of alcohol or Khat/Miraa. The project could potentially exacerbate the issue as a trickle-down effect of men employed at the construction site having more disposable income, engaging more in alcohol and drug use and therefore committing more of these crimes.

Workplace sexual harassment includes unwanted sexual advances, request for sexual favors and sexual physical contact.

GBV has serious and far-reaching negative effects including physical injuries resulting in death or disfigurement, psychological trauma, infection with HIV/AIDS, unwanted pregnancies, social stigmatization and exclusion and economic deprivation among others. Consequently, it is incumbent that preventive measures be mooted to prevent occurrence of such cases

This may also be experienced while the women are searching for jobs and those giving the jobs may ask for sexual favours.

#### **8.5.9.1 Significance of Impact**

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There are a number of incidences of gender based violence i.e. rape that go unreported in Bubisa as established during the FGD with the women. Therefore, the significance of this impact is considered to be medium considering medium sensitivity of the receptor and medium magnitude of the impact.

#### **8.5.9.2 Suggested Mitigation Measures**

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- Prepare an Awareness Raising Strategy, which describes how workers and local communities will be sensitized to GBV risks, and the worker’s responsibilities;
- Mandatory signing and implementation of code of conduct for the workers
- 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.
- Develop and implement a GBV-SEA/SH Prevention and Response Action Plan with an Accountability and Response Framework as part of the Contractor’s C-ESMP. The action plan will include the necessary measures for prevention and response. Contractor/KP can refer to the World Bank’s Good Practice Note for Addressing Gender-based Violence in Investment Project Financing involving Major Civil Works (Sept 2018) for further guidance.
- An Accountability and Response Framework, to be finalized with input from the contractor, should include at minimum:
  - ✓ GBV Allegation Procedures to report GBV issues to service providers, and internally for case accountability procedures which should clearly lay out confidentiality requirements for dealing with cases; and,
  - ✓ A Response Framework which has:
    - Mechanisms to hold accountable alleged perpetrators associated to the project;
    - The GRM process for capturing disclosure of GBV;
    - A referral pathway to refer survivors to appropriate support services.

## **8.5.10 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, race, ethnicity, disability, sexual orientation and religion. There is potential risk of lack of intentional actions by the mini-grids contractor(s) and implementing agencies for the inclusion of VMGs in the project activities and benefits. This potentially leads to the exclusion of VMGS from the benefits and opportunities derived from the proposed mini-grid facilities.

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

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

1. Women/Widows;
2. Children/Orphans;
3. The elderly (80 years and above)

### **8.5.10.1 Significance of Impact**

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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 take into account the project site inhabitants are predominantly the Gabbra community.

### **8.5.10.2 Mitigation Measures**

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

- Implement the existing grievance redress mechanism

### **8.5.11 Risk of Communicable Diseases/HIV & AIDs**

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

#### **8.5.11.1 Significance of Impact**

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

#### **8.5.11.2 Mitigation Measures**

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

### **8.5.12 Risk of spread of COVID 19 amongst Workers and the Community**

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This impact is triggered during Project Construction Phase and operation phase due to the Project attracting various categories of workers drawn from local, and national markets. This therefore pose risk of spread of COVID-19 and measures should be in place to curb this.

COVID – 19 is a highly infectious disease and since consultations are required during the project implementation, it will also pose a potentially high risk of infection to and among communities. It is important that alternative ways of managing consultations and stakeholder engagement are implemented to mitigate the impacts.

According to the Ministry of Health, Marsabit County is one of the counties with relatively small number of reported Covid 19 cases and infections. At the time undertaking the assessment, the county had only 840 Covid-19 reported cases and was ranked at number 35 out of the 47 counties. No significant cases had been reported in Bubisa area. If the status remains the same even at the time of implementation of the project, then the significance of this impact pre-mitigation is considered to be moderate.

#### **8.5.12.1 Significance of Impact**

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The receptor sensitivity medium and low magnitude, hence Moderate significance.

### **8.5.12.2 Mitigation Measures**

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- Install handwashing facilities with adequate running water and soap, or sanitizing facilities at entrance to main site;
- Ensure routine sanitization of shared social facilities and other communal places routinely including wiping of workstations, doorknobs etc.;
- All workers and visitors accessing the site every day shall be subjected to rapid Covid-19 screening which may include temperature check and other vital signs;
- The project shall put in place means to support rapid testing of suspected workers for covid-19;
- Avoid concentrating of more than 5 workers at one location. Where two or more people are gathered, maintain social distancing of at least 2 meters;
- Sensitize all community segments and project workers on Covid 19 and precautionary measures that need to be observed;
- Avoid concentrating of more than 15 community members at one location. Where two or more people are gathered, maintain social distancing of at least 2 meters;
- The team carrying out engagements within the communities on one-on-one basis will be provided with appropriate PPE for the number of people they intend to meet;
- Restrict site access to only Authorised persons; and
- Continuously adhere to the MoH, WHO and World Bank guidelines on Covid-19 management.

## **8.6 Key Environmental impacts – Operation phase**

### **8.6.1 Impact on Soil Environment**

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The proposed solar plant will occupy that is currently covered by natural vegetation with no grazing or farming activities. Compaction of soils and installation of solar modules within the site will result in lower permeability and therefore, decreased infiltration and increased runoff. Without appropriate measures, runoff from PV panels, compacted areas and hard standing areas may increase erosion and increase the sediment load in run-off.

Once the plant is commissioned there will be limited disturbance to soil, however, repair and maintenance of underground cables and associated utilities will lead to generation of hazardous wastes such as used transformer oil. The defunct/damaged photo voltaic cells will also be generated and storage/disposal on unpaved ground can lead to contamination of soil being a hazardous waste.

Herbicidal chemicals tend to be employed throughout the operation phase to prevent or control the growth of plants which may cut off sunlight from the solar paneling. Herbicides sprayed in the project area could contaminate the soil, surface water and groundwater

#### **8.6.1.1 Significance of Impact**

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The overall impact significance on soil erosion and compaction has been assessed as negligible.

#### **8.6.1.2 Proposed Mitigation Measures**

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- The operator will develop and implement a waste management plan for proper management of all types of wastes in order to prevent contamination of surface or groundwater

- The Operator will develop and implement emergency response procedures for accidental spills that may occur and end up contaminating surface or groundwater
- Properly installed and maintained storm water control measures (i.e., detention basins) would minimize the impacts of storm water runoff from impervious surfaces. Potential impacts would also become less likely as vegetation covers and stabilizes the site. The on-site sanitary wastewater system would be operated to prevent any adverse impacts to surface or groundwater resources.
- The operator should consider manual weeding over usage of herbicide to control plant growth in the solar panel area.

### **8.6.1.3 Residual Impact Significance**

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The significance of residual impacts has been reduced to negligible considering the recommended mitigation measures.

## **8.6.2 Waste Generation**

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

The quantity of hazardous waste generated will be much lesser quantity than during the construction phase. Therefore, receptor sensitivity has been assessed as low.

The quantity of municipal and hazardous waste generated will be much lesser in quantity in operation phase than during the construction phase. Thus, the Impact magnitude has been assessed too small.

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

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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.

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

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Additionally, the following steps must be undertaken to avoid soil contamination:

- Ensure oil/ lubricants are stored on impervious floor in the storage area having secondary containment.
- Use of spill control kits to contain and clean small spills and leaks during O&M activities; and
- The guidelines and procedures shall be prepared and followed for immediate clean-up actions following any spillages.

### **8.6.2.3 Significance of Impact**

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

### **8.6.2.4 Additional Mitigation Measures**

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- Municipal domestic waste generated at site to be segregated onsite.

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

#### **8.6.2.5 Residual Impact Significance**

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The significance of residual impacts will be negligible post implementation of recommended mitigation measures.

### **8.6.3 Impact on Water Environment**

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

Discussions with the residents in Bubisa confirmed that there is scarcity of water in the area due to the arid nature of the area. Since the project is likely to generate very little or negligible amount of wastewater during the O&M phase, the impact magnitude has been assessed to be small.

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

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Planning of toilets and waste collection areas should be away from natural drainage channels (*lag gas*).

#### **8.6.3.2 Significance of Impact**

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The overall significance of impacts is assessed to be **minor**.

#### **8.6.3.3 Suggested Mitigation Measures**

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- 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 for use of toilets. Open defecation and random disposal of sewage shall be strictly restricted.
- Construction labor deputed onsite to be sensitized about water conservation and encouraged for optimal use of water.
- Regular inspection for identification of water leakages and preventing wastage of water from water supply tankers.
- Recycling/reusing to the extent possible.
- The contractor should provide portable/mobile toilets for use on site

#### **8.6.3.4 Residual Impact Significance**

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The residual impact significance is envisaged to be negligible upon application of embedded controls and additional mitigation measures.

## **8.6.4 Impact on Noise and Air Quality**

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Negligible noise and vibration will be produced during operation phase of the project and would be from the backup generator. It is also anticipated that there will be gaseous emissions from vehicles using the road.

### **8.6.4.1 Suggested Mitigation Measures**

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The generator room should be made sound proof to ensure no noise of a nuisance level will be produced

## **8.6.5 Landscape and Visual Impacts**

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The solar panels will be spread over a horizontal form with maximum height of 2m above the ground level. In addition, the entire facility will be fenced with a stone wall with height of approximately above 2 meters, hence may not be visible to the passers or moving traffic.

The current use of land surrounding site is mixed commercial and residential. The permanent change of current landscape to area spread with solar panels will have potential visual impact for nearest habitations and passers.

### **8.6.5.1 Significance of Impacts**

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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.

Based on the above, significance of visual impact on landscape during operation phase of the project has been assessed as moderate

### **8.6.5.2 Suggested mitigation measures**

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

- Signage related to the minigrd 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.
- Landscape development around the solar farm site with the participation of the local community.

### **8.6.5.3 Residual impact significance**

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After implementation of mitigation measures, the significance of residual impacts will reduce to minor.

## **8.7 Key Ecological Impact- Operation Phase**

### **8.7.1 Collision and electrical hazards from power transmission infrastructure**

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Several bird's species were identified in the project area from secondary data sources. The poles can potentially constitute an electrocution and collision hazard to birds. Some birds also utilize the transmission towers for nesting.

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

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

### **8.7.1.2 Additional Mitigation Measures**

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

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

### **8.7.1.3 Residual Impact Significance**

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After implementation of mitigation measures, the significance of residual impacts will be **Minor**.

## **8.8 Key Occupational Health and Safety Impacts- Operations Phase**

### **8.8.1 Worker Health and Safety**

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During the operational phase, KP personnel will operate and maintain the proposed solar mini-grid in Bubisa. The lack of competent operations and maintenance staff trained in occupational safety and health (OSH) could potentially lead to accidents and injuries during the operational phase of the project. OSH hazards associated with the operational phase include (i) live power lines, (ii) working at heights etc.

#### **8.8.1.1 Significance of Impact**

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The impact on occupational health and safety during the construction phase is evaluated to be of minor significance, as the minigrid operations will be done through experienced and trained workers.

#### **8.8.1.2 Additional Mitigation Measures**

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- KP will undertake a comprehensive occupational safety risk assessment of the operations and maintenance activities associated with the power plant
- Subsequently, KP will develop and implement a Safety management system to comprehensively address all the identified safety risk in Proactive manner.
- Additionally, the OSH systems will be alignment with the requirements of OHSAS 18001 for the operational phase of the project. This MS will include relevant OSH management programs such as Energy Isolation, working at heights and Contractor Management.

## **8.9 Key Social Impacts – Operations Phase**

### **8.9.1 Impact on Economy and Employment**

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

During the operations phase, the requirement for unskilled and semi-skilled labor 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. Even though these job opportunities will be less as compared to those generated during the construction phase, the existing poor socio-economic conditions suggest that provision of employment opportunities will have significant impact in the local community and eventually have a multiplier effect as a result of the project activities.

It is also equally important that the community is well prepared in advance in order to manage expectations and build their capacity in taking up the available jobs during the operation phase. There should also be a transparent process from the advertisement to the recruitment exercise so as to avoid any discontent for

the community especially since these opportunities will be less than those that were available during the construction phase

Stable and reliable power supply will open up business opportunities for self-employment. Availability of power will enable businessmen to scale up their businesses while making it possible to set up businesses such as salons, barber shops, photocopying machines, cyber cafes, welding, and 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.

#### **8.9.1.1 Significance of Impact**

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The overall impact significance of the impact on economy and employment during the operations phase is assessed as positive.

#### **8.9.1.2 Enhancement Measures**

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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 labor or suppliers to pass on maximum economic benefit locally.
- Opportunities should be provided to the vulnerable population in Bubisa.
- Maximize local employment through training and capacity building
- Ensure the community is well informed in advance on the number of available opportunities so as to manage expectations

#### **8.9.1.3 Residual Impact Significance**

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The significance of the residual impacts will remain positive

### **8.9.2 Development of clean, renewable energy infrastructure**

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Energy production has been and still is one of the main pivots of the social and economic development of Kenya. Kenya currently relies on biomass energy to meet its energy demands. Almost 70% of Kenya's primary energy is biomass i.e. charcoal, wood fuel and agricultural waste.

The use of solar irradiation for power generation is considered a non-consumptive use of natural resource which produces zero GHG emissions. The government considers the use of renewable energy as a contribution to sustainable development.

Increasing the contribution of the renewable energy sector to the local economy may contribute to the diversification of the local economy and provide greater economic stability. The growth in the solar energy could introduce skills and development into the area. The development of a solar energy facility plant could therefore add to the stability of the economy.

Residents in the area use different sources of energy but mainly wood fuel. Electricity supply will imply that as many as are willing can apply for connection and get connected. This will result in reduced individuals and organizations using diesel generators, less reliance on kerosene, wood fuel and charcoal.

#### **8.9.2.1 Significance of Impact**

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The overall impact significance of the development of clean, renewable energy during the operations phase is assessed as positive.

### **8.9.3 Improvement in Social Services**

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#### **Education**

Access to electricity at the household level and schools will create opportunities for children be able to study even for longer hours. Additionally, children in households can also access education programs being aired through different radio and T.V. channels. Schools will be able to take advantage of information technology and communication that are becoming a way of life in education sector and learning in general.

### **Security**

Bubisa area will benefit from improved security since houses, businesses and public spaces will be well lit using electricity. Electricity will lead to enhanced provision of security through well-lit streets.

Street-lighting might also lead to a decrease of sexual assault (rape) incidences which occur past sundown. Subsequently, the women will feel safe walking alone at night.

### **Communication**

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.

### **Health and Healthcare Benefits**

Solar energy for lighting is better than firewood that is in use currently. This is because burning of firewood releases a high level of smoke into air and emits tiny particles (PM<sub>2</sub>) that cause air pollution. The health risks posed by this indoor air pollution mainly include acute respiratory infections, lung problems etc. 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. The project will result in many families replacing firewood for lighting with electricity there-by reducing chances of the aforementioned disease incidences.

Provision of lighting in the healthcare facility will improve healthcare service delivery i.e. it will enable laboratory services such as refrigeration of medical samples etc.

## **8.9.4 Impacts on Community Health and Safety**

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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.

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

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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.

### **8.9.4.2 Significance of Impact**

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

### **8.9.4.3 Additional Mitigation Measures**

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

- Implementing the existing grievance redress mechanism

- A technical operator should be stationed within or near the site in order to handle emergencies in the event that they occur.

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

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

#### **8.9.5.1 Significance of Impact**

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

#### **8.9.5.2 Mitigation Measures**

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- 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.

### **8.9.6 Exclusion of VMGS, Vulnerable and 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 derived from the proposed mini-grid facilities.

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

### **8.9.6.1 Significance of Impact**

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

### **8.9.6.2 Mitigation Measures**

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- 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

### **8.9.7 Risks related to poor or inadequate stakeholder engagement (conflict)**

---

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

#### **8.9.7.1 Significance of Impact**

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

#### **8.9.7.2 Mitigation Measures**

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- 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

### **8.9.1 Electro-Magnetic Fields (EMFs)**

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

### **8.9.2 Fire Outbreaks**

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Carelessness and negligence both at the solar Minigrid and by the PAPs of electricity may cause fires.

### **8.9.2.1 Significance of the Impact**

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The impact will be direct, temporary and major,

### **8.9.2.2 Proposed Mitigation Measures**

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- 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 evacuation plan should be prepared and posted at strategic points and should include procedures to take when a fire is reported.
- Workers especially operators of the plant must be trained on fire management
- No smoking signs shall be posted within the Mini-grid area
- A fire Assembly point should be identified and marked

### **8.9.3 Shocks and Electrocuting to the PAPs**

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

#### **8.9.3.1 Significance of Impact**

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

#### **8.9.3.2 Mitigation Measures**

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

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

## **8.10 Key environmental impacts – Decommissioning Phase**

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In the event of decommissioning of the project, it is likely that any potential impacts would be like those in the construction phase, however, different activities would be required and therefore impacts on the physical environment associated with this phase.

### **8.10.1 Noise and Vibration**

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The demolition works will lead to significant deterioration of the acoustic environment within the project site and the surrounding areas. This will be as a result of the noise from demolition works. The impact will be direct, temporary and minor.

#### **8.10.1.1 Significance of Impact**

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The overall impact significance is envisaged to be Minor.

#### **8.10.1.2 Proposed Mitigation Measures**

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Significant impacts on the acoustic environment will be mitigated by the project proponent who will put in place several measures that will mitigate noise pollution. The following noise-suppression techniques will be employed to minimize the impact of temporary noise at the project site.

- Install portable barriers to shield compressors and other small stationary equipment where necessary.
- Use quiet equipment (i.e. equipment designed with noise control elements)
- Co-ordinate with relevant agencies in case the noise produced will require a license.
- Limit pickup trucks and other small equipment to a minimum idling time and observe a common-sense approach to vehicle use and encourage workers to shut off vehicle engines whenever possible.
- Demolish mainly during the day when most of the neighbours are out working.

### **8.10.2 Solid Waste Generation**

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Demolition of the Mini-grid and related infrastructure will result in generation of solid waste. The waste will contain the materials used in construction including concrete, metal, wood, glass, paints, adhesives, sealants and fasteners, conductors, poles solar panels and batteries. Although demolition waste is generally considered as less harmful to the environment since they are composed of inert materials, there is growing evidence that large quantities of such waste may lead to release of certain hazardous chemicals into the environment. The impact will be moderate. The batteries and panels need to be disposed in a specific way.

#### **8.10.2.1 Proposed mitigation measures**

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- Provision of facilities for proper handling and storage of demolition materials to reduce the amount of waste caused by damage or exposure to the elements
- Adequate collection and storage of waste on site
- Safe transportation to the disposal sites / designated area

### **8.10.3 Dust Impact**

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Some dust will be generated during demolition works. This will affect demolition staff as well as the neighbors. The impact will be minor

#### **8.10.3.1 Proposed Mitigation Measures**

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High levels of dust concentration resulting from demolition or dismantling works will be minimized as follows:

- Watering all active demolition areas to suppress the dust.
- Cover all trucks hauling soil, sand and other loose materials or require all trucks to maintain at least two feet of freeboard.

## **8.11 Key Social Impacts – Decommissioning Phase**

### **8.11.1 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 (such as security guards and casual labourers) who will be affected.

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

#### **8.11.1.1 Significance of Impact**

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The overall impact significance is envisaged to be **Minor**.

#### **8.11.1.2 Proposed Mitigation Measures**

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

- The proponent should ensure that retrenchment packages are provided for all staff who stand to lose their jobs when the plant is decommissioned.
- The contractor shall inform the workers and local community about the duration of work.
- Reduction of worker will be done phase wise and corresponding to completion of each activity; and
- All waste generated from demobilization shall be collected and disposed of at the nearest designated disposal site.

#### **8.11.1.3 Residual Impact Significance**

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Significance of residual impact is assessed to be negligible upon incorporation of the above mentioned mitigation measures.

## **8.12 Cumulative Impacts**

### **8.12.1 Cumulative Impact Assessment**

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It was observed during the site reconnaissance 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.

## **8.13 Impacts on Wayleave Acquisition**

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As mentioned before, the Bubisa site will have a distribution line (DL) circuit of 16.4 km in total. Construction of the distribution line will involve the acquisition of land. It is likely that the DL will pass through communal land/private land. Additional information is required on the routing of the DL to enable a proper impact assessment of the wayleave acquisition. At the time of the study, the consultants did not have this inform. Additionally, it is recommended that extensive consultations should be carried out with the stakeholders affected by the DL and those who reside in close proximity to the wayleave.

The following are some of the impacts envisaged from the wayleave acquisition:

### **8.13.1 Loss of land**

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This denotes loss of land for the setting up of the low voltage lines. The distribution lines should utilize the road reserves (if any) as much as possible to minimize loss of land and livelihoods. Once the routes and their locations are identified, screening should be done to assess whether there are people using the land, specify the sub-project impacts and establish the appropriate safeguard documents needed (RAP or ARAP) to define entitlements for compensation.

### **8.13.2 Loss of housing**

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This denotes loss of physical structures such as residential house, auxiliary structures like livestock structures. Impacts on the associated structures if damaged during construction are compensated for.

### **8.13.3 Loss of Businesses**

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If an affected business closes, the owner will lose their livelihood.

### **8.13.4 Loss of Vegetation**

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This denotes the loss of trees/bushes/shrubs that may be cleared to pave way for the construction of the distribution lines

**NOTE:** This list of impacts is general. Specific impacts will be identified during wayleave acquisition for this sub-project.

#### **8.13.4.1 Proposed Mitigation Measures**

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- Avoiding involuntary resettlement to the extent possible through subproject design such as selection of routes;
- Engagement of the community on wayleave acquisition and obtaining their consent
- PAPs will be consulted and given opportunities to participate in planning and implementing resettlement programs and provided with technically and economically feasible resettlement alternatives;
- Displaced persons will be provided prompt and effective compensation at full replacement cost for loss of assets attributable directly to the project; and
- Displaced persons will be compensated for losses incurred and assisted in their efforts to restore their livelihoods especially in the event of physical relocation to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.

## 9 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

### 9.1 Environmental and Social Management Plan

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This Environmental and Social Management Plan (ESMP) seeks to manage and keep to a minimum the negative impacts of the proposed solar mini-grid project and at the same time, enhance the positive and beneficial impacts

### 9.2 Objectives of the ESMP

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The objectives of the ESMP are to:

- Identify a range of mitigation measures which could reduce and mitigate the potential impacts to minimal or insignificant levels;
- To identify measures that could optimize beneficial impacts;
- To create management structures that address the concerns and complaints of stakeholders with regards to the development;
- To establish a method of monitoring and auditing environmental management practices during all phases of development;
- Ensure that the construction and operational phases of the project continues within the principles of Integrated Environmental Management;
- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project;
- Ensure that the safety recommendations are complied with;
- Propose mechanisms for monitoring compliance with the ESMP and reporting thereon; and
- To ensure that the legal requirements applicable to the project are complied with

### 9.3 Approach to Environmental Impact Management

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The proposed ESMP will be the responsibility of the Proponent/REREC, and the contractor as outlined. This section presents the range of approaches that will be used to manage potential impacts of the proposed project.

#### 9.3.1 ESMP Roles and Responsibilities

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##### 9.3.1.1 Duties of the Proponent

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It will be the duty of the proponent to ensure that all legal requirements as pertaining to the development are met as specified by the law, including World Bank Safeguards and specifically OP4.01 (Environmental Assessment).

- The proponent shall hand over the site to the contractor for implementation of the project after the social and environmental mitigation measures that are the responsibility of the proponent has been completed.
- REREC will supervise construction works through a supervision consultant

- Monitoring of the technical aspects will also be done by the KP appointed engineer while monitoring of the ESMP will be done by the safeguards team
- The proponent is also the one to fund the project
- The proponent will ensure that the ESIA is submitted to NEMA and a license is obtained.
- The proponent is also the one who has initiated the project and will also ensure its satisfactory implementation

#### **9.3.1.2 Duties of the Supervising Consultant**

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- The consultant must appoint an ESHS officer who will be reporting on the ESMP implementation
- The consultant ESHS officer be required to generate various reports including production of minutes of monthly site visits and quarterly supervision reports detailing environmental, health, social and safety compliance on quarterly basis.
- Reporting on the ESMP will be done on regular basis and will be captured in the construction site log, periodical E&S reviews with the Engineer

#### **9.3.1.3 Duties of the Contractor**

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- Implementation of the contractor related aspects of the ESMP and regularly reporting back to the Project proponent.
- The contractor on his part will have to appoint EHS officer to coordinate ESMP implementation during construction period.
- The contractor shall recruit a Social specialist to oversee social impacts and implementation of their mitigation measures
- The contractor will also engage a Community Liaison Officer (CLO) to act as the link between the community and the Contractor and support the social specialist. The CLO should be sourced from the local Bubisa community and trained on how to undertake his duties.
- Maintaining the required level of stakeholder engagement and communication, including providing project schedule information to the public, accepting and resolving public grievances, advertising and hiring local workers.
- Maintain a working grievance redress mechanism.
- Ensure that the project has children protection champions.
- Prepare and maintain an approved Time and Progress chart, showing clearly the period allowed for each section of the work
- The contractor is to comply with all regulations and by-laws of the local Authority including serving of notices and paying of the fees.
- The proponent shall define the area of the site, which may be occupied by the contractor for use as storage, on the site
- The contractor shall refer to ESIA recommendations and the ESMP when preparing the contractors-ESMP.
- The contractor shall provide water required for use in connection with the works including the work of subcontractors, and shall provide temporary storage tanks, if required
- The contractor shall make his own arrangements for sanitary conveniences for his workmen. Any arrangements so made shall be in conformity with the public health requirements for such facilities and the contractor shall be solely liable for any infringement of the requirements.

- The contractor shall be responsible for all the actions of any subcontractors in the first instance.
- The contractor shall take all possible precautions to prevent nuisance, inconvenience or injury to the neighbouring properties and to the public generally, and shall use proper precaution to ensure the safety of wheeled traffic and pedestrian.
- All work operations which may generate noise, dust, vibrations, or any other discomfort to the workers and/or guest of the client and the neighbours must be undertaken with care, with all necessary safety precautions taken.
- The contractor shall take all effort to muffle the noises from his tools, equipment and workmen to not more than 70dBA
- The contractor shall upon completion of working, remove and clear away all plant, rubbish and unused materials and shall leave the whole site in a clean and tidy state to the satisfaction of the Proponent. He shall also remove from the site all rubbish and dirt as it is produced to maintain the tidiness of the premises and its immediate environs.
- No shrubs, trees, bushes or underground thicket shall be removed except with the express approval of the proponent.
- No blasting shall be permitted without the prior approval of the proponent and the local authorities.
- Borrow pits will only be allowed to be opened up on receipt of permission from the
- proponent
- The standard of workmanship shall not be inferior to the Kenya Bureau of Standards where existing. No materials for use in the permanent incorporation into the works shall be used for any temporary works or purpose other than that for which it is provided. Similarly, no material for temporary support may be used for permanent incorporation into the works.
- Disposing of the waste generated during construction activities in accordance to the ESMP.
- The contractor EHS officer will report on ESMP implementation during construction period. The aspect to be reported by the contractor will include safety issues i.e. 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 etc); Environmental incidents and near misses; noncompliance incidents with permits and national law; Training on E&S issues (dates, number of trainees, and topics); Details of any security risks; Worker & External stakeholder grievances and E&S inspections and audits by contractor, engineer, or others, including authorities

Environmental and Social concerns need to be part of the planning and development process and not an afterthought, it is therefore advisable to avoid land use conflicts with the surrounding area. To avoid unnecessary conflicts that retard development in the project area, the proponent undertook this ESIA and incorporated environmental and social concerns as advised by the Authority. Finally, a comprehensive Environmental and Social Management and Monitoring Plan (ESMMP) has been prepared and will guide in mitigation measures.

**NOTE:**

- All the subcontracted companies should subscribe to the main Contractors EHS Policies and guidelines.
- The subcontractor should manage all E&S related risks while on site.
- The Contractor must supervise the subcontractor while on site.
- The subcontractors should provide their EHS policies, staff training certificates, plant inspection reports, methods statements etc. to the main contractor for approval

- The subcontractor should develop and implement relevant Environmental and social management plans for use while on site.

#### **9.3.1.4 Duties of the EHS Officer**

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The EHS Officer is responsible for the implementation of the ESMP during construction phase and liaison between the Proponent and Contractor. The following tasks will fall within the responsibilities of the EHS Officer:

- Be aware of the findings of the Environmental Impact Assessment and the conditions stated within the EIA License
- Be familiar with the recommendations and mitigation measures of this ESMP
- Be conversant with relevant environmental legislation, policies and procedures, and ensure compliance with them
- Undertake regular and comprehensive site inspections/ audits of the construction site according to the ESMP and EIA in order to monitor compliance with ESMP
- Educate the construction team about the management measures of the ESMP and the EIA
- Monitor and verify that environmental impacts are kept to a minimum, as far as possible
- Recommend corrective action for any non-compliance incidents on the construction site

#### **9.3.1.5 Duties of a Social Specialist**

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- Facilitate the investigation, verification and timely closure of complaints in consultation with GRC.
- Deal with all social issues arising from the communities during and post construction and other stakeholder matters
- Review sub-contracts and ensures social provisions are incorporated
- Collect data and information on social issues
- Establish linkages with Contractor/stakeholders on social matters
- Supervise implementation of various social management plans
- Assess the level of awareness on major social issues affecting the community as a result of KOSAP project
- Facilitate Gender Mainstreaming in the project.
- Oversee the C-ESMP Implementation

### **9.4 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 ESMP 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 ESMP.

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 – REREC 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 analysing 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 Table 23 below.

#### **9.4.1 Environmental and Social Monitoring by Contractors**

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A monitoring program will be implemented for the duration of the construction phase of the project. This program will include:

- Monthly environmental inspections to confirm compliance with the ESMP and EIA License conditions. These inspections can be conducted randomly and do not require prior arrangement Project Manager
- Compilation of an inspection report complete with corrective actions for implementation.
- Monthly EHS committee meetings to be held to ensure compliance with the OSHA and its subsidiary legislation.

The EHS Officer shall keep a photographic record of any damage to areas outside the demarcated site area. The date, time of damage, type of damage and reason for the damage shall be recorded in full to ensure the responsible party is held liable.

During the pre-construction, construction and operational phases, the Contractor will implement their Grievance Mechanism. The Contractor shall be responsible for acquiring all necessary permits, during the construction phase of the project. Such licenses include any abstraction of water permits, extraction of aggregates from borrow pits and their rehabilitation, etc.

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

## **9.4.2 Compliance with the ESMP and associated documentation**

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### **9.4.2.1 Training and Awareness**

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#### **9.4.2.1.1 Training of Construction Workers**

The construction workers must receive basic training in environmental awareness, including the storage and handling of construction materials and substances, minimization of disturbance to sensitive areas, management of waste, and prevention of water pollution. They must also be appraised of the ESMP’s requirements.

#### **9.4.2.1.2 Contractor Performance**

The appointed Contractor must ensure that the conditions of the ESMP are adhered to. Should the Contractor require clarity on any aspect of the ESMP, the Contractor must contact the Project Manager for advice.

## **9.5 Management of impacts during the construction phase**

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The contractor will prepare target management plans to deal with specific environmental and social aspects guided by the ESMP and any other emerging issues on the ground. The Contractor should also prepare and implement a Construction Environmental & Social Management Plan (C-ESMP) informed by this ESMP

The following management plans will be prepared and implemented during construction phase of the proposed project:

1. Construction management plan
2. Labour and human resources plan
3. Workplace health and safety plan
4. Community safety plan

5. Emergency management and response plan
6. Rehabilitation and site closure management plan
7. Labour influx management plan
8. Local recruitment plan
9. Stakeholder engagement plan
10. GBV(SEA/SH) management plan
11. Grievance redress mechanisms plan
12. Abbreviated Resettlement Action Plan (A-RAP)
13. Security Management Plan

**NOTE:**

Stakeholder Engagement Plan; Grievances Redress Mechanism; GBV (SEA/SH) Management Plan will be implemented throughout the project cycle

### **9.5.1 Construction Management Plan**

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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 KP.

**d) Management of air quality**

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

**e) Neighbouring land owner and occupier relations**

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

## **f) Complaints register**

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

## **g) Construction Control**

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

### ➤ **Control of access**

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

### ➤ **Control of material supply and burrow areas**

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

## **9.5.2 Rehabilitation and Site Closure Plan**

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- 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

## **9.5.3 Labour and Human Resources Plan**

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In designing the labour and human resources plan contractor shall:

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

## **9.5.4 Workplace Health and Safety Plan**

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The workplace health and safety plan to be implemented by the contractor and KP 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 a social specialist on board to oversee social impacts and implementation of their mitigation measures

- 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.

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

### **9.5.6 Emergency Preparedness and Response Plan**

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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.

### **9.5.7 Gender Based Violence (GBV-SEA/SH) Prevention and Response Action Plan**

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The contractor will prepare a GBV management plan that will include a GRM that ensures confidentiality. The GBV management 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 the 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 sensitization of community members and sub-project workers on the potential of the sub-project 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 sub-project workers on the referral pathways.
- Prepare and implement a functional and accessible contractor GBV GRM for use by workers and community members (as appropriate)

- The GBV GRM should allow for anonymous incident reporting and should be GBV survivor-centric
- Sensitize community members and workers on contractor GRMs
- Prepare and sensitize Code of Conduct (CoC) for SEA and SH, and their responsibilities for the same, to demystify the stigma associated with SEA and SH.

### **9.5.8 Labour 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, the Contractor shall;

- Comply with the provision of the 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 and semi-skilled and unskilled labour.

### **9.5.9 Stakeholder Engagement Plan**

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

### **9.5.10 Grievance Redress Mechanism**

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The 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.

### **9.5.11 Abbreviated Resettlement Action Plan**

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The Proponent has prepared an Abbreviated Resettlement Action Plan (A-RAP) to guide the acquisition of land for the mini-grid and the way-leave for the power distribution lines. An A-RAP is applicable 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 this case there is no physical displacement of affected persons and the foreseen impact on livelihoods i.e., grazing occasioned by the mini-grid construction is minor.

The land acquisition and contractor mobilization to the site will be undertaken after the A-RAP is disclosed.

### **9.5.12 Security Management Plan**

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The Proponent will develop a security management plan to manage security threats that could arise from both internal and external threats. Internal threats could be as a result of worker misconduct i.e workplace violence and vandalism while external threats could be attacks to the plant with an aim to sabotage the construction works/operations (community conflicts between Gabbra and Borana), theft, terrorism etc.

The Security management plan should encompass the following:

- Controlled access and exit from the construction site
- Established screening at the security check points; and
- Formal identification system for construction workers.

## **9.6 Institutional Implementation Arrangements for the Proposed Project**

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This section presents roles and responsibilities of the Proponent, implementing agency, supervision consultant and contractor. The project is jointly implemented by the Ministry of Energy and REREC. Specific roles are presented below:

### **9.6.1 Proponent- Ministry of Energy**

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The Ministry of Energy will provide overall coordination and oversight of the project. MOE will be responsible for overall responsibility for safeguards, due diligence and compliance monitoring. The MOE will also provide funding for the project planning and implementation.

### **9.6.2 KOSAP Project Implementation Unit**

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The MoE has already put in place a Project Implementation Unit (PIU) to guide implementation of the project. The PIU is already implementing the project. In the PIU Environmental and Social issues are spearheaded by an Environmental and Social Safeguards Expert whose role is to coordinate and oversee the implementation of safeguards. The PIU reports to the MOE.

### **9.6.3 The Implementing Agencies**

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REREC will be responsible for the construction and implementation while KPLC will be in charge of operation and maintenance of the project on behalf of the MOE. Some of the key responsibilities include but not limited to are:

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

### **9.6.4 County Government of Marsabit**

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The County Government is a key stakeholder. The roles of the County Government include giving relevant approvals needed, assisting in the land allocation process for the mini-grid, solving grievances that cannot be sorted at project level, monitoring progress of the project among others.

### **9.6.5 National Environment Management Authority**

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This authority is responsible for approval of the ESIA report and licensing of the project and is free to check progress of implementation of ESMMP.

### **9.7 Management of impacts during operation phase**

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The operation phase of the proposed project will be mainly power supply, line maintenance and clearing of wayleaves. KP will be responsible for all the mitigation measures for negative impacts during the operation phase. This will be done by implementation of the following steps:

- Inspections
- Corrective action
- Reporting

A detailed Environmental and Social Management Plan for preconstruction, construction, operations and decommissioning phase is well illustrated in the table below.

**Table 23: Environmental and Social Management Plan  
Social Impacts**

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>	<ul style="list-style-type: none"> <li>Construction</li> <li>Operations</li> <li>Decommissioning</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> <li>REREC</li>   <li>O&amp;M</li> <li>Contractor/KP</li> <li>LC</li> </ul>	<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>	<ul style="list-style-type: none"> <li>Construction</li> <li>Decommissioning</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> <li>REREC</li> </ul>	<ul style="list-style-type: none"> <li>-Number and types of businesses sourced from, businesses owned and operated by vulnerable individuals, types</li> </ul>	Quarterly	No additional cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
				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>-Prepare and implement an <b>Abbreviated Resettlement Action Plan (A-RAP)</b> to guide land acquisition for the mini-grid, and wayleaves for power distribution. Further, the proponent will fast-track A-RAP preparation to ensure that land acquisition and contractor mobilization to the site is undertaken after the A-RAP is finalized, cleared, and disclosed.</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 basis for storage of material will be restored to their original form.</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	Value of compensation in kind project will be equivalent to the value of land acquired as per NLC

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<ul style="list-style-type: none"> <li>-Consultations with the community on the low voltage lines.</li> <li>-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.</li> </ul>					
<b>Labor Influx and related impacts (SEA/SH, HIV/AIDs and other STIs)</b>	<ul style="list-style-type: none"> <li>-Tap into the local workforce to the extent possible to reduce labor influx.</li> <li>-Recruit local workforce to the extent possible especially for unskilled and semi-skilled jobs.</li> <li>-Consult with and involve local community in project planning and other phases of the project.</li> <li>-Raise awareness among local community and workers on the need to have a good /cordial working relation</li> <li>-Sensitize workers regarding engagement with local community.</li> <li>-Make provision to provide resources needed by the workers if the need for such resources may result to</li> </ul>	Construction Decommissioning	Contractor  REREC	<ul style="list-style-type: none"> <li>-Records of employees/updated employee register.</li> <li>-Number of local community employees and external employees/ updated employee register.</li> </ul>	Quarterly	50,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<p>competition e.g., water.</p> <ul style="list-style-type: none"> <li>-Establish and operationalize an effective Grievance Redress Mechanism accessible to community members.</li> <li>-The contractor and the project/community grievance redress committee to work closely address complains raised on time.</li> <li>-Include gender considerations in employment opportunities.</li> <li>-Provide appropriate compensation for work done.</li> <li>-Respect for community values/culture.</li> <li>-Prompt payment of workers as per the contractual agreements/terms.</li> </ul>					
<b>Child labor</b>	<ul style="list-style-type: none"> <li>-Employ workers who are 18 years and above, and with a valid national ID at the time of hire.</li> <li>-Implement and monitor the employment register regularly. Compliance with the national labor laws and labour management practices.</li> <li>-Put visible signage on site <b>"No Jobs for children"</b></li> </ul>	Construction Decommissioning	Contractor  REREC	<ul style="list-style-type: none"> <li>-Updated employment register indicating locals employed, their ages, national identification numbers etc.</li> <li>-Grievances raised, aggrieved persons and status on resolution etc.</li> </ul>	Quarterly	20,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	-Do not allow children at the project site.					
<b>GBV- SEA and SH</b>	<p>-Prepare an SEA/SH Prevention and Response Action Plan, to manage the SEA/SH risks.</p> <p>-The Action Plan to be proportionate to potential SEA/SH risks, and to include measures such as awareness creation for communities and workers; identification of referral services for survivors and a GRM that ensures confidential reporting of GBV cases.</p> <p>-Implement a code of conduct signed by all those with physical presence on site.</p>	Construction Operations Decommissioning	Contractor  REREC	<p>-Minutes of awareness creation sessions for the community and workers on GBV-SEA/SH.</p> <p>-Code of conduct signed by all those with physical presence on site.</p> <p>-GRM that ensures confidentiality of GBV cases in place. Documented referral services for survivors.</p> <p>-Grievances raised, aggrieved persons and status on resolution etc</p>	Quarterly	50,000.00
<b>Forced Labor</b>	<p>-Adhere to the Employment Act which outlaws any form of forced labor.</p> <p>-Report any form of forced labor at the site.</p>	Construction Decommissioning	Contractor  REREC	-Number of reported cases of forced labor.	Quarterly	20,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	-Ensure that all workers have a national ID card or documentation to show they are adults (above 18 years).					
<b>Risks related to Inadequate stakeholder engagement</b>	<p>-Prepare a stakeholder engagement/consultation plan (SEP) that is proportionate to the subproject and the identified stakeholders.</p> <p>-Timely and prior disclosure of project all project information, including project instruments, the full rights and entitlements of project affected persons, sub-project positive and negative impacts and opportunities, proposed subproject budget.</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</p>	Construction Operations Decommissioning	Contractor  REREC	<p>-Availability of and implementation of the Stakeholder Engagement Plan.</p> <p>-# of stakeholder consultations held</p> <p>-Record of stakeholder consultations held (minutes of meetings and list of participants).</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</p>	Quarterly	30,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	representatives from the community. -Sensitize stakeholders on SEP and GRM.			resolution etc. -Concerns raised and actions raised.		
<b>Exclusion of VMGs and vulnerable individuals and households</b>	In line with the provisions of the ESMF, VMGF and Social Assessment ensure the following. <ul style="list-style-type: none"> <li>• Early identification and inclusion of VMGs and disadvantaged groups.</li> <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> </ul>	Pre-construction Construction Operations Decommissioning	Contractor  REREC	Minutes of consultative meetings with all community segments including VMGs and vulnerable individuals and households, grievances raised and status on resolution etc.	Quarterly	No additional cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<ul style="list-style-type: none"> <li>Access to culturally appropriate project benefits and opportunities.</li> </ul>					
<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	Contractor  REREC	-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  REREC	-Local Grievances Committee in place, composition of committee, awareness of community and workers on project and worker GRMs,	Quarterly	No additional cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<p>-Awareness on the culturally appropriate and accessible GRM to all community segments including VMGs, vulnerable individuals and households and CSOs</p> <p>-All reported grievances are logged, dated, processed, resolved and closed out in a timely manner.</p> <p>-Proportionate representation of VMGs and vulnerable individuals in the local grievances committee.</p> <p>-GRM provides for confidential reporting of particularly sensitive social aspects such as GBV, as well as anonymity.</p>			<p>updated GRM logs, types of grievances</p> <p>-Availability of grievance redress process</p> <p>-Number of grievances reported</p> <p>-Number of grievances resolved in a timely manner</p> <p>-Number of grievances escalated to national courts and the World Bank Grievances Redress Service and Inspection Panel.</p>		
<b>Impacts on Security</b>	<p>-A Security Management Plan that involves a threat assessment and analysis should be developed by the Contractor and the Proponent.</p> <p>-The plan should address security threats such as Terrorism, bomb threats, workplace violence and vandalism etc. of the solar</p>	Construction Operations Decommissioning	Contractor  REREC	<p>-A Security Management plan</p> <p>-Number of reported crimes</p> <p>-Number of complaints</p>	Monthly	300,000

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<p>plant.</p> <ul style="list-style-type: none"> <li>-Working hours should be kept within daylight hours during the construction phase</li> <li>-Security personnel should be trained on how to deal with the community to avoid confrontations</li> <li>-Access in and out of the site should be strictly controlled by a security company</li> <li>-The contractor should provide workers with identity tags and prohibit access of unauthorized people to the construction site.</li> <li>-A method of communication should be implemented whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process</li> <li>-The Project Contractor should also be guided by the Voluntary Principles on Security and Human Rights in managing security during the</li> </ul>					

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	construction phase.					
<b>Environmental Impacts</b>						
<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>5. Re-vegetation including planting of trees around the plant/facility</li> </ol>	Construction	Contractor  REREC	-Number of trees cleared -Planted trees	Once off	50,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
Soil erosion	<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 cut slope destabilizing should be addressed through landscaping and grassing, carting away and proper disposal of construction materials</li> <li>4. Use silt traps where necessary</li> <li>5. Cover soil stock piles</li> <li>6. Landscaping with grass on areas without electrical installation (lower areas)</li> </ol>	Construction	Contractor  REREC	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)
	7. Monitoring of areas of exposed soil during rainy seasons to ensure that any incidents of erosion are quickly controlled.					
<b>Contamination of soil from fossil fuels</b>	<ol style="list-style-type: none"> <li>1. Ensure wastewater 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 REREC	Records of any leakages from construction equipment/ vehicles.	Quarterly	50,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
Dust emissions	<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 during dry or windy conditions to reduce dust emissions.</li> <li>4. Burning of woody debris &amp; construction waste to be prohibited</li> <li>5. Use of personnel protective equipment (PPE) -masks should be provided to all personnel in areas prone to dust emissions</li> <li>6. Restrict speed on loose surface roads during dry or dusty conditions</li> <li>7. Keep stockpiles and exposed soils</li> </ol>	Construction	Contractor  REREC	<ul style="list-style-type: none"> <li>-Visual Observation of dust</li> <li>-Provision of PPEs especially masks</li> </ul>	Daily	100,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<p>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> <p>Plant short trees to break speed of wind</p>					
<b>Vehicle exhaust and emissions from Generator</b>	<p>1. Drivers of construction vehicles must be sensitized so that they do not leave vehicles idling so that exhaust emissions are lowered.</p> <p>2. Maintain all machinery and equipment in good working order to ensure minimum emissions of carbon monoxide, NOX, SOX and</p>	Construction	Contractor REREC	-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>suspended particulate matter</p> <p>3. Maintain equipment in good running condition – no vehicles to be used that generate excessive black smoke</p> <p>4. Use of diesel which is Sulphur- free to run the power producing 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>	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	Construction	Contractor REREC	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>they were removed that is top soil last;</p> <ol style="list-style-type: none"> <li>2. Segregate waste</li> <li>3. Provide litter collection facilities such as bins</li> <li>4. Contractor to put in place and comply with a site waste management plan</li> <li>5. The contractor should comply with the requirement of OSHA ACT 2007 and Building rules on storage of construction materials</li> <li>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</li> <li>7. Recovery of materials remains and return to stores</li> </ol>					

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<ul style="list-style-type: none"> <li>8. Re-use of materials where possible</li> <li>9. Proper budgeting to avoid waste generation</li> <li>10. Proper disposal of waste in line with solid waste regulation</li> <li>11. Construction wastes to be managed in accordance with construction standards in Kenya</li> </ul>					
<b>Impacts on Water Resources and Water Quality</b>	<ul 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> </ul>	Construction	Contractor  REREC	<ul style="list-style-type: none"> <li>-Oil spill containment plan.</li> <li>-Provision of fuel/oil drip and spill trays</li> </ul>	Quarterly	150,000

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<p>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.</p> <p>5. No vehicle maintenance and service shall be done at project site</p> <p>6. Ensure that potential sources of petro-chemical pollution are handled in such a way to reduce chances of spills and leaks.</p>					
<b>Noise &amp; vibration</b>	<p>1. Construction activities to avoid any unchanneled flow of water at the site</p> <p>2. Storage areas that contain hazardous</p>	Construction	Contractor  REREC	<u>Noise levels-</u> Records of noise measurements done by contractor within the project area	Quarterly	150,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<p>substances should be bunded with an approved impermeable liner and provision for a pit to be made in case of oil spill.</p> <p>3. The excavation and use of rubbish pits during construction should be strictly prohibited.</p> <p>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,</p> <p>5. Areas contaminated by spilled concrete and/or fuels and oils leaking from vehicles and</p>			and at distances of 30m from the Solar mini-grid		

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	machinery should be cleaned immediately					
<b>Impacts from Hazardous materials -</b>	<ol style="list-style-type: none"> <li>Maintenance of construction vehicles will not be done on site</li> <li>All hazardous products and waste should be labelled and handled properly to avoid contact with the ground</li> <li>Dispose hazardous waste through a NEMA approved waste handler</li> </ol>	Construction	Contractor REREC	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>In the event of accidental leaks, contaminated top soil should be scooped and disposed of appropriately.</li> <li>Refuelling and maintenance of vehicles will not take place at the construction site.</li> </ol>	Construction	Contractor REREC	Records of all accidental spills and number of litres	Quarterly	150,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<p>3. Create awareness for the employees on site on procedures of dealing with spills and leaks</p> <p>4. Vehicles and equipment must be serviced regularly and kept in 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</p>					

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	individual containers.					
<b>Fire Hazards</b>	<ol style="list-style-type: none"> <li>1. Create awareness to the construction workers on potential fire hazards</li> <li>2. Provision of firefighting equipment on site during construction.</li> <li>3. No smoking shall be done on construction site</li> <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</li> </ol>	Construction	Contractor  REREC	-Records of any Fire incidences -Fire equipment and evacuation plan	Quarterly	100,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	point					
<b>Impacts of construction material sourcing (e.g., quarrying)</b>	<ol 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> </ol>	Construction	Contractor  REREC	Sources of raw materials (from local community)	Quarterly	Part of contractor's cost
<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</li> </ol>	Construction	Contractor  REREC	Water usage records	Quarterly	Part of contractor's cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	sustainable and reliable water supply for both construction and operation phase.					
<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 consumed in excessive amounts.</li> <li>3. Complementary to these measures, they monitor energy use during construction and set targets for reduction</li> </ol>	Construction	Contractor REREC	Energy consumption records	Quarterly	No additional cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	of energy use.					
<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> </ol>	Construction	Contractor  REREC	<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)
	<ul style="list-style-type: none"> <li>7. Risk assessment by contractor of the construction activities and implement mitigation measures appropriately</li> <li>8. Adherence to occupational Safety and Health Act 2007</li> <li>9. Availability of equipped first aid box on site</li> <li>10. Provide safe drinking water for workers</li> <li>11. Engagement of trained first aider on site</li> <li>12. Ensure the WIBA cover is taken for the staff</li> <li>13. Establish safety committees</li> </ul>					
<b>Community safety –access</b>	<ul style="list-style-type: none"> <li>1. Proper barricading</li> <li>2. Hazard communication.</li> <li>3. Controlled access to the site by designated personnel</li> </ul>	Construction	Contractor  REREC	Presence of a controlled access and records of every person accessing the site	Daily	20,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	4. Maintain records of any person who comes to site					
<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> </ol>	Construction	Contractor  REREC	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>5. Allowing migrant workers time to be with their families</p> <p>6. The contractor is impressed upon not to 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>	Construct/ install pit latrines for both genders clearly labelled	Construction	Contractor  REREC	Presence of separate and clean washrooms for	Quarterly	300,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
				both the gents and ladies		
<b>Solid Waste Generation</b>	<ol style="list-style-type: none"> <li>1. Provide waste handling facilities such as labelled waste bins</li> <li>2. Emphasis on prudent waste generation and give priority to reduction at source</li> <li>3. Solid waste management awareness to operators</li> <li>4. Operator to contract a NEMA licensed waste handler to collect and dispose solid waste</li> </ol>	Operation	Contractor KPLC	Presence of well-maintained receptacles and centralized collection points	Quarterly	50,000.00
<b>Liquid Waste/Oils Generation</b>	<ol style="list-style-type: none"> <li>1. Proper storage of the oil is required to ensure no leakages</li> <li>2. Frequent inspection and maintenance of the generator to minimize leakages.</li> </ol>	Operation	Contractor KPLC	<ul style="list-style-type: none"> <li>-Engine maintenance records</li> <li>-Oil spill containment plan</li> </ul>	Quarterly	200,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	3. No vehicles should be serviced or maintained at the Mini-grid area. 4. The waste oil or used oil must be disposed-off appropriately. 5. Proper training for the handling and use of fuels for the operators of the Mini-grid. 6. In the event of accidental leaks, contaminated top soil should be scooped and disposed of appropriately.					
<b>Increased oil Consumption</b>	1. Efficient energy consumption 2. Install an energy-efficient lighting system	Operation	Contractor KPLC	Energy consumption records	Quarterly	No additional cost
<b>Increased storm water flow</b>	1. Construct the drainage system in a way to follow natural drain of the water	Operation	Contractor KPLC	Provision of a drainage system and a rain water harvesting system	Quarterly inspections	200,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<p>2. Concrete only the required area and leave the rest of the land with vegetation like grass</p> <p>3. Construct rain water harvesting system on the control buildings/office and harness into storage tanks for use</p>					
<b>Fire Outbreaks</b>	<p>1. The power plant must contain firefighting equipment (Portable fire extinguishers) of recommended standards and in key strategic points</p> <p>2. Detection/alarm systems that can detect fire should be and installed</p> <p>3. A fire evacuation plan should be prepared and posted at strategic points and should</p>	Operation	Contractor  KPLC	<p>-Provision of serviced fire equipment, evacuation plan and safety signages</p> <p>-Records of fire safety training</p>	Quarterly	50,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<p>include procedures to take when a fire is reported.</p> <p>4. Workers especially operators of the plant must be trained on fire management</p> <p>5. ‘No smoking’ signs shall be posted within the Mini-grid area</p> <p>6. A fire Assembly point should be identified and marked</p>					
<b>Water demand</b>	<p>1. Ensure prudent use of water.</p> <p>2. Install water-conserving automatic taps.</p> <p>3. Any water leaks through damaged pipes and faulty taps should be fixed promptly.</p>	Operation	Contractor KPLC	Water usage records	Quarterly	20,000.00
<b>Sanitary waste</b>	<p>1. Provide sanitary waste facilities for both genders clearly marked</p>	Operation	Contractor KPLC	Presence of separate and clean washrooms for	Quarterly	No additional cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	2. Disposal of waste through septic tanks			both the gents and ladies		
<b>Flooding</b>	<ol style="list-style-type: none"> <li>1. Ensure drainage channels are free of any obstruction at all times i.e., not blocked</li> <li>2. Construct more channels and or expand existing ones</li> <li>3. Raise foundations of the solar panels and ensure a proper and from concrete base</li> <li>4. Create flooding diversions and or spill ways to divert water from getting into the solar power facility</li> </ol>	Operation	Contractor  KPLC	<ul style="list-style-type: none"> <li>-Provision of drainage system</li> <li>-Raised foundations for the structures</li> </ul>	Quarterly	100,000.00
<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</li> </ol>	Operation	Contractor  KPLC	<ul style="list-style-type: none"> <li>-Provision of PPEs and WIBA cover</li> <li>-Environmental audit reports</li> </ul>	Quarterly	100,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<p>appropriate and adequate person protective equipment (PPE) such as; safety footwear, helmet among others.</p> <p>3. Operators must be skilled on firefighting management</p> <p>4. Annual environmental audits should be done</p> <p>5. WIBA cover for staff is mandatory</p>					
<b>Hazardous waste-damaged panels</b>	<p>1. Segregation from other waste streams</p> <p>2. Proper disposal through a NEMA approved/licensed handler</p>	Operation	Contractor KPLC	Presence of well-maintained receptacles and centralized collection	Quarterly	200,000.00
<b>Noise and Vibration</b>	<p>1. Generator room should be soundproof to ensure no noise of a nuisance level will be produced.</p> <p>2. Monitor noise levels</p>	Operation	Contractor KPLC	<u>Noise levels-</u> Records of noise measurements done by contractor within the project area	Quarterly	Part of contractor's cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
				and at distances of 30m from the Solar mini-grid		
<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 measures while using electricity such as not</li> </ul> </li> </ol>	Operation	Contractor  KPLC	-Records of awareness sessions conducted  -Incidences report	Quarterly	No additional cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<p>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  KPLC	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</li> </ol>	Operations	Contractor  KPLC	Grievance records	Quarterly	20,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<p>the earliest time possible</p> <p>5. Ensure all grievances are logged and closed</p> <p>6. Monitoring the pattern of grievances to come up will long term measures</p>					
<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	Operations	Contractor  KPLC	-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 transmitted	Operations	Contractor  KPLC	Number of awareness creation sessions conducted.  -Availability of and distribution of condoms		20,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	<p>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>					
<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> <p>4. Provision of contact numbers for the nearest</p>	Operations	Contractor KPLC	<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)
	<p>health facility for testing and treatment</p> <p>5. Adhering to any other measures from the ministry of health which may be issued from time to time</p>					
<b>Dust Emission</b>	<p>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</p> <p>2. Ensure planting of grass around and within the facility compound</p>	Operations	Contractor  KPLC	Visual inspection	Quarterly	50,000.00
<b>Vehicle Exhaust Emissions</b>	<p>1. Drivers of the vehicles must be sensitized so that they do not leave vehicles idling so that exhaust emissions are lowered.</p>	Operations	Contractor	Engine maintenance records	Quarterly	No additional cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	2. Company vehicles should be well maintained					
<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-sense approach to vehicle use and encourage workers to shut off vehicle</li> </ol>	Decommissioning	Contractor	<u>Noise levels</u> - 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)
	engines whenever possible. 5. Demolish mainly during the day when most of the neighbors are out working.					
<b>Solid Waste Generation</b>	<ol style="list-style-type: none"> <li>Demolition contractor to adhere to the various manufacturer's guidelines and requirements regarding demolition and disposal</li> <li>Segregation of waste in order to separate hazardous waste from non-hazardous waste and other streams of waste</li> <li>Provision of facilities for proper handling and storage of demolition materials to reduce the amount of waste caused by damage or exposure to the elements</li> </ol>	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>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>	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 awareness campaigns/ to the community.	Decommissioning	Contractor	Records of awareness creation sessions conducted. -Availability of and distribution of condoms	Once off	20,000.00
	Total					4,680,000.00

## 10 CONCLUSION AND RECOMMENDATIONS

### 10.1 Conclusion

During the preparation of this report for the proposed development, it is observed and established that most of the negative social and environmental impacts can be mitigated and have potentially short term low significant effects. The positive impacts are highly rated and will benefit the community at Bubisa and the county at large. The project proponent, the implementing agency and the contractor must adhere to prudent implementation of the social and environmental management and monitoring plan. The contractor should commit to obtaining all necessary permits and licenses from the relevant authorities and have qualified and adequate personnel to do the project as proposed. The ESIA has proposed adequate safety and health mitigation measures as part of the relevant statutory requirements.

The analysis of the ESIA has demonstrated that the construction and operation of the proposed Solar Mini-grid will have positive impacts to the government and Kenyan society at large. The impacts will include; Increase in reliable and sustainable clean energy, employment to local community members, increase in the national/local investment, increase in government revenue, improvement of standards of living for Bubisa residents. However, despite the outlined positive impacts, the proposed development will cause some negative impacts such as; noise, dust generation, soil erosion, oil spills, fire hazards, electrocution, shocks, solid waste generation, occupational health hazards, social risks such as labor influx, insecurity, demand for resources, gender-based violence, public health impacts (HIV & AIDs, Covid 19) among others that need to be avoided, reduced and mitigated against.

The proposed solar mini-grid power plant and associated infrastructure is unlikely to result in permanent damaging social impacts. The potential for positive socio-economic benefits can be realized if the enhancement measures are put in place. There is no opposition to the project from the County's lead agencies, local authority, or community representatives. From a social perspective it is concluded that the project could be developed subject to the implementation of the recommended mitigation measures and management actions in the ESMP.

It is the duty of NEMA to consider licensing the project subject to EIA study; in accordance with the Environmental Management and Coordination Act, EMCA of 1999 and its Amendment, 2015 and the Environmental Impact Assessment and Audit Regulations, Legal Notice No. 101 of 2003.

An Environmental and Socio- economic Management Plan (E&SMP) outline has been developed to ensure sustainability of the project area activities from construction through operation to decommissioning. The plan provides a general outlay of the activities, associated impacts, mitigation action plans and appropriate monitorable indicators. Implementation timeframes and responsibilities are defined, and where practicable, the cost estimates for recommended measures are also provided.

The proposed Environmental and Social Management Plan describe implementation mechanism for recommended mitigation measures together with monitoring to verify overall project performance. The implementation of the mitigation measures including monitoring schedule will provide a basis for ensuring that the potential positive and negative impacts associated with the establishment of the Power Plant are taken care off. This ESIA study together with mitigation measures and follow up of recommendations on management actions will help KP in complying with the environmental standards and meet the World Bank Standards.

### 10.2 Recommendations

The project is assessed to generate limited environmental and social impacts owing to construction related activity which will not extend beyond Solar mini-grid's footprint, water resource requirement and movement of traffic. Additionally, the following is recommended:

- REREC and the contractor must adhere to relevant legal and regulatory framework to ensure compliance and success of the project

- Adherence to the mitigation measures as spelt out in the ESMMP and monitoring of the same is mandatory to ensure environmental and social sustainability of the project.
- Cultivate and maintain a good working relationship with the community members
- Ensure social inclusion of the vulnerable groups by paying attention to the most vulnerable and provide ready boards as spelt out
- Contractor to plant trees in construction phase to promote environmental sustainability
- Stakeholder engagement to be carried out throughout the construction and operation and decommissioning phases.
- Contractor to ensure grievance redress mechanism is established and operational
- Environmental Audits should be carried annually or as prescribed by the Authority during the operational phase and invitation of Inspectors and Experts from NEMA to ascertain compliance with the provided ESMMP and set NEMA regulations and Standards.
- Diligence on the part of the contractor and proper supervision by the REREC shall be enhanced as much as possible.

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

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

### **Authorization Opinion**

In terms of NEMA requirement the environmental practitioner is required to provide an opinion as to whether the activity should or should not be authorized. The expert is reticent to venture such an opinion since we are not an elected entity mandated to make decisions on behalf of authority. Nevertheless, in this section a qualified opinion is ventured and in this regard the Lead expert believes that sufficient information is available for NEMA to take a decision. The fundamental decision is whether to allow development which brings socio-economic advantages and is consistent with planning and certain development and social responsibility and upliftment of policies, but which may impact on an area as a result of negative impacts identified. The Lead Expert believes that the ESIA have shown that the applicant's preferred alternative and technological alternatives are generally acceptable. The ESIA has also assisted in the identification of essential mitigation measures that will mitigate the impacts associated with the project to within acceptable limits.

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- Community Land Act, 2016
- The Land Registration Act, 2012
- The Land Act, 2012
- The Energy Act, 2019
- The Constitution of Kenya, 2010
- Marsabit County Integrated Development Plan 2018-2022

## 12 APPENDICES

**Table 24: List of Appendices**

No	Appendix	Item
1	Appendix 1	Minutes of EIA consultation meeting
2	Appendix 2	List of attendance
3	Appendix 3	Minutes of Land acquisition meeting
4	Appendix 4	Lists of Attendance for Land Acquisition Meeting
5	Appendix 5	A-RAP Document
6	Appendix 6	Community Profile, FGDS and KIIs
7	Appendix 7	Firm and Lead expert EIA practising licences

# Appendix 1: Minutes of EIA consultation meeting



MINUTES OF EIA CONSULTATION HELD AT ..BUBISA (LOCATION).....	
Date: 17/01/2021	Time: 1440hrs
Venue: Bubisa	

<b><u>PRESENT</u></b>		
List is attached		
<b><u>AGENDA</u></b>		
<ol style="list-style-type: none"> <li>1. Introduction</li> <li>2. Opening Remarks</li> <li>3. Remarks by the consultant</li> <li>4. Concerns/ Issues from participants</li> <li>5. Responses given by the consultant</li> <li>6. Project Acceptance/Rejection of the proposed project</li> <li>7. Adjournment</li> </ol>		
Item No	Description	Action by
Min 1/22	<b>Introduction</b>	
	<p>The project was introduced by the local team to the community. The project is under ministry of energy for all underserved communities.</p> <p>The Area Chief welcomed teams (Consultant Centric Africa Ltd, REEC Rep, and Country Public Health and energy rep.</p>	AREA CHIEF
Min 2/22	<b>Opening Remarks</b>	
	<p>The meeting was opened by a word of prayer by one of the elders.</p> <p>The project is meant to ensure supply of electricity to all households in proximity to the proposed project site.</p> <p>All members were as well asked whether they have been informed about the project and their views total agreement that they have been informed.</p> <p>It was as well mentioned that Bubisa is among these identified underserved communities will therefore be electrified hence the proposed project.</p>	CENTRIC AFRICA LTD S REEC REP

Min 3/22	Remarks by the Consultant	
	<p>Concerns from Participants</p> <p>* Community wanted to know in an event of accident, fire, property damage and loss of life.</p> <p>→ Here we confirmed that all procedures shall be followed. All households shall be required to ensure all electrical wiring is installed by a competent personnel and a completion certificate shall be issued prior to installation and supply of power.</p>	

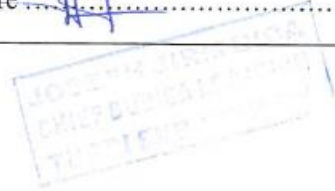
Min 4/22	Concerns/Issues from participants	CENTRIC AFRICA LTD WATHIKU
	<p><u>Remains By Consultants</u></p> <p>ESIA lead requested the members present to confirm that they have given and allowed the government to use the identified piece of land to be used for the project.</p> <p>- It was confirmed that identified piece of land is a community land and all were in agreement for the project.</p> <p>ESIA process was a meant to ensure that all members are informed about the project, its impacts (social/economic environment, and health and safety of all.</p> <p><u>NERRA</u> ESIA lead informed members that the process 'being undertaken' is meant to fulfill the requirements of ENCA Act 1999, that shall ensure:</p> <ul style="list-style-type: none"> <li>→ Sustainable project</li> <li>→ reduced negative impacts</li> <li>→ increased benefits</li> <li>→ economic development.</li> </ul> <p><u>Environmental pollution</u></p> <p>- Proposed project shall be conducted in accordance to procedures meant to protect the environment</p> <ol style="list-style-type: none"> <li>1) All vehicles shall be maintained in proper condition to reduce emission.</li> <li>2) There shall be need to limit speed limit is observed to reduce the chances of accidents.</li> <li>3) All workers shall be required to wear personal protection gear.</li> </ol> <p><u>Inho Mate (RERA)</u> She confirmed the compensation through the projects as discussed by community members. The community agreed on 3 projects which the contractor will ensure the compensation project starts first.</p> <p>It was confirmed that the first priority shall be given to neighbors who are at least 3km from the project site. There shall be a requirement that those within 3km shall be required to acquire certificate of no objection. This shall be communicated to them. She also confirmed that there shall be a standby generator to ensure that the power shall be enough to provide adequate power for welding works, borehole pumping water.</p> <p>All welders shall be paying for electricity into-m</p>	

Min 5/22	Responses given by the consultant	
	<p>Households found outside the 2km</p> <p>- It was informal that there will be a second project of providing alternative solar solution through provision of delight solar items/ equipments, at affordable prices</p> <p>Positive Benefits of the proposed project</p> <ul style="list-style-type: none"> <li>* employment (main women youth) the form of employment may not require skilled labor, therefore it shall be mandatory that community members shall be allowed to offer their services.</li> <li>* For engineering and all technical works contractor shall be allowed to higher someone competent to perform the duties</li> <li>* There shall not be discrimination based on any of the following (gender, vulnerability/ durability.</li> <li>* Ready market of materials and goods from within the project area.</li> <li>* Electricity generated shall also open up market, business, and schools, shops requiring power for operations, equipment, welding machines, and improved security.</li> </ul> <p>Negative Impacts and Controls in place.</p> <ul style="list-style-type: none"> <li>* Excavations without proper barricade can expose one to accident             <ul style="list-style-type: none"> <li>- All open excavations shall be protected</li> </ul> </li> <li>* All works to be conducted during daytime to reduce disturbance to the community at night</li> <li>* All waste generated shall be disposed off in accordance with the requirements of the waste</li> </ul> <p>Community Requested to Know when the project is likely to start up</p> <ul style="list-style-type: none"> <li>* It was confirmed that the project has already started.</li> <li>* It will take about 6 months as the organisations and contractors are already bidding for solar contracts awards.</li> </ul>	

<b>Min 6/22</b>	<b>Acceptance/Rejection of the project</b>	
	All members agreed and supported implementation of the project. None of members rejected the project.	
<b>Min 7/22</b>	<b>Adjournment</b>	
	Meeting was adjourned, as - There was interruption of meeting by heavy rains and storm, and we planned to accomplish the exercise another day.	

Minutes Prepared by: Dickson Alubaka Date: 17/01/2022  
 Position: Environmental Expert  
 Signature: 

Minutes Confirmed by: Joseph Jim Date: 22/01/22  
 Position: Chief Business Location  
 Signature: 



## Appendix 2: Lists of Attendance for Land Acquisition Meeting



REPUBLIC OF KENYA  
MINISTRY OF ENERGY

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

SITE BUBISA.....

MEETING VENUE BUBISA.....

DATE 18/10/2021

### LIST OF ATTENDANCE/PARTICIPANTS LIST

No	NAME	Identification number - ID No	Mobile No.	Gender Male/Female	Village	Sign
1.	KIOKO MAITHYA	10924666	0722176997	M		
2.	Katelo Samata	25719370	0717323340	M	Wachana	
3.	MAMO Diba	-	0799170332	M	Ilmadike	
4.	SHAMA GUYO	0628864	0703222741	m	shama Guyo	
5.	CHEPE Turri	0012480	0720892722	m	Naivasha	



6.	Jillo A. Seiko	0067253	070278706	M	CENTRE	J
7.	HASSAN GOLICH HARSAMA	20345265	0704771595	M	MOLLE GALGALDO	Handwritten signature
8.	BOAMOLEW ABKULA TURE	-	-	M	TURA GALGALDO	Handwritten signature
9.	Gollo Wario	4597482	0711715876	m	TOWSE	Handwritten signature
10.	GALGALDO QOYAFI			M	WALTON	
11.	RACHO DABELLO			M	SHAMA GUMD	
12.	SORA DIBA GODAMA			M	SHAMA GUMD	
13.	GUMD BORO QODE			M	MAMO ELEMA	
14.	ROBA QIDE			M		
15.	ELEMA QERRE			M		
16.	ABUDO MAMO ELEMA			M		
17.	WALLO KURRO			M		
18.	GODAMA DIBA			M		
19.	IBREN WATO					



20.	JIENA DABARA Gumpo	-	074121354	M	WICHTA	
21.	JARSO ELEMA ANMA	-		M	TURA GALELO	
22.	ALI GODANA HARRY	0595347	<del>07</del> 079964 - 7337	M	TURA GALELO	
23.	KOLOMPO KONSICHA ROBA	-	8704773297	M	KONICHA	
24.	SHAMO AU GARORA	0594363	-	M	BONIA ADATO	SHAMO
25.	BAKACHA GALSALO	0211530	-	M	STRA DOKO	
26.	ROBA SHAMA	20085884	-	M	Nairobi	
27.	GODANA DOSSO	-	-	M	Nairobi	
28.	Bante SIBA	-	-	M	Dakdum	
29.	JARSO WARIO	-	-	M	Taura	
30.	Orge Hussein	-	-	F	Nairobi	
31.	GANO ADANO	-	-	F	Nairobi	
32.	Gumato Ketele	-	-	F	Taura	
33.	DARARE Buize nach	-	-	F	Nairobi	



ID No

34.	wola ISACK	-	<del>MA</del> _F		Nairobi
35.	BOKAYO MAMO	-	F		Nairobi
36.	KAME Guyo MAMO	27559098	F		Dakuburu
37.	GURE Salacha	-	F		Ngiroru
38.	SARI MOLA	-	F		Town
39.	wato Racha	-	F		Mirari
40.	SATA Guyo ELEMO	-	F		Ilmorog
41.	busoya Adano	-	F		Ilmorog
42.	BIKO MARKO	-	F		Town
43.	BIKO Guyo	-	F		Bonw
44.	Budha wario	-	F		Nairobi
45.	Jillo mamo	-	F		Mosi Chu
46.	BONE Fon Chora	-	F		Ilmorog
47.	TALISO ADANO	-	F		Ilmorog



ID mobile # Gender Village Sr.

48.	SALLO QATU	-	-	F	Antola	
49.	SHAKOLE YATTANI	-	-	F	Nairobi	
50.	BICHE BARR DULELE	-	-	F	Antola	
51.	ROBE BAGAJA	-	-	F	Wachau	
52.	DIMA QONCHORO	-	-	F	Wachau	
53.	DIBO BATHOLE	-	-	F	Bathole	
54.	GUMATO GOLLO ISAKU	-	-	F	Umuro Harco	
55.	SHORBA GACHA	-	-	F	11 <sup>ma</sup> Str	
56.	DOROTHY KAGWENY					<del>Wachau</del>
57.	AMINA C. KODE	26589402	072422230	F	-	<del>Wachau</del>
58.	IRENE MATE	26961056	0729081220	F		<del>Wachau</del>
59.	PAST GAL GALLO	21769741	071195908	M	KARIBI	<del>Wachau</del>
60.	BONAYA ABADHO	30100217	071126740	M	Nairobi	<del>Wachau</del>
61.	Abeluh A- Ganya	29982861	0710153035	M	Town	<del>Wachau</del>



62.	Abudu GaribBE	02431692	0707195959	M	Franco	[Signature]
63.	Salim Lesuper	36775925	0718009308	M	MARSABIT Duruyor	[Signature]
64.	Jaboa Kanchan	22936958	0751629587	M	Mutu a'shaka	[Signature]
65.	Namo Adano	23399361	0723784842	M	Chadun Gafala	[Signature]
66.	Abulcasim Jillo	2185540	072299612	M	NHC	[Signature]
67.	James chiga	24990862	0729905945	M	Perce	[Signature]
68.	Osman M. Karamo	25249064	0121431554	M	CGM-LAND	[Signature]
69.	Aziz G. D. H. H.	11915322	0722883869	F	None	[Signature]
70.						
71.						
72.						
73.						
74.						
75.						

## FGD LISTS – MEN, WOMEN & YOUTH



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 BUBISA

MEETING VENUE BUBISA

DATE 19/10/21

### LIST OF ATTENDANCE/PARTICIPANTS LIST - FGD MEN

No	NAME	Identification number – ID No	Mobile No.	Gender Male/Female	Village	Sign
1.	KIROKA MAITHYA	10924666	072274597	m		
2.	Salim Lesuper	36775925	0718009308	M	MARSAKAT Surveyor	
3.	Jaxso Klaris Guyo	—	—	m		
4.	Guyo Gorté	—	—			
5.	Bagajo galgalo	—	—	m		



6.	Golompo Kosincha	-	070777327	M	
7.	Ali Godana	0595347	079916473 47	M	
8.	Taso Elama Qunyo	-	07069310 56	M	
9.	Sora Abudho	-	-	M	
10.	Godana Diba	-	072825 0024	M	
11.	Bante Diba	-	-	M	
12.	Golich FORA	-	-	M	
13.	Klavo Ali	-	07964743 92	M	
14.	Ibrano watho	-	-	M	
15.	Molo Abkula	-	-	M	
16.	Garse fora	-	-	M	
17.	HUKA D. GUYO	22867886	07080480	M	Amr
18.	Galgal Kattan	-	-	M	
19.	Racho ka Babelo	-	-	M	



20.	Guyon Boru Dido'	-	-	M		
21.	Sora Diba	-	-	M		
22.	Abudo mamu	-	-	M		
23.	Klaro Kullu	-	-	M		
24.	Elama <del>kaqere</del>	-	-	M		
25.	Roba Gidbo'	-	-	M		
26.	Gollo <del>Wawo</del>	1597182	071171876	M	Tawa	<del>Tawa</del>
27.	Philip Chape Turi	0912480	072089272	M	Tawa	<del>Tawa</del>
28.	Jillaw Abdullab	0067253	0702389060	M	Tawa	<del>Tawa</del>
29.	Katelo Dumata.	25718370	071732340	M	Wedhan	<del>Wedhan</del>
30.	LACKO DENGE	22556656	0746496832	M	Shama	<del>Shama</del>
31.	Roba Shama	20085884	-	M		<del>Shama</del>
32.						
33.						



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.....Bv.B.I.S.A.....

MEETING VENUE.....Bv.B.I.S.A.....

DATE.....18/10/2021.....

LIST OF ATTENDANCE/PARTICIPANTS LIST - FGD WOMEN

No	NAME	Identification number - ID No	Mobile No.	Gender Male/Female	Village	Sign
1.	AZUO GACHAU	11599322	072583861	F	Uncia	
2.	GUMATO GOLLO ISAKO			F		
3.	NIKO BORU		0705929741	F		
4.	lbo Wario	3151514	0701706206	F		
5.	Shangiso Elimo	0628621	0705828794	F		



ID

Phone

6.	Digo - Guye	0204258 <del>AD</del>	0705825784 <del>AD</del>		Village	50
7.	Salo Mudo Buzako	0594797	0786702934			
8.	Rusoye Adana Dido		0701706289			
9.	Shakobe Yattani wato		0712958820			
10.	Jillo Jaraso	011562655	070623839			
11.	ella Yttani		0742109904			
12.	Bichi Bora Durelle		0740222716			
13.	Talaso Jilly Elema		0740622234			
14.	Shobu Di Dachs Jarzo.	22937871				
15.	Adeys Bare		0700689404			
16.	Talaso Adanu Huga		0701706155			
17.	Bonne Korro		0705529931			
18.	Soroso Sharamo		0745396926			
19.	Kulle Adanu Wago		0713910791			



20.	Mama Bokayo Isacko		0740222066			
21.	Dorothy Kagwera					
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REPUBLIC OF KENYA

MINISTRY OF ENERGY

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

SITE BUBISA

MEETING VENUE BUBISA

DATE 18/10/2021

LIST OF ATTENDANCE/PARTICIPANTS LIST - FGD YOUTH

No	NAME	Identification number - ID No	Mobile No.	Gender Male/Female	Village	Sign
1.	IRENE MATE	26961056	0729081220	F		
2.	BWAYA Abuelo Baraco	30100217	0711267460	M	Mangata Nairobi	
3.	LOBA SHAMA	20085884	0722485596	M	"	
4.	KAME Guyo MAMO	27559098	0707491301	F	Daka barido	
5.	LOKHA BAROLE	24815733	0740222074	F	Daka barido	



6.	Abubakar Hina Jello	24813040	0722996912	M	NK-Coinity Coordinator	
7.	JACKO DENGGE ABUBAKAR	32556656	0746496832	M	Harshat Bubakar	
8.	James Chege	24790556	0723905545	M	Peter C	
9.	Omar M. Kargbo	25740064	0727435554	M	Com-LMS	
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## Appendix 3: Minutes of Land Acquisition Meeting

### MINUTES OF COMMUNITY CONSULTATION MEETING HELD ON 18/10/2021 AT BUBISA LAGER STARTING AT 12.27PM

12.1

#### AGENDA

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

In attendance (refer to annexed list of participants)

#### MIN 1.0 WELCOMING AND OPENING

The project team introduced themselves to the community as follows;

13 N	Name	Title/Institution
1.	Dorothy Kagweria	Ministry of Energy
2.	Ms. Irene Kawira	Snr. Environmentalist (REREC)
3.	Ms. Agnes Gachoki	Snr. Surveyor (REREC)
4.	Mr. Kioko Maithya	Social Safeguards Officer (REREC)
5.	Amina C. Abdi	CGM, Land & Energy
6.	Salim Lesuper	Surveyor, Marsabit County Government
7.	Abdillahi Jillo	National Lands Commission (NLC)
8.	James Chege	REREC supervisor, Marsabit
9.	Osman Galgallo	CGM-Land, Marsabit

#### 2.0 KOSAP AND BUBISA MINI GRID

Ms. Dorothy Kagweria informed the participants that the proposed project is part the Kenya off Grid Solar Access Project (KOSAP) which is funded by the World Bank and is being implemented by the Ministry of Energy, the Kenya Power and Lighting Company (KPLC) and the Rural Electrification and Renewable Energy Corporation (REREC). MoE will provide overall coordination of the Project including responsibility for

safeguards, due diligence and compliance monitoring. REREC will implement the mini grid and will be responsible for the implementation of Resettlement Framework Plan, Environmental Social Management Framework and Social Assessment. She said the Government is committed to providing electricity to communities that have not been served by the national grid such as Bubisa because it recognises energy as an enabler to development.

She said KOSAP entails the following components;

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

She further said KOSAP is being implemented in 14 counties. In Marsabit County 16 minigrids including one to be sited at Bubisa will be implemented in addition to stand-alone solar projects (public facilities) and solarisation of boreholes. The agenda of the visit she said was to; undertake an environmental and social screening of the proposed project site, to sensitize the community on the project land requirements and community rights and entitlements, explain the Project Technical architecture and connection requirements, discuss potential environmental/social risks and impacts and mitigation and sensitize community on grievance redress mechanism. The proposed mini grid will comprise a solar system and a thermal unit (generator) and those residing within 1.5 km radius from the project site will be connected to power. Those living beyond this radius can benefit from solar home systems. She said for one to be connected he/she will be required to pay a one-off connection fee of Kshs 1000. Thereafter they shall be buying prepaid tokens in order to access electricity. Tokens can be purchased through a vendor or directly through the mobile money platforms (Mpesa).

### **3.0 PROJECT LAND REQUIREMENTS: RIGHTS AND ENTITLEMENTS OPTIONS AND IMPLICATIONS**

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

She explained the various forms of acquiring land including; allocation, land adjudication process, compulsory acquisition, settlement programs, transfers, and long-term leases.

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

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

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

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

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

#### **MIN 4.0 SOCIAL AND ENVIRONMENTAL ISSUES**

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

#### **POTENCIAL POSITIVE IMPACTS**

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

2. Access to electricity

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

3. Improved Standard of living

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

4. Reduced disease burden and mortality rates

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

5. Benefits to Education

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

#### 6. Improved Security

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

#### 7. Improved communication and access to information

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

#### 8. Gender Considerations

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

## POTENTIAL NEGATIVE IMPACTS AND THEIR MITIGATION

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

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

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

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

		<p>Ensure that access to the power plant should only be by authorization and trained personnel</p> <p>Place warning signs on strategic places</p> <p>Conduct periodic awareness and sensitization campaigns for the neighbouring communities on electrical safety</p>
23.	Insecurity	<p>Liaising with area administration to enhance security</p> <p>Create public awareness on the need to protect public infrastructure for continued supply of electricity and to minimize exposure to electrical hazards</p> <p>Employing of security guards/competent security firm from the local population at the site</p> <p>Fencing of the installation area and whole site using a perimeter wall to ward off intruders</p>
24.	Health & safety for workers and community members	<p>Implement an appropriate re-vegetation programme to restore the site to its original status. Indigenous plant species should be prioritized</p>

She said that the project beneficiaries were the Gabra, who are Indigenous people and are the only VMG residing near the sub-project area thus the sole project beneficiary.

## 5.0 GRIEVANCE RESOLUTION COMMITTEE (GRC)

Ms. Mate informed the Baraza on the need for constitution of a locational Grievance Resolution Committee (GRC) for purposes of resolving any grievances that may arise in the lifetime of the project as guided by project frameworks. The local GRC will be the first stop shop for resolution of project related disputes and grievances for project affected persons and interested parties. The GRM should be culturally appropriate, inclusive, and accessible and developed in consultation with Bubisa 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.

### Existing Grievance Redress Mechanism

Amongst the Gabra community, If a person has a dispute with another member he/she reports to village elder (mzee wa Manyatta) if mzee wa Manyatta is unable to resolve he escalates the dispute to 'Jalabe' who if incapable of resolving it forwards it to 'Hayu' (President) whose judgment is final. Mzee wa Manyatta is elected by the community members. Every family lineage has a 'Jalabe'

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

QUESTION/COMMENTS	ANSWER/REMARKS
<p><b>Zillo A. Shiko</b></p> <p>7 years ago a solar company came saying we would get solarpower. Is this the same company?</p>	<p>This is a follow up, we have come to ascertain and verify about land availability</p>

<p><b>Gollo Wario</b></p> <p>1. Here we have solar and it doesn't have any side effects; Kwani hii solar yenu ni gani?</p> <p>2. Now, if we give you land, when does this project start?</p>	<p>This is a minigrid, and although the power is primarily tapped from the sun, it is more powerful. It is like the normal electricity from the grid</p> <p>After bidding and award of contract is done</p>
<p><b>Stephen Shamoo</b></p> <p>1. Me want to ask, project has started and finished. Are you going to employ locals? kazi? This power can it serve Manyatta houses?</p>	<p>Locals to to employed in unskilled labour category and project security like guards</p> <p>Yes</p>
<p><b>Phillip Chebe</b></p> <p>Your project harnesses power from the sun, are its consumption charges similar to the grid consumers?</p>	<p>Yes charges are uniform and standardised</p>
<p><b>Ali Malicha</b></p> <p>1. We are pastorists who keep cattle, sheep, goats and camel. During the rainy season camels traverse the whole area, they are also tall and may reach the overhead lines and cause calamities.</p> <p>2. When do you want response to land issue?</p> <p>3. There is lot of wind here and might blow down poles</p>	<p>The project land will be fenced off. Conductors will be placed at a height that's beyond the reach of animals</p> <p>When the community is ready</p> <p>There shall be staff stationed at the project 24/7 for operation and maintenance.</p>
<p><b>Sori Mollu</b></p> <p>Hii solar itakuwa imefanya kesi kama zile zingine?</p>	<p>This is a larger power project which shall convert solar power into normal grid like electricity</p>
<p><b>Rusoya Adano</b></p> <p>Can this power be used for borehole?</p> <p>Will it be enough for all our needs?</p>	<p>Yes</p> <p>Yes</p>

## 14 6.0 FOCUS GROUP DISCUSSIONS

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

### FGD-MEN

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

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

During the meeting the Men agreed to provide land, and elected the following representatives to the GRC;

<b>Name</b>	<b>ID number</b>	<b>Telephone number</b>
Gollo Wario	4597482	0711713876
<u>Katelo ramata</u>	25718370	0717323340

The Men said they had fully understood the project and did not have any questions

## **FGD-WOMEN**

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

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

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

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

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

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

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

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

The women elected were:

	<b>Name</b>	<b>ID number</b>	<b>Telephone number</b>
1.	Rusoya Adano Dido	-	0701706219
2.	Ibo Wario	8151514	0701906206

## **FGD YOUTH**

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

The youth did not ask any questions, and proceeded to select the following as members of the grievance redress committee;

	<b>Name</b>	<b>ID number</b>	<b>Telephone number</b>
1.	Isacko Denge Abudo	32556656	0746496832
2.	Roba Shama	20085884	0722485596

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

After the FGDs the participants convened back to the main meeting to review the respective resolutions from the FGDs.

They resolved to provide land for the project, validated the nominees to the GRC and elected officials to lead the identification of project land and sign the land forms on their behalf.

They also proposed the following projects as compensation;

1. Extra Ward at the health centre
2. Dining Hall at Bishop Cavalera School
3. Meeting hall at Bishop Cavalera School

The community nominated the following as members of the GRC:

<b>No</b>	<b>Name</b>	<b>Category</b>	<b>1D No.</b>	<b>Mobile No.</b>
1	Rusoya Adano Dido	Women	-	0701706219
2	Ibo Wario	Women	8151514	0701906206

3	Gollo Wario	Men	4597482	0711713876
4	Katelo ramata	Men	25718370	0717323340
5	Isacko Denge Abudo	Youth	32556656	0746496832
6	Roba Shama	Youth	20085884	0722485596

### **8.0 CLOSING STATEMENT**

The community in Bubisa unanimously agreed to set aside land for Minigrig construction. A Land Identification form was signed by the representative of the community, the county government and the Implementing Agencies summarizing the process of land identification and the agreements reached with the community.

### **Photographs of Community Baraza on land acquisition at Bubisa on 18/10/2021**



## Appendix 4: Lists of Attendance



MAIN LIST



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

Venue: ..... BUBISA ..... Date: ..... 17/11/2022 .....  
 Time: ..... 2:56 PM .....

#	Name	Position/Institution/ Location/Village	Phone No.	
1.	DINO BARNI ELKE	BUBISA	0713911212	
2.	DARARE GARGARO GUYO	BUBISA		
3.	BONE GUYO ABUDA	BUBISA	0707414329	
4.	DINA FLEMO	BUBISA	0765828784	
5.	HUKA DARALLA GUYO / ASST CHIEF	BUBISA	0724321480	
6.	GODANA GOROMP KOSIATA	BUBISA		
7.	DUBO BACHOLE GODANA	BUBISA	0701706206	
8.	BORATO GODANA BORU	BUBISA	0795182547	
9.	DERASSO KOSIATA	BUBISA	0707304070	
10.	BOYA ABUDA ASHU	BUBISA		





Co-located



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

Venue: LAG BUBISA STREAM

Date: 17/01/2022

MAIN ATTENDANCE LIST

Time: 2:56 PM

#	Name	Position/Institution/ Location/Village	Phone No.	
1.	KAPERU RAMA GUYO	BUBISA	0717323840	
2.	GOLLO WAKIO SARU	BUBISA	0711713876	CPWSC
3.	ABDO GEORJOBE KARA	BUBISA	0707195959	Amara
4.	ADANO ELENA AMBARO	BUBISA	071698846	ADANO
5.	BURZI GORAT	BUBISA		
6.	GOLLO GARGAR GABARA	BUBISA		
7.	AMARA OIRE	BUBISA		
8.	IRRAHE HUSA DURE	BUBISA		
9.	TARISO DAMBARA GUYO	BUBISA	0711713942	FD
10.	JUMA DUBA JOY	CHIEF BUBISA		





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

Venue: ..... BUBISA .....

Date: ..... 17/1/2022 .....

Time: ..... 2:30pm .....

#	Name	Position/Institution/ Location/Village	Phone No.	
1.	MAMO BAGAJA MAMO	BUBISA	0797183556	
2.	ADAN GALGALLO GIDANA	BUBISA	0719305427	KA
3.	ADO GALGALLO DOSO	BUBISA	0715952032	
4.	WARE GUTU WARIO	BUBISA	0797677849	
5.	SALLO GUYO DOSO	BUBISA	076805210	
6.	KAME ADANO WARIO	BUBISA	0795182563	KAMO
7.	TALAS. ISACK. KONCHORA	BUBISA	0740620219	TA
8.	ADO DUBA ROBA	BUBISA	0798807212	ADHO
9.				
10.				



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

Venue: ..... BUBISA .....

Date: ..... 17/1/2022 .....

Time: ..... 2 PM .....

#	Name	Position/Institution/ Location/Village	Phone No.	
1.	ROBA SARA QUNTO	BUBISA	N/A	
2.	SHAMA JARLO	"	N/A	
3.	ADANO ERMA AMBARO	"	0716988146	ADANO
4.	BOKATO KONGHORA KIMBA	"	0727758565	
5.	GUMATO GODANA FORA	"	0723448316	
6.	ADHEHA ELEMO	"		
7.	GUMATO ADANO KERE	"	0700792715	
8.	UMURO SHARANO	"	0706016013	
9.	UMURO KOTORE	"	0723255555	
10.	DENGE MBUDU	"	0711891124	



2 MAIN



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

Venue: ..... B.M. BUSI .....

Date: ..... 17/1/2022 .....

Time: ..... 2 PM .....

#	Name	Position/Institution/ Location/Village	Phone No.	
1.	IRENE MATE	S. ENVIRONMENTALIST REREC	0729081220	
2.	SATO WAKA	Env. H. PRACITUNEN	0729377370	
3.	KATELO GALGALLO GUYO	BUBISA	0715952082	
4.	HASSAN GOLICH HARSAMA	BUBISA	0704771595	
5.	PHILIP CHEDE TURI	BUBISA	0720892722	
6.	ALI MALICHA	"	0702455579	
7.	JOTHARI KOTORE	"	0794381365	
8.	RARA KONDO	"	0720077646	
9.	MAMO WAGO	"	0759728984	
10.	GUDOTA HUKA	"		



## FGD LISTS – MEN, WOMEN & YOUTH



<b>ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES, MARSABIT COUNTY</b>	
Venue: ... <u>Bubisa Location</u> .....	Date: ... <u>22/01/2022</u> .....
... <u>Poo Male</u> .....	Time: ... <u>10:02am</u> .....

#	Name	Position/Institution/ Location/Village	Phone No.	
1.	Gollo wario	Bubisa	0711713876	<i>[Signature]</i>
2.	Mamo waco	Bubisa	0759728984	<i>[Signature]</i>
3.	Kochora Kendo	Bubisa	0720077646	<i>[Signature]</i>
4.	Gudota Huka OBE	"	N/A	
5.	ROBA SORA QUNYO	"	0701703477	
6.	HARO ABUDO	"	010158466	<i>[Signature]</i>
7.	SHAMA JALLO	"	N/A	<i>[Signature]</i>
8.	ADADO ERENA	"	071698946	<i>[Signature]</i>
9.	PHILIP CHEPE TURI	"	0720892722	<i>[Signature]</i>
10.	ALI MACHA	"	0702455579	<i>[Signature]</i>





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

Venue: ... Bubisa location ... Date: ... 22/01/2022 ...  
Male Pur Time: ... 10:00 AM ...

#	Name	Position/Institution/ Location/Village	Phone No.	
1.	<u>KARLO GAGALO</u>	<u>BUBISA</u>	<u>0715952082</u>	<u>KARLO</u>
2.	<u>Abida Gathara</u>	<u>"</u>	<u>0707195939</u>	<u>(Signature)</u>
3.				
4.				
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**ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES, MARSABIT COUNTY**

Venue: BUBISA.....

Date: 17<sup>th</sup> January 2022.....

Women

Time: .....

#	Name	Position/Institution/ Location/Village	Phone No.	
1.	<del>GRACE FOA</del>	<del>BUBISA</del>	<del>0</del>	
2.	Kame Adano Wario	UBUBISA	0795782563	Kame
3.	Buleya Anthony		0799374695	
4.	TERESA Dergo		0707304070	
5.	Talaso Isako Kuchora		0740622219	
6.	TALASO DAMBALA		0711713942	TD
7.	BIKO BORU ELLE		0713911212	
8.	SHANGAYO ELEMO		0705828784	
9.	GUMARO GODANA FOYA		0723448316	
10.	BOKAYO BONCHORA KOMBO		0727758565	

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

Venue: BURISA Date: 22/01/2022  
Women Time: 10 AM

#	Name	Position/Institution/ Location/Village	Phone No.	
1.	Lucy BU	Centre Africa Ltd	0725131519	
2.	ABATHEYA GEMO	BURISA	—	
3.	GUMATO ADAM KERE	BURISA	0700792715	
4.	ADAMO GALGALLO ROSSO	BURISA	0715952032	
5.	WARE GUYO WARIBO	BURISA	0769052210	
6.	SALO GUYO ROSSO	BURISA	0797677649	
7.	KAME ADAMO WARIBO	BURISA	0795182563	
8.	TALASO ISACKO DONCHORA	BURISA	0740622219	
9.				
10.				

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

Venue: BUBISA ..... Date: 22/01/2022 .....

FGD - YOUTH ..... Time: 1000HRS .....

#	Name	Position/Institution/ Location/Village	Phone No.	
1.	ADAN GALCALLO	BUBISA	0719305427	
2.	HASSAN GOLICH HASSANA	BUBISA	0704771595	
3.	WOTO BRAGA ASUDO	BUBISA	0708495337	
4.	DENGE ABUDO WOKO	BUBISA	0711891124	
5.	Umuro Sharamo	Bubisa	0706016013	
6.	Umuro Kotore Ali	Bubisa	0723255555	
7.	Mamo BagaJa Mamo	Bubisa	0799783556	
8.				
9.				
10.				



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

Venue: BUBISA VILLAGE (E.R.O)..... Date: ...22/01/2022.....  
 Time: ...11:12 A.M.:.....

#	Name	Position/Institution/ Location/Village	Phone No.	
1.	ADANO ELENA AMBALO	BUBISA	0716988146	ADANO
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				



## Appendix 5: A-RAP Document

### ABBREVIATED RESETTLEMENT ACTION PLAN

#### (A-RAP)

#### 1. Bubisa Sub-project Site

The Bubisa sub-project site is located on unregistered community land and held in trust by the County Government of Mandera on behalf of the community, in line with the Community Land Act 2016. . The proposed site is uninhabited, has no structures, community facilities, or encumbrances. Consultations leading to the identification and selection of the sub-project site are captured in the Environmental and Social Screening report for Bubisa. *Refer to Chapter 5 of the ESIA for the comprehensive socio-economic profile.*

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

The number of project-affected persons (PAPs) is 544 (approximately 532 households). The land acquisition-related impacts are loss of land, some trees/shrubs/grass. Mitigation measures include in-kind compensation for loss of land and pasture, and designing power distribution lines to avoid impacting trees, crops, structures, and community facilities. No physical displacement is anticipated, however, there is minimal loss of pasture occasioned by the acquisition of land utilized by the community for grazing. The 1.388 hectares identified for the sub-project will be acquired compulsorily by the Land Commission (NLC). The proposed site will be valued and compensated in line with the provisions of the Resettlement Policy Framework (RPF) prepared under KOSAP. *Refer to section 3.3 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 Bubisa community proposed three projects in order of priority, i) Extra ward/unit at the Bubisa Health Center; ii) Dining Hall at Bishop Cavallera School; iii) Meeting Hall at Bishop Cavallera School. The value of the priority community project will be proportional to or higher than the value of land under acquisition. In addition, any loss or damage to crops, trees, structures, and community facilities will be 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	Government agencies.	No compensation for public land allocated to another government body.	

governments and the Ministry of Interior			
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 and registered group ranches (e.g., grazing, farming etc.).	Communities utilizing unregistered community land, unregistered group ranches, and registered group ranches.	Compensation in-kind as prioritized by the community.	
<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>2</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**

<sup>2</sup> A cost basis that will yield compensation sufficient to replace assets, plus necessary transaction costs associated with asset replacement).

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

#### **4.1 Engagement of Project -Affected Persons (PAPs)**

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

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

#### **4.2 Identification of Community Representatives**

The Bubisa 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 6 of the ESIA on the Grievance Redress Committees.*

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

#### **4.3 Summary of Consultations on Land Acquisition and Compensation Options**

<b>Date</b>	<b>Objective</b>	<b>Implementing</b>	<b>Land Acquisition and Compensation Aspects</b>	<b>Key Issues Raised</b>	<b>Responses</b>
-------------	------------------	---------------------	--	--------------------------	------------------

		<b>Entities</b>	<b>Discussed</b>		<b>Given</b>
October 18th, 2021	Environmental and Social Screening. Voluntary land donation (VLD). Constitution of the Locational Grievance Redress Committee (GRC).	Ministry of Energy (MoE) Kenya Power (KPLC) Rural Electrification and Renewable Energy Corporation (REREC)	Site identification and land allocation for the sub-project.  Criteria for VLD.  Community entitlements (forms of compensation and implications for each).	When does the project start when the community provides the land?  When do you want response to land issue?	After bidding and award of contract is done  When the community is ready
January 17 <sup>th</sup> 2022	Environmental and Social Impact Assessment.	Consultants MoE KPLC REREC	Land acquisition through compulsory acquisition (not voluntary land donation). Selection of three priority community projects, whereby one is to be implemented as in-kind compensation for land.	Community proposed three projects; i) Extra ward/unit at the Bubisa Health Center. ii) Dining Hall at Bishop Cavalera School. iii) Meeting hall at Bishop Cavalera School.	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

<b>Entity</b>	<b>Role</b>
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 time bound indicators, which can be monitored by all parties – the PAPs, IAs, the Ministry, third-party monitor, and the Bank.

### 7.2 Budget

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

**Appendix 6: Community Profile, FGDs and KIIs**

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COMMUNITY Profile Checklist Kenya Off-grid Solar Access Project (KOSAP)			
Section A: General Information			
1. Name of Interviewer (s):	HOTTENSIA W. KABUKI		
2. Name of respondent and position in village:	JOSEPH JIRM: CHIEF - BOBISA LOCATION.		
3. Name and telephone number of Chief:	JOSEPH JIRM: 0723021712.		
4. Date of Interview:	22/01/2022.		
Section B: Physical Information			
1. Location name:	BOBISA	1. County:	MARSABIT TURBI SUBCOUNTY. (formerly MARSABIT NORTH)
2. Sub-Location:	BOBISA	2. Ward	TURBI.
3. Village	BOBISA.	4. Name of the nearest town in kilometres	MARSABIT CENTRAL 47 kms.
3. Distance to the nearest town in kilometres	47 kms.	4. How long has the village existed/brief background to village	66 years.
Section C: Demographics/Population			
1. Population:	6,000.	2. Gender (%):	M % 45.
3. Approx. number of households:	1000		F % 55
4. Approx. number of people per household:	6 per HH.	5. Approx. no. Vulnerable households:	Male HH - 800 HH Female HH - 150 HH Child HH - 3 HH Elderly - 200 PLWD - 50 Others specify
6. Has the population increased or decreased over the last 2 years?	Increased.	7. What has the reason been for the increase or decrease? Why?	Immigration from within sub-county. Increased birth rate.
8. If the population has INCREASED, where have the people come from? Why have they come to this area?	From within the sub-county. Fleeing from conflict (Gabbra & Borana)	9. What % of the village are indigenous and what % of the village are settlers?	% Indigenous: 90% % Settlers: 10%
10. Who are the most vulnerable members/persons in the community? Why?		11. Primary religions:	Islam & Christianity.
12. Primary ethnic groups:	Gabbra.	13. Other Ethnic groups:	None.

Section D: Land Ownership and Rights			
1. What % of the people in the village own land?	The land is owned communally	2. How have people inherited land in the village?	Only inherit the section where the households are (from parents).
3. What % of the population rent land?	None.	Land ownership type	Communal.

Section E: Livelihoods			
1. What are the main jobs that people do in the village?	Pastoralism Retail trade Household Agriculture Construction	2. Approximately what % of the population is in formal employment with a salary?	% Formal: 1%. % Informal: 99%.

Section E: Land Use			
1. What is the main land uses in the village? (e.g., grazing, crops, unused etc).	Grazing.	2. If applicable, what are the main permanent and non-permanent crop types produced? (eg trees and vegetables)	N/A.
3. Where are the crops sold? What are the names of the locations/ markets? What is the distance in kilometres?	N/A.	4. Generally, how are crops transported from the farm to the market (eg motorbike, car, walk etc)?	N/A.
5. What are the main sources of irrigation? Where are they located?  Are there any times of year when irrigation does not function? Why is this?	N/A.	6. Add description of any other key land use.	Households, businesses.

Section E: Community Cohesion/Cultural Sites			
1. Names of Community Based Organisations/Associations and Objectives:	None.	2. Conflicts? E.g., any village or land disputes we need to be aware of?	None within the village but there is conflict between the Gobra & Borong where the location borders Marabout Central.
3. How is the community organised? Who are the main representatives? Prepare a diagram of how the community is organised	Chief → Assistant Chief → Elders → Community.		
4. Where are the graves in the village? If not in the village, what cemetery do they use?	3 Cemeteries within the village.	5. Are there sacred shrines/bushes in the village or close by? What are they used for? (Include the name of the society if applicable)	None.

Section F: Public Facilities/Infrastructure in the Village							
1. Educational facilities in the village (insert specific names and number)		Name of facility	Distance in KM from the village	2. Health facilities in the village (insert number)		Name of facility	Distance in KM from the village
Primary	Caralera Primary	Bubisa primary		Hospital			
Secondary	Hon. Lockett memorial	Boys Secondary school.		Pharmacy			

	Higher education (University, College (specify))	N/A.		3. Is there a community centre in the village? What is the name?	No.
				4. Religious building (insert type and number)	
5. Access to drinking water (select the type of facility in the village and number)	Handpump		6. Road type to access the village	Asphalt	✓ Marsabit - Moyale Road
	Borehole	4 boreholes		Gravel	
	Hand dug well			Dirt	
	Outside tap			No Road	
	Other (specify)	Water pan / rain fed / dam			
7. What is the main form of public transport in the village? Where does it go from/to?  How well does it function? Does it meet the needs of the community?	Matatu (to Marsabit & Moyale) → Bodoboda (motor cycles) The transport system is adequate.			8. What material are houses made from (walls, roof, floor)?	Walls → sticks / mud / fabric Roof → sticks / sisal Floor → earth.
9. Does anyone in the village have access to electricity? From what sources (e.g., community generator, public/government electricity, private generators, Solar other)?  How would you describe the availability of electricity?	D-light, Solau Panda, M-kopa (Solau energy) in households & businesses (Private).  The area is not connected to the National Grid. Only a few HUs can afford the private source.			10. What type of toilet facilities are in the village (e.g., private/communal, flush, ventilated pit, non-ventilated pit? no toilet)	Pit latrines are available but are few. Shared between households.  Open defecation also practiced.

Section G. Community Development

1. Name the top three community development needs (in order of priority) and the reason why it is required?	Community priority	Reason why it is required
a) First priority:	Healthcare: Require medicine and equipping of the health center.	
b) Second priority:	Education: Secondary school for girls.	There is no secondary school for girls.
c) Third priority:	Vocational/Technical center. Social Hall.	There is no tertiary institution in the area. For community gatherings.
2. Are there any aid/community support mechanisms to support vulnerable households or individuals in times of need?	→ HSNP (Hunger Safety Net Program) → Cash Transfer Programmes for the elderly & OrCs. → PASIDA provides finances for borehole maintenance.	

**FGD -Grievance Redress Committee (GRC)**

**Facilitator Instructions:** The purpose of the meeting is to gather information on the background of the GRC and issues that may relate to people in the project affected communities. Keep the discussion focused and please probe for explanations for responses (what, where, when, why, how). Take lots of pictures.

Ministry of Energy (MoE) is coordinating the implementation of Kenya Off-grid Solar Access Project (KOSAP) for Underserved Counties in Kenya. The project is financed by the World Bank and implemented by the Ministry of Energy (MoE), Kenya Power and Lighting Company (KPLC) and R Rural Electrification and Renewable Energy Corporation (RREC). The project aims at providing a comprehensive suite of investments to provide electricity services to households, enterprises and community facilities and boreholes. We are undertaking an environmental and social impact study to gather information to understand the potential impacts of the project and gather feedback on the project. Show the participants the layouts/models

Section A: General Information		Responses
1	Date and time of meeting	22 JANUARY 2022. : 11:12 A.M
2	Name of facilitators (inc note taker)	HOTTENCIA W. KABUKU
3	Location/address of meeting County Sub-County	BUBISA LOCATION : TURBI SUB COUNT.
4	Number/gender of participants (take register).	Males: 1; Females:
5	Name of GRC	

**Section B: Details of the GRC**

1	When and how was the GRC constituted?	October 18 <sup>th</sup> , 2021
2	How many members constitute the GRC? Describe the committee structure?	6 Committee Members (Two men, Two women, Two youths)
3	Describe roles and responsibilities of the GRC?	The Committee was constituted to handle project related grievances. The committee was informed their role will commence when construction of the project begins.
4	Have you held any meetings? How frequent are the meetings? (Needs basis/ scheduled?) If yes provide the sample minutes/latest	There have been no meetings held by the GRC.
5	Do you have any questions/comments regarding the project?	None. The committee will deliberate on their roles & responsibilities when construction of the project commences.

**Section B: Any additional comments**

1	
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Please take some pictures of the meeting with a description below each photo:

## KII Education

**Facilitator Instructions:** The purpose of the meeting is to gather information on access to education, resources, educational performance and skills in the project area. Introduce yourselves, the project and explain the purpose of the meeting. Keep the discussion focused and please **probe** for explanations for responses (what, where, when, why, how). Take lots of pictures of the educational facility.

Ministry of Energy (MoE) is coordinating the implementation of Kenya Off-grid Solar Access Project (KOSAP) for Underserved Counties in Kenya. The project is financed by the World Bank and implemented by the Ministry of Energy (MoE), Kenya Power and Lighting Company (KPLC) and Rural Electrification Authority and Renewable Energy Corporation (REREC). The project aims at providing a comprehensive suite of investments to provide electricity services to households, enterprises and community facilities and boreholes. We are undertaking an environmental and social impact study to gather information to understand the potential impacts of the project and gather feedback on the project. **Show the participants the layouts/models**

Section A: General Information		Responses
1	Date and time of meeting	17 <sup>th</sup> January 2022
2	Name of facilitators (inc note taker)	Said Labo.
3	Name of Organisation / Institution / Department	Bishop Caralaga primary School.
4	Type of facility (government, NGO, private) and level	Government
5	Location/address of meeting County Sub-county	Bubisa - Marakissa North - Marakissa
6	Name (s) / roles of participants	Head of the Institution.
Section B: The Project		
1	Have you heard of the project before? How/when/where (if not please explain)	Yes. 16/02/2019.
2	How do you think that the project could positively impact on the community? How?	It will lead to creation of job opportunities. - It will make life easy since lighting enhances more efficient daily duties.
3	What other impacts do you think that the project will have on the community and access to education?	- It will reduce the cost of constant fueling the pump for animals to get water. Also promotion of I.C.T. - pupils and student can study at night.
4	What do you think the project could do to avoid/minimize negative impacts?	- Creating awareness to the community - training the operators to avoid accidents and break down.
5	Do you have any questions/comments regarding the project?	Yes comment: This will brighten lives of the community and every one else who is around.
Section C: Infrastructure and Resources		
1	How long have you worked in the school?	For five years.

2	How many teachers are working at the school?	Eight.
3	What are the things that you think are good and are working well at the school?	- Our performance graph is on upward trend.
4	What are the main challenges at the school? How do you think these could be addressed?	- lack of reliable source of power - due to overcrowding due to inadequate classes - insecurity due to damaged fence, - lack of boarding facilities eg kitchen, dining,
	Are there any government /NGO initiatives in place to support the school/education system here?  If yes, what are these? Do you think this initiative will be successful?	Yes - is free primary funds. Kibera, assist from little from government of Kenya
	What is the average distance a student walks to get to school?	- At most Five Kilometers
	What is the furthest distance a student walks to get to school?	Six KM.
	Are the students provided with meals at school?	NO. - For the last two terms.
	How/where are teachers paid (how far do they have to travel to get to a bank to check if they have been paid or to withdraw money for living expenses)?	Majority are paid by T.S.C. and others by B.O.M. - Teacher have to cover at least 45KM to access their salary.
	How can you participate in the proposed project?	- By giving some civic education to locals. - School can also have a program to teach the importance of the project.
	How will you be impacted by the project?	- It can boost l.c.T. learning in school. - It will also be the mother source of power in school.

How can you support the project?	<p>- By giving civic education to local</p> <p>- School can induce a program to educate learners about the importance of the project.</p>
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Section D: Curriculum

1	<p>Are there any constraints to accessing education?</p> <p>Are there groups with more/less access than others? Especially the VMG?</p> <p>If yes, what are the reasons for this?</p> <p>In your opinion how could these differences be addressed?</p>	<p>- Yes -</p> <p>- No groups all are the same due to power challenges.</p> <p>By providing adequate source of power.</p>
2	<p>Do boys achieve higher grades than girls or vice versa? Why is this?</p> <p>Are there any challenges in attendance of students (e.g., distance to school, provision of uniform or fees, domestic chores etc?)</p>	<p>No.</p> <p>Yes. - Some learners covers very long distances to school hence dilating their school attendance.</p>
3	<p>What percentage of students go to higher education level?</p>	<p>30%.</p>

Section E: Attendance

1	<p>Total number of males and females attending the school.</p> <p>What is the sex ratio of students this school (% female - % male)?</p>	<p>Boys (male) - 145</p> <p>Girls (female) - 268</p> <p>2:1</p>
2	<p>What are the attendance rates for males at each level?</p> <p>What are the attendance rates for females at each level?</p>	<p>98%</p> <p>97%</p>
3	<p>What are the completion rates for males?</p> <p>What are the completion rates for females?</p>	<p>99%</p> <p>99%</p>

Section F: Please insert any observations/comments regarding the meeting here

1	<p>Comments/observations (what went well/not so well, describe your observations of the school and facilities)</p>	<p>The meeting was successful - The existing facilities are in good state although we are in need of facilities like lounge, dining hall, kitchen, additional class rooms.</p>
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THE HEADTEACHER  
BISHOP CAVALLERA  
P.O. BOX 140, M.A.S.  
Date: 17th Jan 2012

Section G: Insert photos here

Please take some pictures of the meeting / facility with a description below each photo:

## KII Health

**Facilitator Instructions:** The purpose of the meeting is to gather information on access to health care and of health issues in the project area including service area, services available, resources and prevalence rates. Introduce yourselves, the project and explain the purpose of the meeting. Keep the discussion focused and please **probe** for explanations for responses (what, where, when, why, how). Take lots of pictures of the health facility.

Ministry of Energy (MoE) is coordinating the implementation of Kenya Off-grid Solar Access Project (KOSAP) for Underserved Counties in Kenya. The project is financed by the World Bank and implemented by the Ministry of Energy (MoE), Kenya Power and Lighting Company (KPLC) and Rural Electrification Authority and Renewable Energy Corporation (REREC). The project aims at providing a comprehensive suite of investments to provide electricity services to households, enterprises and community facilities and boreholes. We are undertaking an environmental and social impact study to gather information to understand the potential impacts of the project and gather feedback on the project. **Show the participants the layouts/models**

Section A: General Information		Responses
1	Date and time of meeting	17/1/2022 Time: 2:51pm.
2	Name of facilitators (inc note taker)	Said Luba.
3	Name of Organisation / Company / Department	Ministry of health
4	Type of facility (government, NGO, private)	Government.
5	Location/address of meeting County Sub-County	Bubisa, North Horr sub-county.
6	Name (s) / roles of participants. Take contact details	MACHI ALI BALA - 0725178778 - Godana Isaac Godan - 0717469530.
Section B: The Project		
1	Have you heard of the project before? How/when/where (if not please explain)	Yes. How? Through Public Participation when? Aug 2021 where? Bubisa health facility.
2	What do you think could be the impacts on the health of people living near the project area?  How do you think that these could be minimized or avoided?	No harm to human health.  None.
3	How do you think that the project could positively impact on the community so that people benefit?	- Good light for facility - help in immunization activities as vaccines need energy for refrigeration. - 24hrs maternity services
	How can you participate in the proposed project?	Through interview & filling of questionnaires
	How will you be impacted by the project?	- Good <del>for</del> maternity services. - Good lights for the entire facility. - Efficient source of energy for immunization services i.e vaccines need refrigeration




	How can you support the project?	- Through mobilization & public participation.
4	Do you have any questions/comments regarding the project?	NO.
<b>Section C: Facility</b>		
1	What are the opening hours?	- 24hrs ; <del>7:00am</del> 7:00am - 6:30pm for staffs on day duty. 6:30pm - 7:00am for staffs on night duty.
2	Names of communities in service area, approximate distance in km and service population size	Bubisa Community. 500m from facility.
3	What health services does the health facility offer?	- Out patient services (OPD) - Inpatient services (IPD) - nutritional services.
<b>Section D: Infrastructure and Resources</b>		
1	How many doctors and nurses do you have? (m/f)?  Do you have enough staff to meet demand?	4 ; three nurses one clinical officer (CO)  NO.
2	Please list the infrastructure that this establishment; and is it in Good / Moderate / Poor condition?  What are the main challenges regarding infrastructure?	- chairs, maternity bed, refrigerator (sibir) that uses gas as energy, trolley, weigh machine. - in moderate condition. energy challenge is refrigerator needs energy for the vaccines to operate well and when the gas goes off it becomes a challenge.
3	What equipment does this establishment have to treat the main health issues; and condition: Good / Moderate / Poor?  What are the main challenges regarding equipment?	- blood pressure machine - thermometer - fridge for vaccines - moderate condition. - electricity.
4	How accessible are health care facilities to communities? (Location, transportation, inclusion etc). How many emergency vehicles do you have?	- Not all can access to the health center because <del>some</del> some communities live in out reach sites due to pastoralism. - No emergency vehicles. we depend on ambulances that is situated in Marsabit hospital (45km from bubisa) to come and solve the situation.
5	Do you provide outreach and educational services in relation to health? What services to you provide?	- outreach services are provided by patients. health education services that we provide is exclusive breast feeding, hygiene and nutrition, care for the born child.

6	Have there been any recent changes in the health care system in the last 5 years? Have there been any changes in the level and/or quality of services? If yes, what is the reason for this?	recently no dnrgs in the facility.
7	Are there any plans for expanding or reducing the services currently offered?	- need to expand maternity - need to expand out patient <del>services</del> building.
8	What are the gaps or stresses in the health care system? What do you think could be done to address these issues?	- need more nutrition. - need more nurses - need more CHAs (community health assistants).
9	What is the cost of health care to users? What do people get for free and what do they have to pay for?	The institution is a health center hence nothing is paid, all the services are free.

Section E: Prevalence Rates / Health Issues

1	What are the top 3 health issues among children (1 being the most common)?  What is the reason for these issues?  Are they seasonal?	1. Malnutrition 2. Pneumonia. 3. Diarrhoea - some.
2	What are the top 3 health issues among women (1 being the most common)?  What is the reason for these issues?  Are they seasonal?	1. UTI (urinary tract infection) 2. Gynaecological conditions i.e. amenorrhoea, dysmenorrhoea. 3. Brucellosis
3	What are the top 3 health issues among men (1 being the most common)?  What is the reason for these issues?  Are they seasonal?	1. Brucellosis 2. UTI 3. Pneumonia
	What are the most common health issues among the VMG?	- Pneumonia in children.
4	Prevalence rates for malnutrition  Is food security a problem in communities?  Describe what a typical diet consists of among the community? Ask if there are any issues around purchasing or accessing meat, fish, fruit, vegetables etc	More.  yes.  No balanced diet.
5	Prevalence rates for sexually transmitted illness and disease (including HIV/AIDS)  How common are sexual health issues?	low.  Not common

6	Are there any issues regarding domestic or sexual violence in communities? What is the reason for this?	NO.
7	Average life expectancy for men and women  What are the most common reasons for death (men/women/children) and why	Men - 60-65 Women - 55-65. Life style.
8	Maternal and infant mortality rates  Are there any issues regarding maternal health and child birth?	NO. NO.
9	Are mental health issues common? What are the most common mental health issues? Why are these the most common?  Are they most common among women or men (what age group) and why? How are they addressed?	NO. NO.
10	Have you dealt with any incidents relating to Gender Based violence? Please explain	NO.
11	Are there issues with the quality of the environment and health? e.g., poor air quality (dust or odour), noise or road hazards. If so, how long has this been a problem and what is the main cause?	NO
12	Who are the most vulnerable people in communities? Why is this?	Children, Women.
Section G: Please insert any observations/comments regarding the meeting here		
1	Comments/observations (what went well/not so well, describe your observations of the health centre and facilities)	- Need electricity at the facility -
Section H: Insert photos here		
Please take some pictures of the meeting / facility with a <u>description below each photo</u> :		
		

## KII Education

**Facilitator Instructions:** The purpose of the meeting is to gather information on access to education, resources, educational performance and skills in the project area. Introduce yourselves, the project and explain the purpose of the meeting. Keep the discussion focused and please **probe** for explanations for responses (what, where, when, why, how). Take lots of pictures of the educational facility.

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Section A: General Information		Responses
1	Date and time of meeting	17/01/2022 at 2:20pm
2	Name of facilitators (inc note taker)	Said Lubu
3	Name of Organisation / Institution / Department	HON. ISACKO MEMORIAL BOYS
4	Type of facility (government, NGO, private) and level	GOVERNMENT.
5	Location/address of meeting County Sub-county	PO BOX 379- MARSABIT TURBI SUB COUNTY:
6	Name (s) / roles of participants	
Section B: The Project		
1	Have you heard of the project before? How/when/where (if not please explain)	Yes, through the national broadcasting media
2	How do you think that the project could positively impact on the community? How?	① The Project will definitely increase reduce Insecurity ② Improve the lightening system and improve the Vision.
3	What other impacts do you think that the project will have on the community and access to education?	① The Project will help the community at large by enabling preservation of food ② In terms of education, day scholars will have an easy time studying at night school
4	What do you think the project could do to avoid/minimize negative impacts?	The Project could install security lights along the streets within the community
5	Do you have any questions/comments regarding the project?	① Will the project be responsible for maintenance of the installed solar system within the institution?
Section C: Infrastructure and Resources		
1	How long have you worked in the school?	7 Years

Principal  
HON. ISACKO MEMORIAL  
BOYS HIGH SCHOOL  
P.O. BOX 397-68500  
MARSABIT  
17/01/2022

2	How many teachers are working at the school?	18 - teachers.
3	What are the things that you think are good and are working well at the school?	① The school dining hall, and other ② Infrastructure.
4	What are the main challenges at the school? How do you think these could be addressed?	① Water supply - The project could probably drill a borehole to serve the school within the school. ② Lighting system - Additional lighting infrastructure
	Are there any government /NGO initiatives in place to support the school/education system here?  If yes, what are these? Do you think this initiative will be successful?	① Yes. ① The supply of Textbooks by KLB through Ministry of Education. ② Supply of food stuffs by some NGOs
	What is the average distance a student walks to get to school?	N/A
	What is the furthest distance a student walks to get to school?	N/A
	Are the students provided with meals at school?	Yes
	How/where are teachers paid (how far do they have to travel to get to a bank to check if they have been paid or to withdraw money for living expenses)?	through banks which are accessible at Marsabit town which is about 42kms from school.
	How can you participate in the proposed project?	By ensuring that those working in the project have a conducive working environment.
	How will you be impacted by the project?	The project will ease the way of living since most of the issues that <del>relate</del> <sup>relate</sup> <del>depend</del> <sup>depend</sup> on supply of electricity will now be achieved by printing and cyber services.

	How can you support the project?	By providing conducive environment for the people who will be working/installing the systems provided by the project.
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**Section D: Curriculum**

1	<p>Are there any constraints to accessing education?</p> <p>Are there groups with more/less access than others? Especially the VMG?</p> <p>If yes, what are the reasons for this?</p> <p>In your opinion how could these differences be addressed?</p>	There are financial constraints since most of the students come from a humble background thus raising school fees is a challenge.
2	<p>Do boys achieve higher grades than girls or vice versa? Why is this?</p> <p>Are there any challenges in attendance of students (e.g., distance to school, provision of uniform or fees, domestic chores etc?)</p>	The school is a boys boarding high school.
3	What percentage of students go to higher education level?	30%

**Section E: Attendance**

1	<p>Total number of males and females attending the school.</p> <p>What is the sex ratio of students this school (% female - % male)?</p>	Boys -
2	<p>What are the attendance rates for males at each level?</p> <p>What are the attendance rates for females at each level?</p>	100% attendance for the boys. Since it's a boys boarding school.
3	<p>What are the completion rates for males?</p> <p>What are the completion rates for females?</p>	100% completion rate.

**Section F: Please insert any observations/comments regarding the meeting here**

1	Comments/observations (what went well/not so well, describe your observations of the school and facilities)	 <p>Stamp: PRINCIPAL HON. ISACKO MEMORIAL BOYS HIGH SCHOOL P.O. BOX 397-60500 MARSABIT</p> <p>Signature: [Handwritten Signature] ROBA</p> <p>Date: 12/01/2022</p>
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**Section G: Insert photos here**

Please take some pictures of the meeting / facility with a description below each photo:

**FGD Male**

**Facilitator Instructions:** The purpose of the meeting is to gather information on men's role in the household, livelihoods/jobs, health issues, challenges, perceptions on quality of life, education options for children, health care and project perceptions. Introduce yourselves, the project and explain the purpose of the meeting. Gather a representative sample of a maximum of 10 males that include a combination of youth, elderly and disabled where appropriate. Keep the discussion focused and please **probe** for explanations for responses (what, where, when, why, how). Take lots of pictures. **Ensure everyone participates in the discussion.**

Ministry of Energy (MoE) is coordinating the implementation of Kenya Off-grid Solar Access Project (KOSAP) for Underserved Counties in Kenya. The project is financed by the World Bank and implemented by the Ministry of Energy (MoE), Kenya Power and Lighting Company (KPLC) and Rural Electrification and Renewable Energy Corporation (REREC). The project aims at providing a comprehensive suite of investments to provide electric services to households, enterprises and community facilities and boreholes. We are undertaking an environmental and social impact study to gather information to understand the potential impacts of the project and gather feedback on the project. **Show the participants the projects layout**

Section A: General Information		Responses
1	Date and time of meeting	22/07/2022      Tues 10:02am
2	Name of facilitators (inc note taker)	Fred Wuba
3	Name of county	Marbabit
4	Name of location/sub-location County Sub-County	Bubisa location, South Horr Sub county
5	Number of participants	12
6	Describe the demographics/composition of the group (age range, ethnicity and any vulnerabilities)	Men over 36 years including respected members of community like Dabe
Section B: The Project		
1	Have you heard of the project before? How/when/where  Do you feel that you understand the project? (If not please provide an explanation and show the route map)	Yes - site visit by team in  Yes
2	What is your view on the project?  How do you think that the project could impact men in the community positively and negatively?	We really need the power for water pumping, cooking, lighting - watching T.V, cooking, water, cooking - paying of bills, Maintenance, damages
3	How do you think that the project could minimize or avoid negative impacts on men and the community?	- Minimising of bills since its use of solar power - only competent, electrician to be used during wiring
4	Do you have any questions/comments regarding the project?	- The wiring should be cheap - The power should be safe - locals should be trained to continue provide services to community
Section C: Role of men		

1	What roles do men typically undertake in the community? Please consider this in terms of the home and livelihoods.	- looking after livestock watering livestock & feeding fowls providing for the family by doing business
2	Do you think that men and women have equal opportunities in the community, workplace and education? (explain responses) Do you think it is easier for men than for women in the community or vice versa?	Men & women have equal opportunities
3	What resources do men mainly have control of compared to women? (eg land, assets, equipment) Please explain response	- livestock - land & other assets
4	Do men feel safe in the community?  Are there any particular crimes that are common in the community?  Have you experienced any conflicts in the community? Explain responses	Diseases, poverty, old age Drunkards jes - over resources like water, women pasture
5	Are there any special challenges that men face in the community?	- settling disputes
6	How do men receive information about local issues and developments, news etc in the settlement / local area?	Radio, phone, T.V
<b>Section D: Institutions / Community Development</b>		
1	Do you have any men's traditional/cultural groups? What are they called? What is the purpose of these groups?	Dabela, Itafu - leading prayers, Marriage ceremonies
2	What are the top three community development priorities/needs (number 1 being the top priority)? Please provide a reason for each.	1. roads - putting of culverts & bridges 2. water - piping of water pan tanks. 3. stone crusher project alternative livelihood eg. Annual Insurance - very reliable
<b>Section E: Economy/Income Generation, Health - level IV/V</b>		

1	<p>What are the main income generating activities in the area that men are engaged in? From which economic activity do you get the majority of your income?</p> <p>Second most important source of income?</p>	<p>Investment Business ✓ //</p>
2	<p>On average, do men tend to contribute more or less than women to household income? Why?</p>	<p>Both contribute depending on income/ even though men sometimes have more exp</p>
3	<p>What could men do to have greater economic opportunities in the area?</p>	<p>More education and skills to do different work like, electricity, welding</p>
4	<p>Do you have access to a bank/credit/savings account?</p>	<p>No.</p>

Section F: Land Use

1	<p>What are the land-based activities do men undertake? <u>Please complete the seasonal calendar at the back of the form.</u></p>	
2	<p>Do you practice Agriculture? YES/ <input checked="" type="radio"/> NO</p> <p>Do you rear livestock? <input checked="" type="radio"/> YES/ NO</p> <p>What are the main crops that you grow? What % of these is for household consumption and what % is for sale? If you sell crops, where do you sell them?</p>	<p>% for household N/A</p> <p>% for sale</p>
3	<p>Have there been changes harvesting seasons over the last 5 years? What is the reason for these changes?</p>	<p>N/A</p>
4	<p>What are the main animals that people keep in the community? Is this a subsistence activity or an income-generating activity?</p>	<p>camel, cattle, sheep, goats, chickens, donkeys (mostly concerning both subsistence and sale)</p>
5	<p>Do people move with their cattle? How often and how far?</p>	<p>Yes - 200KM - 500km</p>

6	<p>Are there any specific natural resources you collect? (eg timber, herbs, firewood and roofing, fruits, etc) that you rely on for subsistence and domestic use? What do you collect?</p> <p>Where do you get these from? Explore issues related to charcoal production as well as commercial extraction of natural resources</p>	<p>Stones, sand, firewood, water wild fruits, berries</p> <p>ND charcoal burning</p>
7	<p>Where does the community buy and sell agricultural produce? How far is the nearest market? What is the name of the market?</p>	<p>comes from Meru County</p>
8	<p><u>Have you experienced any conflicts in the community in relation to land?</u> Who was involved? What was the issue? How was it resolved? Are conflicts frequent? (explain response)</p>	<p>Yes - between 2 neighbouring communities still ongoing (conflict)</p>
9	<p>Are men involved in fishing, fish processing or trading of fish?</p> <p>What role to men play in fishing related activities?</p>	<p>N/A</p>
Section G: Education, Literacy and Training		
1	<p>How would you describe accessibility and quality of education for children in your community?</p> <p>How far are they (KM)? what are the names/levels of schools accessed</p>	<p>Good, but compared to down Kenya not that good no good reading materials</p> <p>6KM</p>
2	<p>Do most males in the community go to school? What level do they generally complete up to? Explain responses</p> <p>Are there factors that prevent boys accessing further education?</p>	<p>Yes - up to class 8.</p> <p>Yes - looking after livestock - early marriage</p>
3	<p>Can boys/men in the community generally read and write?</p>	<p>20% of people aged 36 years &amp; above</p>
Section H: Health		

1	How and where do you access healthcare?  Do the services available meet your needs?	Bugisa Health Centre. Not all services are available
2	What are the top 3 health problems that men face in the settlement? Please explain the reason for each of the health issues  Are there any particular times of the year where these issues are more challenging than others?	1. Cancer - salty water, chemical deposition, explosives, industrial board, vet. services 2. High blood pressure - life style 3. Diabetes - life style 4. Blindness - sun rays
3	If someone in the household is ill, how do you usually treat him/her? How do you treat sick elderly, children, men, women and PLWDs? Are there any disabled people in the community that require care?	- taking to hospital, (referral) - PLWDs have some small help but not adequate.

**Section I: Access to Water**

1	Where do you get your water for drinking, cooking, bathing and for livestock?	Description of water source	Walking distance from dwelling (KM)	Collection method (if applicable)	Description of quality/colour/taste/smell
	Drinking:	Borehole	3km	Tap	Good & some Salty
	Cooking:	"	"	"	"
	Washing dishes:	"	"	"	"
	Bathing:	"	"	"	"
	Livestock:	"	"	"	"
	Irrigation:				

2	Who in the household is responsible for water collection?	Women
3	If the community has a borehole, do they know when it was installed? Who installed it? Are there times of the year when the water runs out, have quality changes?	1956 - Colonial government [broke down Many times but repaired by community, runs throughout the year

**Section J: Sanitation and Hygiene**



1	What type of toilet facilities do households have? (e.g., community or private/household, ventilated pit latrine, un-ventilated pit latrine, hole in the ground, no latrine/use the bush etc)	not well covered, open de fannawo 115 pracheede
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**Hygiene & Waste**

1	Where/how do you wash your hands?	Note since corona some practice handwash simple from de fannawo
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**Section K: Access to Power**

1	What energy source do you use? Where are each of these sources these located (eg grid connection from the house, firewood, charcoal, kerosene, gas, solar etc)?	Type	Source of energy/power	Location
		Lighting:	solar	Bubsã
		Keeping warm:	firewood	!
		Cooking:	firewood	!
		Heating water:	firewood	!
		Charging mobile phones:	solar	!
		Cooling food:	Aeration	!

2	Do you face any challenges regarding access to power? Please explain?  What could be done to address these challenges?	Yes  provide more solar energy
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**Section L: Transport**

1	What are the main forms of transportation used within the community?  Please describe the quality/accessibility of transportation in the community	Mafatu, motor bike, camel  it has schedule time not always available
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**Section M: Telecommunications**

1	Do you have access to telecommunications? Explain the quality of service you receive	Safanoni fer] only 2oprus radios
2	Do you have access to internet? Explain the quality of service you receive	Yes -

**Section N: Cultural Heritage**

1	<p>What are the sacred/historical or religious sites in the area? Are these accessible to men?</p> <p>Where are they located?</p>	<p>Mosque, church, shrines even at home.</p> <p>in Bonbisa Town.</p>
2	<p>What are the main festivals or rituals undertaken in the community by men? Give details</p>	<p>Atkado, Korra, Somis.</p> <ul style="list-style-type: none"> <li>- prayer - Thanks giving</li> <li>- Marriage Ceremonies</li> </ul>
<p><b>Section O: Insert photos here</b></p>		
<p>Please take some pictures of the meeting with a <u>description below each photo</u>:</p>		

**FGD Female**

**Facilitator Instructions:** The purpose of the meeting is to gather information on women's role in the household, livelihoods/jobs, health issues, challenges, perceptions on quality of life, education options for children, health care and project perceptions. Introduce yourselves, the project and explain the purpose of the meeting. Gather a representative sample of a maximum of 10 women that include a combination of youth, elderly and disabled where appropriate. Keep the discussion focused and please **probe** for explanations for responses (what, where, when, why, how). Take lots of pictures. **Ensure everyone participates in the discussion.**

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Section A: General Information		Responses
1	Date and time of meeting	22/01/2022
2	Name of facilitators (inc note taker)	Lecy
3	Name of county Sub-County Location/Sub-location	Marsabit North Horr Bubusa
4	Name of location/sub-location	Bubusa
5	Number of participants	
6	Describe the demographics / composition of the group ( <u>age range, ethnicity and any vulnerabilities</u> )	18-35 - 50%, 40-50 - 50%, 70+ above - 20%
7	Number of female headed households in the group?	appx. 6 female h/household.
	What is the main reason for this?	- Men are allowed to marry many women -
Section B: The Project		
1	Have you heard of the project before? How/when/where  Do you feel that you understand the project? (if not please provide an explanation and show the site map)	Yes. last year  - security improvement - Road construction - charging phones - employment - - lighting in our household.
2	What is your view on the project?  How do you think that the project could impact women in the community positively and negatively?	- security - Regular service increase & deposits
3	How do you think that the project could minimize or avoid negative impacts on women and the community?	N/A
4	Do you have any questions/comments regarding the project?	① If you have default who will correct? Look for certified electrician. ② Who pay for the electricity? connectivity is 1kg payback to KPLC
Section C: Role of Women		
1	What roles do women typically undertake in the community? Please consider this in terms of the home and livelihoods.	- Cooking - fetch water, firewood. - Washing - look after livestock (sometimes)

2	Do you think that men and women have equal opportunities in the community, workplace and education?	No. Men are the head of the family and they are their providers of the family. - It's culture.
3	What resources do women mainly have control of compared to men? (e.g., land, assets, equipment) Please explain response.	No. Culture dictates
4	Do women feel safe in the community?  Are there any particular crimes that are common in the community?  Have you experienced any conflicts in the community? Explain responses	Yes
5	Are there any challenges that women and girls face in the community?  Are there any specific challenges that female headed households face?	Early marriages - - <del>Water</del> education be accessible to everyone to avoid illiteracy. - firewood (far distance)
6	How do women receive information about local issues and developments, news etc in the community?	- phone call - chief avail - village elders - Radio
7	Are the roles of women and men changing? How?	Yes: Women do alot; pay school fees : look after cattle This has change even meetings that they attend than earlier before.

Section D: Institutions / Community Development

1	Are women involved in decision making both at household and community level? If YES, how are they involved?	No They contribute to discussion but they don't decide.
2	Are any Non-Governmental Organisations, CBOs and FBOs working here?  If yes - which ones and what do they do? How successful have the projects been?	Pacida - water projects Ftt - pay school fees - Concern - health, food, immunisation, vaccines Greaters - funds
3	What are the top three community development priorities/needs (number 1 being the top priority)? Please provide a reason for each.	1. Hospital 2. Schools 3. Funds (business)

Section E: Economy/Income Generation

1	From which economic activity do women get the majority of income from? What is the second most important source?	Business eg shops, livestock, clothes (hawkers) - -vegetables -group loans
2	On average, do women tend to contribute more or less than men to household income? Why?	Women contribute more than men.
3	What could women do to have greater economic opportunities in this area?	Yes -school fees (pay) -they don't use drugs: eg mirra -Alcohol.
4	Do you have access to a bank/credit/savings account? If so, is it your own personal account or a joint account? Do you access mobile banking services (Mpesa, telecom cash) Do women have their own money at disposal? What do they spend it on most frequently?	-Group loans -Bank -Mpesa -Bank accounts
Section F: Land Use		
1	What is the main land-based activities that women undertake?	N/A.
2	Do you practice Agriculture? What are the main crops that you grow? What % are for household consumption and what % do you sell? If you sell crops, where do you sell them?	YES/NO Green house is but not profitable due to soil texture/type % Household consumption % For sale
3	What are the main animals that people keep in the community? Is this a subsistence activity or an income-generating activity?	-Camels -Goats -Cows -donkey -sheep
4	Do people move with their livestock? How often and how far?	Move with household - households
5	Do you collect natural resources (eg timber, herbs, firewood and roofing, fruits, etc) for subsistence and domestic use? Where do you get these from, how far? Explain the uses.	Firewood, far distance
6	Are women involved in business eg buying and selling of agricultural produce?? How far is the nearest market? What is the name of the market?	Yes: -selling of livestock (goats, sheep) - -just within Babusa (home to home)
7	Do you sell your labour or hire labour? If so, who to, where from, for how long? Do you participate in any labour sharing groups in the community?	N/A.

8	<p>Have you experienced any conflicts in the community? Who was involved? What was the issue? How was it resolved? Are conflicts frequent? (Explain response)</p>	None.
	<p>Do you experience GBV within the community?</p>	yes
	<p>If YES what are the most common types of GBVs in the households</p> <p>Do you have support centers for GBV cases (Govt, Non government)</p>	<p>husband/wife</p> <p>yes - concerns</p> <p>- Ftt</p>
	<p>What can be done to address to GBV in the locality?</p>	- to discuss with husband and settle them.
9	<p><u>If a fishing community/coastal region</u> - Are women involved in fishing, fish processing or trading of fish?</p> <p>What role do women play in fishing related activities?</p>	N/A.
Section G: Education, Literacy and Training		
1	<p>How would you describe accessibility and quality of education for women/girls in your community?</p> <p>How far are they (KM)? what are the names/levels of schools accessed</p>	<p>women - Gemburu</p> <p>girls - school.</p>
2	<p>Can girls/women in the community generally read and write?</p>	<p>yes</p> <p>- equal education with boys</p>
Section H: Health		
1	<p>How and where do you access healthcare?</p> <p>Do the services available meet your needs?</p>	<p>yes - Nurse 4</p> <p>No medication</p> <p>- Nurse laboratory.</p>
2	<p>What are the top 3 health problems that girls and women face in the settlement? Please explain the reason for each of the health issues</p> <p>Are there any particular times of the year where these issues are more challenging than others?</p>	<p>1. Chest pains      4. Cancer</p> <p>2. Asters</p> <p>3. Allergies</p>
3	<p>Are there any environmental issues that affect health in the community (e.g., water quality, sanitary conditions etc) Please explain</p>	<p>urinary burns</p>
4	<p>? Do you have access to family planning services for contraception and pre-post-natal services? Please Explain</p>	<p>Some's some explain and discuss with their men</p> <p>Some completely don't discuss, but they go ahead and have it.</p>

5	If someone in the household is ill, how do you usually treat him/her? How do you treat sick elderly, children, men, women and PLWDs? Are there any disabled people in the community that require care?	Hospital medication.
6	Do women in the area prefer traditional medicine or going to hospital?	Hospital.

**Section I: Access to Water**

1	Where do you get your water for drinking, cooking, bathing and for livestock?  Do you pay for water? (Site specific)		Description of water source	Walking distance from dwelling (KM)	Collection method (if applicable)	Description of quality/colour/taste/smell
		Drinking:	Borehole (2)	50m-1km	Tap	good. - Saline
		Cooking:	1/	1/	1/	1/
		Washing dishes:	2/			
		Bathing:	1/			
		Livestock:	3/			
		Irrigation:	1/	1/	1/	1/

2	Are there times of the year when water runs out, runs low or the quality changes? Please explain the water source and reason for the change in water levels?	- It there's depend on the working pump machine.
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**Section J: Sanitation and Hygiene**

1	What type of toilet facilities do households have? (eg community or private/household, ventilated pit latrine, un-ventilated pit latrine, hole in the ground, no latrine/use the bush etc).	pit latrine (individual).
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**Hygiene & Waste Management**

2	Do women have access to sanitary facility/product (e.g. sanitary towels)? Explain	yes @ 100%
3	How / where do people dispose of household waste? (Burn, dump, put in the river or sea, other - specify)	Dump them at pit latrines.

**Section K: Access to Power**

1	What energy source do you use? Where are each of these sources these located	Type	Source of energy/power	Location
		Lighting:		

(eg grid connection from the house, firewood, charcoal, kerosene, gas, solar etc?)

Keeping warm:		
Cooking:	firewood	veg waste (scrap)
Heating water:		
Charging mobile phones:	Solar Panda. Delight	Company
Cooling food:		

2	Do you face any challenges regarding access to power? Please explain?	Expensive Charging for long due to less power.
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**Section L: Transport and Communication**

1	What are the main forms of transportation used within the community?  Please describe the quality/accessibility of transportation in the community	Makadua to \$ from 400K Moto. Moring daily.
2	Are there telecommunication services in the area?	Safaricom

**Section M: Cultural heritage**

1	What are the sacred/ historical or religious sites in the area? Are these accessible to women?  Where are they located?	Church - catholic Aek. Mosque.
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## FGD Youth / Association

**Facilitator Instructions:** The purpose of the meeting is to gather information on the socio-economic situation of the youth in terms of participation in decision making, employment, recreation and aspirations. There should be no more than 10 participants. Keep the discussion focused and please **probe** for explanations for responses (what, where, when, why, how). Take lots of pictures.


Ministry of Energy (MoE) is coordinating the implementation of Kenya Off-grid Solar Access Project (KOSAP) for Underserved Counties in Kenya. The project is financed by the World Bank and implemented by the Ministry of Energy (MoE), Kenya Power and Lighting Company (KPLC) and Rural Electrification Authority and Renewable Energy Corporation (REREC). The project aims at providing a comprehensive suite of investments to provide electricity services to households, enterprises and community facilities and boreholes. We are undertaking an environmental and social impact study to gather information to understand the potential impacts of the project and gather feedback on the project. **Show the participants the layouts/models**

Section A: General Information		Responses
1	Date and time of meeting	22/01/2022   1000 HRS
2	Name of facilitators (inc note taker)	DICKSON A
3	County Sub-County Location/Sub-Location	MARSABIT   NORTH HORE   BUBISA
4	Location and Sub-Location	BUBISA - BUBISA
5	Name of Village	BUBISA
6	Number/gender of participants	Males: 7 Females: 0
Section B: The Project		
1	Have you heard of the project before? How/when/where (if not please explain)  Do you feel that you understand the project?	Informed by other members of community
2	What do you think could be the positive impacts of the project on youth, so that people benefit?	- Open business opportunities - shops welding photocopy - enhance/improve security - Enhance and improve health care
3	What other impacts to you think that the project could have on the youth and VMG communities?	- Increased levels of lightning causing injuries / property damage - Conflict may rise to household who are 3km from the project site
4	How do you think that the project could minimize or avoid negative impacts?	- For households 3km away from the plant will be provided with home solar system at subsidized cost. - No penalties or no defaults in away - it should be based on model payment
5	Do you have any questions/comments regarding the project?	Will the route be signed exchange for employment by contractor. - Yes it shall be mandatory that contractors give priority.
Section C: Overview		
1.	If a youth group - When was the youth group established? And what is the function?	Bubisa Youth Group (2017) - Membership programme.

2.	What are the key priorities among the youth? What are the main issues faced? Why?	Business → Lack of capital x Long droughts x Community conflicts x Lack of infrastructure investment
3.	To what extent do the youth play a role in decision making?  Do they feel that their voices are heard?	YES
4.	What programmes are in place to help the youth?  How successful have they been?	Pacta. - Created employment opportunities for maintenance of water treatment project - Building of social-hubs for gaming and training
Section D: Education		
1.	What approximate percentage of youths have completed secondary education?	40%
2.	What approximate percentage of youths have completed Vocational/colleges school?	30%
3.	What major skills do the youth feel they have that enable them to work?	Buying and selling of livestock
Section E: Unemployment		
1.	What approximate percentage of youths have full-time salaried jobs?	5%
Section F: Employment		
1.	What percentage of youths are self in employment?	2%
2.	What are the main jobs that the youth have?	Belebebe Inartour keeping Retail (shops) (Business)

<b>Section G: Recreation</b>		
1.	What do the youth do in spare time? Where do they go?	Gaming - football - Betting - pool table
<b>Section H: Please insert any observations/comments regarding the meeting here</b>		
1.	Comments/observations (what went well/not so well, was everyone participating, were there any vulnerabilities, how motivated were the youth to participated during the meeting?)	- We appreciate the programme, but we don't go lunch allowance.
<b>Section I: Insert photos here</b>		

## Appendix 7: Firm and Lead Expert's Practicing Licences



FORM 7 (r.15(2))

**NATIONAL ENVIRONMENT MANAGEMENT  
AUTHORITY (NEMA)**  
**THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT**  
**ENVIRONMENTAL IMPACT ASSESSMENT/AUDIT (EIA/EA) PRACTICING  
LICENSE**

License No : NEMA/EIA/ERPL/18263  
Application Reference No: NEMA/EIA/EL/23929

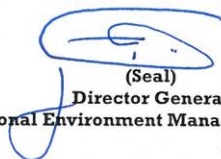
M/S **Norken International Limited**  
(individual or firm) of address  
P.O. Box 9882 - 00100 NAIROBI


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

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

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

Signature.....

  
(Seal)  
**Director General**  
**The National Environment Management Authority**

P.T.O.  
  
ISO 9001:2015 Certified



**nema**  
mazingira yetu | uhai wetu | wajibu 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/ERPL/18279

Application Reference No: NEMA/EIA/EL/23951

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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

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Signature.....

(Seal)

**Director General**

**The National Environment Management Authority**

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