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| **ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT REPORT FOR THE PROPOSED CHAKAMA OFF-GRID SOLAR PROJECT IN CHAKAMA LOCATION, KILIFI COUNTY**  **PROJECT: KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP)** **FOR UNDERSERVED COUNTIES**  **SUB-PROJECT: COMPONENT 1. MINI-GRIDS FOR COMMUNITY FACILITIES, ENTERPRISES, AND HOUSEHOLDS**  **DSC02615**  **2023** | | |
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# CERTIFICATION

This ESIA project report for the proposed Chakama Off-Grid Solar Projectwas 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.*

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# Abbreviations

**ACRONYM DEFINITION**

**ADR** Alternative Dispute Resolution

**AoI** Area of Influence

**CBOs** Community Based Organizations

**CoK** Constitution of Kenya

**CDI** County Development Index

**CEMP** Construction Environmental Management Plan

**CGRCs** County Grievance Redress Committees

**CRA** Commission on Revenue Allocation

**CSR** Customer Social Responsibility

**CIDP**  County Integrated Development Plan

**CPS** Country Partnerships Strategy

**DOSHS** Directorate of Occupational Safety and Health Services

**EHS** Environment Health and Safety

**EIA** Environmental Impact Assessment

**EPRA** Energy Petroleum Regulatory Authority

**EPT** Energy and Petroleum Tribunal

**EPRA** Energy and Petroleum Regulatory Authority

**ESI** Electrical Supply Industry

**ESIA** Environmental and Social Impact Assessment

**ESMF** Environmental and Social Management Framework

**ESMP** Environmental and Social Management Plan

**ESMMP** Environmental and Social Management and Monitoring Plan

**EMCA** Environmental Management and Coordination Act

**EMF** Electromagnetic Field

**FGD** Focus Group Discussions

**GDC** Geothermal Development Company

**GM** Grievance Mechanism

**GoK** Government of Kenya

**GRC** Grievance Redress Committee

**GRM** Grievance Redress Mechanism

**HDPE** High Density Poly Ethylene

**IAs** Implementing Agencies

**IPPs** Independent Power Procedures

**IPs** Indigenous Peoples

**JV** Joint Venture

**KETRACO** Kenya Electricity Transmission Company

**KII** Key Informant Interviews

**KOSAP** Kenya Off-Grid Solar Access Project

**KP** Kenya Power

**LEP** Labour and Employment Plan

**LGRCs** Local Grievance Redress committee

**MGs** Mini Grids

**MOE** Ministry of Energy

**MSDS** Material Safety Datasheet

**NEMA** National Environmental Management Authority

**NGOs** Non-Governmental Organizations

**NLC** National Land Commission

**NTSA** National Transport and Safety Authority

**OHS** Occupational Health and Safety

**OM** Operation and Maintenance

**OP** Operational Policies

**PAD** Project Appraisal Document

**PAPs** Project Affected Persons

**PCU** Project Co-ordination Unit

**PPAs** Power Purchase Agreements

**PPEs** Personal Protective Equipment

**PV** Photo-voltaic

**REREC** Rural Electrification and Renewable Energy Corporation

**RPF** Resettlement Policy Framework

**SA** Social Assessment

**SEA** Strategic Environmental Assessment

**SERC** Standards and Enforcement Review Committee

**SHS** Solar Home Systems

**SIA** Social Impact Assessment

**SOP** Safe Operation Procedure

**STDs** Sexually Transmitted Diseases

**STI** Science, technology and innovation

**SMMP**  Social Management and Monitoring Plan

**ToR** Terms of Reference

**VMGF** Vulnerable and Marginalised Groups Framework

**VMGs** Vulnerable and marginalized groups

**VMGP** Vulnerable and Marginalised Group Plan

**WB** World Bank

**WMP** Waste Management Plan

**WRA** Water Resources Authority

# EXECUTIVE SUMMARY

**E-1- Introduction and Project Brief**

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

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

In Kilifi County, one of the target counties, the Proponent is proposing to develop 2 No. mini grid facilities including Chakama 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 Chakama 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 Chakama site as a solar power facility, it falls within the medium risk project category as per the Kenyan legislative framework.

**E-3 Approach and Methodology**

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

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

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

**E-4 Legislative Regulatory Framework**

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

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

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

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

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

**E-5 Environmental Setting**

The project area in Chakama Sub-location, Kilifi County, the area is majorly semi-arid with a sparse population within the area. Kilifi County has four major topographic features. The proposed Chakama site is at the edge of the Nyika Plateau, which rises from 100m to 340m above sea level covering about two thirds of the county area on its western side

The county is divided into five Agro-Ecological Zones (AEZ) defining areas with similar production related characteristics such as annual mean temperatures, vegetation and humidity. The area’s ecological conditions are influenced by the soil type, altitude, vegetation, rainfall pattern and human activities. A major threat to the vegetation cover is the destruction caused by human activities as charcoal burning is the second most popular source of livelihood in the locality.

With regard to water quality in the locality, water is sourced from Galana River and a community well although its salty. The water drawn from the river is considered clean by the locals and is used for drinking and other domestic uses. Some community members also buy drinking water at 5 shillings per 20 litre jerrycan.

The county has a variety of soil types; vertisols, solonetz, cambisols, aerosols, ferrasols, luvisols, nitisols and fluvisols. The project site comprises of cambisols good for agriculture especially along the river for irrigation

**E-6 Project Description**

The Chakama Mini Grid project aims to provide electricity to approximately 554 residential and 7 non-residential consumers in Kanduru Village at Makongeni Sub-location, Chakama Location, Adu Ward in Kilifi County.

The project will utilize 126kWp solar photovoltaic panels, a 408kWh Battery Energy Storage System, and a 65kVA Diesel Generator with a 2000L capacity tank to generate electricity. A 13km Low Voltage Power Distribution Network will be established to distribute the power to customers. The estimated cost of the project is around USD $746,467, although this amount may change as more detailed plans are developed. It will have a 2km MV Network, a 100kVA step-up transformer, and a 50&50kvA step-down transformer.

The project consists of two main components: Hybrid Mini-Grids and a 13km 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.

**E-7 Project Alternatives**

Solar energy is identified as a non-polluting and site-specific option, and the proposed site for Chakama 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.

**E-8 Stakeholder Engagement**

It is important to highlight that two forms of stakeholder engagement were carried out for the project. The first form as noted earlier, focused on the acquisition of land for the project and involved the Proponent and the implementing agency (Kenya Power). 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 September 27, 2021, a total of 75 stakeholders attended. The meeting provided an opportunity to discuss project details, including the preliminary design, positive and negative impacts, and mitigation measures. Stakeholders were encouraged to share their views and provide feedback on the project. Some of the concerns raised by stakeholders included The PLWDs were concerned that they might be left out of the project as it has been the case with major development agendas in the area. Electrical safety; the community wants to be trained on the basic electrical and fire safety to mainly protect their children from any electrical shocks/ accidents. Issues of employment and the ability of the contractor to give the job opportunities to the locals especially the unskilled and semi-skilled. The study team addressed these concerns by assuring stakeholders that

* + Employment will be giving first priority to the locals as long as someone is able to work.
  + The community was advised to stay away from the construction site as there will be barring signages.
  + Safety awareness campaigns will be conducted.

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

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

On the negative side, the pre-construction phase involves minor impacts like land acquisition, while the construction phase encompasses various minor to moderate impacts such as vegetation clearance, soil erosion, dust emissions, and occupational health and safety concerns. Challenges related to stakeholder engagement, labour influx, child labour, 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, labour influx, child labour, gender-based violence, and exclusion of vulnerable individuals and households.

Tables 0-1 to 0-3 below present summaries of anticipated impacts and their corresponding levels of significance, both pre- and post-mitigation.

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

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

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

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

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

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

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

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

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

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

For the mitigation measures to be successful, it is imperative that the Kenya Power (KP) 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

# INTRODUCTION

## Project Background

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

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

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

## Context

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

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

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

The project components are:

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

## Institutional and Implementation Arrangements

The MOE provides overall coordination of the project as well as lead in the implementation of components 2 and 4. Components 1 and 3 (a&b) will be implemented by the Kenya Power (KP) and the Rural Electrification and Renewable Energy Corporation (REREC), respectively.

## Project Overview

The proposed project site is located in Kanduru village at Makongeni sub-location, Chakama location, Adu Ward in Kilifi County at latitude 3°7'10.68"S and longitude 39°37'58.96"E. The proposed solar mini grid will be located on a 0.7786 Hectares piece of land in Chakama Shopping center next to Chakama Primary School. The solar mini grid will comprise Solar panels, batteries, invertors, perimeter fence and length of 13 kilometers distribution line to cover a radius of approximately 1.5km. The project is expected to serve 561 consumers of which 554 are residential and 7 are non-residential.

The project will utilize 126kWp solar photovoltaic panels, a 408kWh Battery Energy Storage System, and a 65kVa Diesel Generator with a 2000L capacity tank to generate electricity. A 13km Low Voltage Power Distribution Network will be established to distribute the power to customers. The estimated cost of the project is around USD $746,467, although this amount may change as more detailed plans are developed. It will have a 2km MV Network, a 100kVA step-up transformer, and a 50&50kvA step-down transformer.

The project consists of two main components: Hybrid Mini-Grids and a 13km 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.

## ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT

### Justification for the ESIA

This Environmental and Social Impact Assessment on the proposed solar Mini-grid in Chakama 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 on 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.

### Objectives of the Study

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

Specific objectives of the study included;

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

### Scope of the ESIA study

The ESIA scope largely covered the following areas:

1. 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.).

1. 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.

1. 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,
2. Identification of Environmental impacts namely physical impacts, biological impacts and Legal Compliance.

## ESIA Methodology

### Kick-off Meeting

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

### Screening and Scoping

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

### Desk based review and baseline assessment

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

### Project Description

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

### Baseline Condition

This entails description and collection of relevant primary data within the project site’s bio-physical, socio-economic and cultural profile with respect to the biodiversity profile, land use types, cultural heritage and practices, social and economic issues likely to be affected, expected project activities to be involved during the design, construction and operation of the proposed facility. The information also includes description of the community social structure, employment and labour market, sources and distribution of income, cultural/religious sites and properties, vulnerable groups and indigenous populations. This also covers description of the sites’ physical environment including their topography, land cover, geology, climate and meteorology, air quality and hydrology. This entailed use of secondary data sources and for some specific environmental parameters the deployment of specialized equipment to measure and record the environmental readings as primary data for analysis and inclusion in the ESIA report. The ecological and biophysical environment will focus on describing the flora and fauna resident in the Kilifi county and at the mini-grid site level. This was be based on observation of flora and fauna, KPIs on local indigenous knowledge on historical and current status of rare, endemic and endangered plant and animal species known to occur in the project area. Vegetation assessment was done to gain an understanding of the mini-grid sites habitat type. This has provided for an in-depth description of existing land use type and their linked socio-economic activities.

### Public Consultations

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 project affected persons, 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 KP and also (KOSAP project implementation unit) officers.

### Impact Assessment (IA) Prediction

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

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

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

### Environmental and Social Management Plan (ESMP)

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

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

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

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

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

The figure overleaf is a summary of the methodology the consultant adopted in undertaking environmental and social impacts assessment for the proposed Chakama Solar Mini grid project.

* Preparation and Planning
* Desk Review of available reports and documents

**Inception Report**

* Stakeholders Consultation and Participation:
  + Key informant interviews
  + Focus Group Discussions (FGDs)

**Draft ESIA Reports**

Incorporation of Review Comments from Proponent/WB

*Deliverable 1*

*Deliverable*2

**Final ESIA Reports for the proposed Chakama Mini grid**

Deliverable 3

* Baseline Environmental and social data gathering
* Identification of Potential Impacts

Summary of mitigation & Management measures

Figure 1‑1: Summary of Environmental and Social Impact Assessment Methodology

## STUDY TEAM

This ESIA process was conducted by a team of experts that comprised the following professionals:

*Table 1‑1: ESIA Study Team*

|  |  |  |
| --- | --- | --- |
| **S/No** | **Names** | **Position** |
| **1** | Mark Oyier | Energy engineer, Ministry of Energy and Petroleum |
| **2** | Pius Nyaga | ESS, Kenya Power |
| **3** | Habel Mwarabu | County Renewable Energy Officer, Kilifi County. |
| **4** | Henry Karanja | Norken International Limited /Centric Africa Limited- EIA/EA Expert |
| **5** | Daniel Chumo | Norken International Limited /Centric Africa Limited- EIA/EA Expert |
| **6** | Lavina Omondi | Norken International Limited /Centric Africa Limited- EIA/EA Expert |
| **7** | Sharon Watiri | Norken International Limited /Centric Africa Limited- EIA/EA Expert |

## Layout of the Report

*Table 1‑2: Structure of the ESIA Report*

|  |  |  |
| --- | --- | --- |
| **SECTION** | **TITLE** | **DESCRIPTION** |
| ***Section 1*** | Introduction | Introduction to the Project and ESIA scope and methodology adopted. |
| ***Section 2*** | Project Description | Technical description of the Project & related infrastructure and activities. |
| ***Section 3*** | Applicable Legal and Regulatory Framework | Discusses the applicable environmental and social regulatory framework and its relevance for the Project. |
| ***Section 4*** | Baseline Settings- Environmental, Ecology and Social Baseline | Outlines Environmental, Ecology and Social Baseline status in the study area of the Project |
| ***Section 5*** | Stakeholder Engagement and Grievance Redress | Provides an overview of the stakeholder engagement activities undertaken during the ESIA, stakeholder categorization and profiling Additionally, it details the provision of Grievance Redress Mechanism for the project |
| ***Section 6*** | Impact Assessment and Mitigation Measures | This section includes details of identified environmental impacts and associated risks due to Project activities, assessment of significance of impacts and presents mitigation measures for minimizing and /or offsetting adverse impacts identified. |
| ***Section 7*** | Environmental and Social Management Plan | Outline of the ESMP taking into account identified impacts and planned mitigation measures and monitoring requirements. |
| ***Section 8*** | Impact Summary and Conclusion | Summary of impacts identified for the Project and conclusion of the study. |
| ***Section 9*** | Appendices |  |

# PROJECT DESCRIPTION

## Introduction

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

***Table 2‑1*** below provides a summary of the pertinent information of the proposed Chakama solar mini grid;

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

| **S. NO.** | **PARTICULARS** | **DESCRIPTION** |
| --- | --- | --- |
| 1. | Project location | The project is located in Kanduru Village near River Galana; Makongeni Sub-location, Chakama location, Adu ward in Kilifi County. Geographically, the site is located on latitude 3°7'10.68"S and longitude 39°37'58.96"E at altitude of 113 meters above the sea level. |
| 2 | Land Size/Tenure | The proposed solar mini grid will be located on a 0.7786 Hectares piece of land next to the Chakama Shopping Centre. The site is on public land under the county government |
| 3. | Mini grid Capacity | - PV Array (DC-kW) of 100kw; 200kWh Battery |
| 4. | Mini grid Power | LV Circuit of 13km |
| 5. | Distribution line | Approximately 13km |
| 6. | Target Consumers | 561 (554 Residential and 7 Non-Residential) |
| 7. | Climatic condition | Temperature ranges between 21°C and 30°C in the coastal belt and between 30°C and 34°C in the hinterland where the proposed site is situated. The average annual rainfall in the area ranges from 300mm in the hinterland to 1,300mm at the coastal belt. Evaporation ranges from 1800mm along the coastal strip to 2200mm in the Nyika plateau in the interior. The highest evaporation rate is experienced during the months of January to March in all parts of the county. |
| 8. | Site Conditions | The side is generally in open area with minimal fauna and flora at the end of the Chakama Shopping Centre. |
| 9. | Road Accessibility | Murram road. |
| 10. | River/canal/nallah/ pond present in project footprint | Sabaki/ Galana River, 1km North from the proposed site but accessed at about 3km away. |
| 11. | Estimated Project cost | USD 746,467 |

## Project Location

The project site is located in Kanduru village near River Galana; Makongeni Sub-location, Chakama location, Adu ward in Kilifi County. Geographically, the site is located on latitude 3°7'10.68"S and longitude 39°37'58.96"E. The proposed power MG will be constructed on approximately 0.7786 Hectares of land at the shopping centre next to Chakama Primary School. The proposed project is situated about 70km from Malindi Town. The site is neighboured by Chakama Shopping Centre and Chakama Primary School. The site soil is primarily sandy loam within the area

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



Figure 2‑1: Project location



*Plate 1: Project location, edge of Chakama centre*

## Description of Project Facilities, Components and Activities

### Project Components

#### Solar PV modules

The project will utilize 126kWp solar photovoltaic panels, a 408kWh Battery Energy Storage System, and a 65kVa Diesel Generator with a 2000L capacity tank to generate electricity. A 13km Low Voltage Power Distribution Network will be established to distribute the power to customers. The estimated cost of the project is around USD $746,467, although this amount may change as more detailed plans are developed. It will have a 2km MV Network, a 100kVA step-up transformer, and a 50&50kvA step-down transformer.

The project consists of two main components: Hybrid Mini-Grids and a 13km 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.

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

#### Battery Energy Storage System

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

#### Inverters

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

#### Distribution lines

Chakama site will have a distribution line circuit of 13km 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 KP 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 KP requirements/specifications.

#### Project Activities

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

#### Construction Procedures

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

The project inputs will include the following;

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

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

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

**Construction activities will include the following:**

**-**Contractor mobilization;

**-**Site Preparation;

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

**-**Storage of PV modules delivery and their installation;

**-** Laying of internal electrical connections;

**-** Installation of inverters and Battery Energy storage system;

Table 2‑2: Summary of project component details

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Monthly Energy Demand (kWh)** | **Daily Energy Demand (kWh)** | **Peak demand (kW)** | **PV Capacity (kWp)** | **Battery Capacity (kWh)** | **PV Inverter (kW)** | **Generator Capacity (kVA)** | **Fuel Tank for diesel generator (Litres)** | **LV Network (km)** | **MV Network (km)** | **Transformer Step-up (KVA)** | **Transformer Step-down (KVA)** | **TOTAL BUDGET ESTIMATE ($)** |
| 13,568 | 452 | 52 | 126 | 408 | 105 | 65 | 2,000 | 13 | 2 | 100 | 50 & 50 | $ 746,467 |

#### Project Cost

The proposed project will have 561 consumers both residential and commercial. It will cover a Circuit of 13km with PV arrays of 126 kW. There will be backup of 65kvA diesel generator and 408kwH batteries. The project is projected to cost USD 746,467.

#### Land Tenure

Land ownership in Kilifi can be categorized into three main categories namely; Public land, community land or and private land. Chakama site is on public land under the county government of Kilifi. The land is unoccupied and has been acquired by the project proponent for mini grid construction.

#### Compensation Details

Compensation for the acquired land for the proposed project will be in kind, the Proponent will undertake project chosen by the community in either education, health or water sectors. The project settled upon will depend on the value of the project in relation to the value of the land acquired as detailed by NLC. In Chakama, the community requested these projects in order of priority:

* Construction and furnishing of a maternity wing at the Chakama Dispensary;
* Improvement of existing water supply source by installing a desalinization unit,
* Construction of 2 number classrooms in Chakama Primary School.

## Resource Requirement

### Workforce Requirement

The solar mini-grid will be installed, operated and maintained by the contractor for the first seven years and then handed over to KPLC engineers and operators. So, for the seven years KPLC will be monitoring the operations of the Operation and Maintenance contractor.

### Water Requirement and Source

#### Construction Phase

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

#### Operation Phase

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

### Raw Material Requirement

#### Construction Phase

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

#### Operation Phase

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

### Power Requirement

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

### Fire Safety and Security

#### Construction Phase

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

#### Operation Phase

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

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

### Electrical safety

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

### Access to the Site

It is proposed that the Chakama Solar Mini-grid will have one access road, which will be designed according to KP’s standards, taking into account the Ministry of Road’s requirements. The Solar Mini-grid will be accessed via the existing murram road. However, a proper access to the site and drainage will be constructed to safely access the Mini -grid site and to avoid flooding.

### Fencing and Security

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

### Vegetation Undergrowth

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.

## Analysis of Alternatives and Project Justification

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

### Present Power Supply Position

In Kilifi county, wood fuel is the main source of energy relied upon by 80% of the population. Access to electricity and solar energy technologies is estimated at 21% and 6% respectively. Ministry of Energy has installed solar systems in health facilities, schools and watering points. Other sources of energy include paraffin, LPG and biogas. The county government of Kilifi needs to invest in solar power which remains a sustainable option for lighting up rural and remote areas of the county and that the sector has the potential to drive economic development in the county. With an arid climate and a vast desert landmass, Kilifi is geographically optimal for harnessing the solar power.

### Alternative Location for Project Site

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:

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

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

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

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

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

6. The Land identified should be on spaces set aside for public use within the community centres.

Chakama was identified as the most suitable area for the establishment of the proposed Mini grid based on the following factors:

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

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

### Alternative Sources of Energy

The possible alternatives to generating electrical energy could be wind power, thermal power, fossil fuel and firewood. Power import from neighbouring countries is another option.

#### Wind Power

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 Chakama residents is technically and financially challenging.

#### Thermal Power Generation

Thermal power through installation of Diesel Gen Sets is an option which can be considered to provide power to Chakama. This would need more than 250-300litres of Industrial Diesel Oil (IDO) is burnt daily to generate targeted 126kWp of electricity at Chakama. Thermal generation can be fuelled using alternative fuels such as natural gas, bio diesel, industrial kerosene, heavy vehicle fuel, coal and unleaded petrol and not a viable option for Chakama. Thermal power generation is also associated with serious environmental impacts like air pollution, waste pollution, noise pollution hence the need for the installation of the proposed solar power plant.

#### Wood Fuel

Wood fuel is the greatest source of Energy contributing to 80% of energy requirements in Africa. Over reliance on wood has led to deforestation, desertification, global warming and climatic change among other socio – economic demerits.

### Zero or No Project Alternative

The No Project option in respect to the proposed project implies that the status quo is maintained. This option is the most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions. This option will however, involve several losses both to Chakama village and Kilifi 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 socio-economic status of the target communities and local economy would remain unchanged.
* Generation of employment opportunities through expansion of business activities that would have been spurred by availability of electric power will not occur
* Opening up the area for investors will not occur.
* Health benefits that come with electricity will not be realized
* The targeted consumers will forgo the desired electricity supply in the area
* The country won’t meet its energy requirement
* The objectives of the government’s efforts towards achieving Vision 2030 will not be realized.

From the analysis above, it becomes apparent that the No Project alternative is no alternative to the target community in Chakama, Kilifi County, Kenyan Government and Investors.

### Analysis of Alternative Construction Materials and Technology

The proposed project will be constructed using modern, locally and internationally accepted materials to achieve public health, safety, security and environmental aesthetic requirements. Equipment that guarantees efficient use of locally available materials will be encouraged to ensure reliability in supply with minimum power loss and good design to allow efficient distribution of power in the area.

The support structures in the Solar Mini-grid can be wooden or steel. Because of its durability and strength, steel is the best choice and all support structures will be steel. Perimeter fence can be a reinforced wire mesh fixed to support structures that can be wooden, concrete or steel. Alternatively, a stone perimeter wall can be constructed and this is the option of choice since it is more durable, offer better protection and requires less maintenance.

The design of the solar mini-grid will be easy to install and dismantle with minimum labor requirements and maintenance costs will be minimal. The process material that are input for the proposed project such as generator diesel fuel and oil and water for cooling the generator and for cleaning purposes are critical elements. There is no alternative for generator oil and water for standby generator cooling and for mini-grid facilities cleaning water.

### Conclusion

Based on the above-mentioned suitability criteria and technical requirements, the proponent decides to put up the Solar Mini-grid within Chakama. Relocation option to a different site is a costly venture, may take a long time, additionally there is no guarantee that the land would be available in the targeted area.

Solar energy is the 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.

# APPLICABLE LEGAL AND REGULATORY FRAMEWORK

## Introduction

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

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

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

## Kenya Electricity Supply Industry (ESI)

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

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

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

* **The Energy and Petroleum Regulatory Authority (EPRA):** established by the Energy Act of 2019. The EPRA’s mandate extends beyond electricity and includes natural gas (including petroleum), renewables and all other forms of energy. The generation, transmission, distribution, supply, import and export of electricity can only be carried out by parties in possession of a license or a permit issued by the EPRA. In the event that the capacity involved is for own use and less than 1 MW, authorization is not required. Although the generated electricity is expected to be less than 1 MW (0.3 – 1 MW), the fact that the generated electricity is intended for use in a factory and there is a possibility for connection to the national grid and sale of excess power to the government, the project requires a license from the EPRC to generate electricity as stipulated in the Energy Act, 2019.

The Energy and Petroleum Regulatory Authority (Authority) together with industry stakeholders have developed the Draft Energy (Mini-Grid) Regulations, 2021 (the ‘Regulations’). The Regulations have been developed within provisions 10, 11 and 208 of the Energy Act, 2019 (the ‘Act’) and shall constitute Regulations to the Act. The Regulations will amongst others, provide guidance to mini-grid developers and other stakeholders on the tariff approval and licensing requirements. This will be directly applicable to the Chakama site.

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

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

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

## National Legal Framework rEVIEW

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

### Role of Institutions

*Table 3‑1: Institutional Roles*

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

### National Laws and Policies

*Table 3‑2: Legal framework National*

| **No** | **Legislation/**  **Guidelines** | **Description of the Legislation/Guideline** | **Relevance of the legislation/regulations in terms of license, permits, and other requirements** |
| --- | --- | --- | --- |
|  | **NATIONAL POLICY FRAMEWORK** | | |
|  | 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. |
|  | The Poverty Reduction Strategy Paper (PRSP) of 2001 | The PRSP has the twin objectives of poverty reduction and enhancing economic growth. The paper articulates Kenya ‘s commitment and approach to fighting poverty; with the basic rationale that the war against poverty cannot be won without the participation of the poor themselves. | The proposed project aims at provision and access of renewable electricity geared towards improved economic performance and thus will contribute to poverty alleviation in the project area. |
|  | National Environmental Action Plan (NEAP) of 1994 | The NEAP for Kenya was prepared in mid 1990s. It was a deliberate policy whose main effort is to integrate environmental considerations into the country ‘s economic and social development. The integration process was to be achieved through multi-sectoral approach to develop a comprehensive framework to ensure that environmental management and the conservation of natural resources forms an integral part of societal decision-making. | The NEMA does not approve a development project unless the impacts of the proposed project are evaluated and mitigation measures proposed for incorporation in the project ‘s development plan, which is in line with the requirements of the NEAP.  The project will be reviewed by NEMA for approval before implementation. |
|  | Environmental and Development Policy (Session Paper No.6 1999) | As a follow-up to the foregoing, the goal of this policy is to harmonize environmental and developmental goals so as to ensure sustainability. The paper provides comprehensive guidelines and strategies for government action regarding environment and development.  The Government will:  1. Ensure Strategic Environment Assessment (SEA), Environmental Impact Assessment, Social Impact Assessment and Public participation in the planning and approval of infrastructural projects.  2. Develop and implement environmentally-friendly national infrastructural development strategy and action plan.  3. Ensure that periodic Environmental Audits are carried out for all infrastructural projects | The proponent:   * is undertaking an Environmental Impact Assessment, Social Impact Assessment and Public participation as part of the planning and approval of infrastructural projects. * Will ensure that periodic Environmental Audits are carried out for the project |
|  | The Gender and Development Policy (Sessional paper no.2 2019) | The overall goal of this policy is to achieve gender equality by creating a just society where women, men, boys and girls have equal access to opportunities in the political, economic, cultural and social spheres of life.  The anticipated outcome of this policy as enshrined in the Constitution that aligns to the project include:  a) Equality and economic empowerment will be of both genders,  b) Women and men will have equality of opportunity to participate in decision making and to contribute to the political, social, economic and cultural development agenda;  c) Sexual and Gender based Violence will abate and men, women, boys and girls will live with dignity | In the absence of appropriate measures, the project can exacerbate gender inequalities and sexual and gender-based violence. In adherence to this policy, measures will be put in place to:   * + ensure gender inclusivity in decision making, employment opportunity and access to the energy generated from the Mini-Grid   + mitigate social risks including sexual and gender-based violence, and any form of discriminations |
|  | The HIV/ AIDS Policy 2009 | In summary, the policy aims at:  i. Establishing and promoting programmes to ensure non-discrimination and non- stigmatization of the infected;  ii. Contributing to national efforts to minimize the spread and mitigate against the impact of HIV and AIDS;  iii. Ensuring adequate allocation of resources to HIV and AIDS interventions; | The proposed project is to be implemented in a rural setting at Chakama 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. |
| 1. **NATIONAL LAWS** | | | |
|  | The Constitution of Kenya | Article 42 of the Bill of Rights of the Kenyan Constitution provides that ‘every Kenyan has the right to a clean and healthy environment, which includes the right to have the environment protected for the benefit of present and future generations through legislative and other measures’ | * The provision of the constitution also encourages public participation and dispute resolution * The ESIA Studies has identified project impacts for implementation of appropriate mitigation measures. * The ESIA has undertaken public participation, stakeholder engagement. This will be continuous during all project phases |
|  | 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. |
|  | L.N. 101: EIA/EA REGULATIONS, 2003 AND 2016 AMENDMENTS | These regulations provide the framework for undertaking EIAs and EAs in Kenya by NEMA licensed Lead Experts and Firms of Experts. An EIA or EA Study in Kenya is to be undertaken by a firm duly licensed by the National Environmental Management Authority (NEMA). The EIA/EA Regulations also provide information to project proponents on the requirements of either an EIA or EA as required by the EMCA. | The proposed project is subject to relevant provisions of these regulations and subsequently, the ESIA has been undertaken in accordance with the requirements. |
|  | L.N. 120: WATER QUALITY REGULATIONS, 2006 | These regulations provide for the sustainable management of water used for various purposes in Kenya. For effluent discharges into the environment and aquatic environment, a Proponent needs to apply directly to the NEMA. For discharges into public sewers, a Proponent needs to apply for the license to the relevant county. The regulation contains discharge limits for various environmental parameters into public sewers and the environment. | These regulations will apply to the proposed project during the construction and operational phases. The contractor will be required to properly manage the effluent from construction activities in accordance with the above regulations prior to discharge into the environment. |
|  | L.N. 121: WASTE MANAGEMENT REGULATIONS, 2006 | These regulations are comprehensive and cover the management of various kinds of waste in Kenya. Generally, it is a requirement under the regulations that a waste generator segregates waste (hazardous and non-hazardous) by type and then disposes the them in an environmentally acceptable manner. Under the regulation, it is a requirement that waste is transported using a vehicle that has an approved “Waste Transportation License” issued by NEMA. Wastes generated in Kenya must be disposed of in a licensed disposal facility. Such a facility will require annual environmental audits to be undertaken by NEMA registered Lead Experts.  The regulation requires that prior to generating any hazardous waste, a proponent shall undertake an EIA Study and seek approval from the NEMA. Labelling of hazardous wastes is mandatory under the regulation and the specific labelling requirements are provided in Rule 18. The treatment options for hazardous waste disposal provided in Rule 19 include incineration or any other option approved by the NEMA. | During the construction and operation phases, the proposed project will generate various streams of wastes. For the most part, it is expected that the wastes will be non-hazardous in nature and can be disposed of in accordance with these regulations. |
|  | L.N. 61: NOISE AND EXCESSIVE VIBRATION CONTROL REGULATIONS, 2009 | The general prohibition of these regulations states that no person shall make or cause to be made any loud, unreasonable, unnecessary, or unusual noise which annoys, disturbs, injures, or endangers the comfort, repose, health, or safety of others and the environment.  The regulations further provide factors that will be considered in determining whether or not noise and vibration is loud, unreasonable, unnecessary, or unusual. | Rules 13 and 14 of the regulations define the permissible noise levels for construction sites. These noise limits will be applicable to the proposed project. |
|  | LICENSES AND PERMITS REQUIRED UNDER THE EMCA | The subsidiary legislations under the EMCA are partially monitored through the use of permits and licenses. Subsequently all licenses and permits required during the construction phase shall be the responsibility of the individual contractors and their agents. During the operational phase, all permits and licenses required to operate the project will be the responsibility of the proponent. | The subsidiary legislations under the EMCA requires some or all the following types of permits to be available for inspection during the construction and operational phases of the project:   * Effluent Discharge License under Legal Notice 120: The Environment Management and Coordination (Water Quality) Regulations 2006; * Waste Transport License under Legal Notice 121: The Environment Management and Coordination (Waste Management) Regulations 2006 for disposal of all types of wastes; and * Noise Permit under Legal Notice 61: The Environment Management and Coordination (Noise and Excessive Vibration Control) Regulations, 2009. |
|  | OCCUPATIONAL HEALTH AND SAFETY ACT, 2007 | The Occupational Safety and Health Act (OSHA) was enacted to provide for the health, safety and welfare of persons employed in workplaces, and for matters incidental thereto and connected therewith.  Part II of the Act provides the General Duties to which the occupier must comply with respect to health and safety in the workplace. Such duties include undertaking safety and health (S&H) risk assessments, S&H audits, notification of accidents, injuries and dangerous occurrences. A number of sections under this part shall be applicable to the proposed project.  Part IV deals with the enforcement provisions that Directorate of Occupational Safety and Health Services (DOSHS) has under the Act. It discusses the instances when Improvement and Prohibition Notices can be issued as well as the powers of Occupational S&H officers. This part of the Act will be mandatory for the occupier to comply with for the proposed project.  Part V of the Act requires all workplaces to be registered with the DOSHS. This part will be applicable for the proposed project as the Occupier will have to apply for registration of their project with the DOSHS on completion of the construction phase and before the operational phase of the project.  Part VI of the Act lists the requirements for occupational health provisions which include cleanliness, ventilation, overcrowding, etc. This section of the Act will apply to the Occupier during the operational phase of the project.  Part VIII of the Act contains provisions for general safety of a workplace, especially fire safety. This part of the Act will apply to the proposed project during the design, construction, and operational phases.  Part X of the Act deals with the General Welfare conditions that must be present during the construction and operational phase of the project. Such conditions include first aid facilities, supply of drinking water, accommodation for clothing, ergonomics, etc. This part of the Act will apply to the proposed project during the construction and operational phases.  Part XI of the Act contains Special Provisions on the management of health, safety, and welfare. These include work permit systems, PPE requirements and medical surveillance. Some sections of this part of the Act will be applicable to the proposed project during the construction and operational phase.  Part XIII of the Act stipulates various fines and penalties associated with non-compliance with the Act. It includes those fines and penalties that are not included in other sections of the Act and will be important for the Occupier to read and understand the penalties for non-compliance with S&H provisions.  Part XIV of the Act is the last section of the Act and contains miscellaneous provisions which are not covered elsewhere in the Act. Some sections under this part of the Act will apply to the proposed project and it is in the interest of the occupier to read, understand, and ensure compliance. | The proposed project will be undertaken in compliance with the OSHA-2007 during the construction, design, and operational phases.  During the construction phase, the contractors will be required to fully comply with the requirements of Legal Notice 40 titled: Building Operations and Works of Engineering Construction Rules, 1984 (BOWEC). Each contractor will develop and implement a formal construction health and safety plan for the entire construction phase duration in alignment with the OSHA and international health and safety best practices. |
|  | L.N. 31: The Safety and Health Committee Rules, 2004 | These rules came into effect on April 28, 2004, and require that an Occupier formalise a S&H Committee if there is a minimum of 20 persons employed in the workplace. The size of the S&H Committee will depend on the number of workers employed at the place of work.  For the Proponent and Contractor, the OSHA and the S&H Committee Rules 2004 are important as they require compliance with the following measures:   * + Posting of an Abstract of the Factories and Other Places of Work Act in key sections of each area of the factory or other workplace;   + Provision of first aid boxes in accordance with Legal Notice No. 160 of 1977;   + Ensuring that there are an appropriate number of certified first aiders trained by an approved institution and that the certification of these first aiders is current;   + Provision of a General Register for recording, amongst other things, all incidents, accidents, and occupational injuries;   + Appointment of a S&H Committee made up of an equal number of members from management and workers based on the total number of employees in the workplace;   + Training of the S&H Committee in accordance with these rules; and   + Appointment of a S&H management representative for the Proponent. | The contractor will be required to constitute Health and Safety Committee to oversee safety and health at the construction site. The number of the committee members will be dictated by the number of staffs hired by the contractor. The S&H Committee must meet at least quarterly, take minutes, circulate key action items on bulletin boards, and may be required to send a copy of the minutes to the DOSHS provincial office.  Appropriate recordkeeping including maintenance of all current certificates related to inspection of critical equipment such as air compressors, lifts, pulleys, etc. Such inspections need to be undertaken by an approved person registered by the Director of the DOSHS. |
|  | L.N. 24: Medical Examination Rules, 2005 | These rules provide for Occupiers to mandatorily undertake pre-employment, periodic, and termination medical evaluations of workers whose occupations are stipulated in the Eighth Schedule to the OSHA and the First Schedule to this Rules. Workers that fall under the above two schedules are required to undergo medical evaluations by a registered medical health practitioner duly registered by the DOSHS. | Some construction activities such as metal cutting and grinding, repair or maintenance of construction equipment could expose the construction workers during construction phase and operations and maintenance workers during operation phase to physical and chemical hazards the contractor should that the workers exposed to such hazards undergo requisite medical examinations as required by these rules |
|  | L.N. 25: Noise Prevention and Control Rules, 2005 | The rules set the permissible level for occupational noise in any workplace (which includes construction sites) as follows:  • 90 dB(A) over an 8-hour time weighted average (TWA) period over 24-hours; and  • 140 dB(A) peak sound level at any given time.  Additionally, the rules set permissible limits for community noise levels emanating from a workplace as follows:  • 50 dB(A) during the day; and  • 45 dB(A) at night.  The Proponent is to ensure that   * any equipment brought to the site for use shall be designed or have built-in noise reduction devices that do not exceed 90 dB(A). * those employees that may be exposed to continuous noise levels of 85 dB(A) are medically examined as indicated in Regulation 16. If found unfit, the occupational hearing loss to the worker will be compensated as an occupational disease. | It is expected that during the construction phase of the project, there may be plant equipment that exceeds the threshold levels of noise stipulated under the Rules. It will therefore be incumbent on the contractor and his or her sub-contractors to ensure that their equipment is serviced properly and/or use equipment that complies with the threshold noise values given above. Alternatively, each contractor will be required to develop and implement a written hearing conservation programme during the construction phase. |
|  | L.N. 59: Fire Risk Reduction Rules, 2007 | A number of sections of the rules apply to the proposed project as enumerated below.  • Regulation 5 requires Proponents to ensure that fire resistant materials are used for construction of new buildings. A number of minimum specifications of materials are provided in this rule.  • Regulation 6 requires that all flammable materials be stored in appropriately designed receptacles. Some of the flammable materials anticipated at the project site including; fossil fuel using running construction equipment and vehicles (during construction phase) and stand by generator (operation phase)  • Regulation 7 requires that all flammable storage tanks or flammable liquid containers be labelled with the words “Highly Flammable” in English or Swahili. It is therefore practical for the Proponent to use a system similar to the Hazardous Material Identification System of labelling their product containers. The regulation requires a Proponent to consult the product’s MSDS for appropriate labelling requirements.  • Regulation 8(3) requires a Proponent to have a Spill Prevention, Control, and Countermeasures (SPCC) plan. This may be important if there will be chemicals stored in the refuelling area at the construction site.  • Regulation 16 requires Proponents to ensure that electrical equipment is installed in accordance with the respective hazardous area classification system. It is also a requirement that all electrical equipment is inspected every six months by a competent person and the Proponent is required to keep records of such inspections.  • Regulation 22 provides a description of the functions of a fire-fighting team.  • Regulation 23 requires Proponents to mandatorily undertake fire drills at least once a year.  • Regulation 33 requires Proponents to have adequate fire water storage capacity. As a minimum this regulation requires Proponents to have at least 10 cubic meters of dedicated fire water storage capacity.  • Regulation 34 requires Proponents to develop and implement a comprehensive written Fire Safety Policy. This policy should contain a Fire Safety Policy Statement signed by the CEO, a Fire Safety Policy Manual and a brief summary of the Fire Safety Policy of the company.  • Regulation 35 requires a Proponent to notify the nearest Occupational S&H area office of a fire incident within 24 hours of its occurrence and a written report sent to the Director of DOSHS within 7 days. | The proponent is expected to comply with the requirements of L.N. 59: Fire Risk Reduction Rules, 2007 by   1. Carrying out, and record, a fire risk assessment identifying any possible dangers and risks. 2. Reducing, or where possible remove, the risk of fire and take precautions to deal with the remaining risks. 3. Putting in place protection measures if there are flammable or explosive materials used or stored on the premises. 4. Developing an emergency plan should a fire occur which includes evacuation procedures etc |
|  | THE ENERGY ACT, 2019 | The Energy Act deals with all matters relating to all forms of energy including the generation, transmission, distribution, supply, and use of electrical energy, as well as the legal basis for establishing the systems associated with these purposes. The Energy Act also established Energy and Petroleum Regulatory Authority (EPRA) in place of the Energy Regulatory Commission (ERC), whose mandate is to regulate all functions and players in the energy sector. One of the duties of the EPRA is to ensure compliance with environmental, health, and safety standards in the energy sector, as empowered by Section 99 of the Energy Act, 2019. In this respect, the following environmental issues will be considered before approval is granted:   * The need to protect and manage the environment and conserve natural resources; and * The ability to operate in a manner designated to protect the health and safety of the project employees, the locals, and other potentially affected communities.   An ESIA approved by NEMA must support licensing and authorisation to generate and transmit electrical power.   * Part VI Section 121 (1a) stipulates that the EPRA shall, before issuing a license, take into account the impact of the undertaking on the social, cultural or recreational life of the community. * Part VI Section 121(1b) stipulates that the EPRA shall, before issuing a license, take into account the need to protect the environment and to conserve natural resources in accordance with the Environmental Management and Coordination Act. * Part VI Section 136 (1a) stipulates that it shall be the duty of a transmission licensee to operate, maintain (including repair and replace if necessary) and protect its transmission grid to ensure the adequate, economic, reliable and safe transmission of electricity; and | The proponent is in line with the Energy act regulations in the following ways;   * The proponent has identified an available site * alignment of the Mini-Grid Project to County development plans; * the Mini-Grid proponent has the technical and financial capability to conduct the project * The proponent has conducted the necessary engagement with the community. |
|  | THE ENERGY (SOLAR PHOTOVOLTAIC SYSTEMS) REGULATIONS, 2012 | These regulations shall apply to a solar PV system manufacturer, importer, vendor, technician, contractor, system owner, a solar PV system installation and consumer devices.  The Regulations prohibits any person from designing or installing any solar PV system unless he/she is licensed by EPRA. | The Regulations regulates, the design and installation of PV systems. The Proponent will ensure that persons engaged in the designing and installation of the Mini-Grid are licensed by EPRA |
|  | THE PUBLIC HEALTH ACT (CAP. 242) | The Act prohibits the project proponents from engaging in activities that cause environmental nuisance or those that cause danger, discomfort or annoyance to inhabitants or is hazardous to human and environmental health and safety. | The proponent will be in line with the regulations of this act and will ensure suppression of infectious diseases and maintain proper sanitation during all the phases of the project. |
|  | COMMUNITY LAND ACT, 2016 | This Act is critical for the proposed project is within community land. Section 6(1) of the Act provides that ‘county governments shall hold in trust all unregistered community land on behalf of the communities for which it is held’. Furthermore, Section 6(2) maintains that ‘the respective county government shall hold in trust for a community any monies payable as compensation for compulsory acquisition of any unregistered community land’. Therefore, the proposed project can access land or water resources in community land that may be unregistered and pay compensation to the County Government which the law authorizes to hold such monies in trust for the communities.  Section 30(1) states that ‘Every member of the community has a right to equal benefit from community land’. Section 26(1) provides that ‘a community may set aside part of the registered community land for public purposes’ and Sub-section (2) holds that ‘where land is set aside for public purposes under Sub-section (1), the (Land) Commission shall gazette such parcel of land as public land’. This provisions offer a window for the proposed project to acquire land for project works legally for communities as necessary and to convert the same into public land. This is useful for the project as once done powerful groups will not have opportunity to exclude them on account of their socio - economic statuses. In any event, Section 35 holds that, ‘subject to any other law, natural resources found in community land shall be used and managed-  (a) Sustainably and productively;  (b) For the benefit of the whole community including future generations;  (c) With transparency and accountability; and  (d) On the basis of equitable sharing of accruing benefits.  The concept of community land has been defined broadly enough to include VMGs. Women, children, old people and future generations have been thought of as beneficiaries and thus their rights secured in this Act | The proposed project site falls on public land. The land has since been acquired for the proposed project. The establishment of the mini grid will convert public land to generation and distribution of electric energy for long term. Further, based on community need assessment the proponent will undertake in kind development project to support the community needs.  The proponent should adhere to the provision of this legislation. |
|  | HIV AIDS PREVENTION AND CONTROL (CAP 246A) | This Act is to promote public awareness about the causes, modes of transmission, consequences, means of prevention and control of HIV and AIDS. It also seeks to positively address and seek to address conditions that aggravate the spread of HIV infection. | Like other projects, the proposed project is expected to attract new people to the project area seeking employment. This can lead to increased transmission of HIV/AIDS and other sexually transmitted diseases (STDs) as they engage in sexual relationships amongst themselves and/or local community members. In line with the requirements of this Act, the Contractors will create awareness and sensitize the workers and other persons on the risks of infections to foster prevention and control. |
|  | 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 |
|  | THE PHYSICAL AND LAND USE PLANNING ACT, 2019 | This Act of Parliament makes provision for the planning, use, regulation and development of land and for connected purposes.  The objects of this Act related to the project include;  (a) the principles, procedures and standards for the preparation and implementation of physical and land use development plans at the national, county, urban, rural and cities level;  (b) the procedures and standards for development control and the regulation of physical planning and land use; (d) a framework for the co-ordination of physical and land use planning by county governments;  (c) a framework for equitable and sustainable use, planning and management of land; | The proposed site is not in contravention of any zoning regulations. The project site is within public 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 –Kilifi County. |
|  | COUNTY GOVERNMENT ACT, 2012 | This Act makes provisions for county governments’ powers, functions and responsibilities to deliver services and for connected purposes. Part VIII of the act on Citizen Participation (87) (b) emphasizes on the right of citizens to participatein any development projects prior to their implementation. section 135 (1) states that the Cabinet Secretary may make regulations for the better carrying out of the purposes and provisions of this Act and such Regulations may be made in respect of all county governments and further units of decentralization generally or for any class of county governments and further units of decentralization comply to the set regulations and by laws. | This is the primary law governing the development of counties and thereby will be key during implementation of KOSAP. All organs established under this law should be consulted and approvals sought from Kilifi County Government by the contractor. |
|  | NATIONAL LAND POLICY, 2009 | The National Land Policy (NLP) has a vision to guide the country towards a sustainable and equitable use of land. The land policy calls for immediate actions to addressing environmental problems that affect land such as degradation, soil erosion and pollution. For instance, the policy stipulates the principle of conservation and management of land based natural resources, the principle of protection and management of fragile and critical ecosystems including wetlands and arid lands. The policy further calls for extensive overhauls to current policies and institutions in an attempt to address chronic land tenure insecurity and inequity. The National Land Policy designates all land in Kenya as public, private (freehold or leasehold tenure), or community/trust land, which is held, managed and used by a specific community. This land policy has thus been formulated to address the critical issues of land administration, access to land, land use planning, restitution of historical injustices, environmental degradation, conflicts, unplanned proliferation of informal urban settlements, outdated legal framework, institutional framework and information management. | The project shall comply to the provision of this Act to ensure prevention of pollution and sustainable use of natural resources throughout all the project phases for Chakama mini-grid. |
|  | LAND ACT, 2012 | This Act gives effect to Article 68 of the Constitution, to revise, consolidate and rationalize land laws; to provide for the sustainable administration and management of land and land-based resources, and for connected purposes. Section 110(1) of the Act provides that land may be acquired compulsorily under this if the Commission certifies, in writing, that the land is required for public purposes or in the public interest as related to and necessary for fulfilment of the stated public purpose. In such an acquisition, this Act, in section 111(1) provides that just compensation shall be paid promptly in full to all persons whose interests in the land have been determined. The procedure for land acquisition is laid out in Part VIII of the Act. | Land in Chakama is community land whose tenure falls under customary land rights. KP will observe all the relevant provisions of the Act. |
|  | LAND AND ENVIRONMENT COURT ACT,2011 | This is an Act of Parliament to give 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 principal objective of this Act is to enable the Court to facilitate the just, expeditious, proportionate and accessible resolution of disputes governed by this Act. Section 13 (2) (b) of the Act outlines that in exercise of its jurisdiction under Article 162 (2) (b) of the Constitution, the Court shall have power to hear and determine disputes relating to environment and land, including disputes:   * Relating to environmental planning and protection, trade, climate issues, land use planning, title, tenure, boundaries, rates, rents, valuations, mining, minerals and other natural resources; * Relating to compulsory acquisition of land; * Relating to land administration and management; * Relating to public, private and community land and contracts, chooses in action or other instruments granting any enforceable interests in land; and * Any other dispute relating to environment and land. | The project will have a grievance redress mechanism with a committee. The work of the committee will be to receive and respond to all the grievances raised. As explained in chapter five of this report, an aggrieved part will turn to the legal system after exhausting the GRM levels of resolution set. In the event any disputes on land and environment are not resolved through the project GRM, this court will provide a forum for timely resolution of such grievances. |
|  | LAND VALUE(AMENDMENT) ACT 2019 | This an Act of Parliament to amend the Land Act, the Land Registration Act and the Prevention, Protection and Assistance to Internally Displaced Persons and Affected Communities Act; to provide for the assessment of land value index in respect of compulsory acquisition of land; and for connected purposes. This act advocates for Just, prompt, and full compensation in relation to compulsorily acquired land or creation of way-leaves, easements and public rights through criteria set out under this Act. This act provides establishment of the Land Acquisition Tribunal to arbitrate on land related issues.  The Act has amended various sections of the Land Act, the Land Registration Act as well as the Prevention, Protection and Assistance to Internally Displaced Persons and Affected Communities Act. It aims at standardising the value of land in Kenya for the primary purpose of enhancing efficiency and expediting the compulsory land acquisition process for public projects.  It introduces Section 107A into the Land Act, which provides the criteria for the valuation of freehold and community land that is the subject of compulsory acquisition. Community Land, like freehold land, shall be valued based on the criteria outlined in Section 107A and the Land Value Index which will be jointly developed by the national government and county government. Section 5 introduces a list of the forms in which compensation can be made. The act states that compensation can be paid in any of the following forms: -  a. Allocation of alternative parcel of land of equivalent value and comparable geographical location and land use to the land compulsorily acquired  b. Monetary payment either in lump sum or in instalments spread over a period of not more than one year  c. Issuance of government bond  d. Grant or transfer of development rights as may be prescribed.  e. Equity shares in a government owned entity or  f. Any other lawful compensation | Land in Chakama is public land under the county government. |
|  | WATER ACT, 2016 | Part 2 section one of the Act notes that every water resource is vested in and held by the national government in trust for the people of Kenya.  Section 143 (1) notes that; A person shall not, without authority conferred under this Act-  (a) Wilfully obstruct, interfere with, divert or obstruct water from any watercourse or any water resource, or negligently allow any such obstruction, interference, diversion or abstraction; or  (b) Throw, convey, cause or permit to be thrown or conveyed, any rubbish, dirt, refuse, effluent, trade waste or other offensive matter or thing into or near to any water resource in such manner as to cause, or be likely to cause, pollution of the water resource.  (2) A person who contravenes this section commits 144. (l) Without prejudice to any other remedy or course of action, if a person contravenes any provision under this Act, then, the Authority, the Regulatory Board, the county government executive concerned or the licensee concerned may, by order served on the person concerned, require that person within a reasonable time specified in the order to remedy the contravention and in particular-  (a) to clean up any pollution or make good any other harm identified in the order which was caused to any water resource by reason of the contravention; | All construction, operation and decommissioning phases will take caution to refrain from polluting any water resource and will endeavour to prevent pollution in line with the ESMP. |
|  | BUILDING CODE OF THE REPUBLIC OF KENYA (2009 EDITION) | The Regulations have been revised in order to encourage the use of innovative designs, new materials and new construction methods; to optimise on resources and to enhance adherence to planning and building standards. Any building designed and constructed with the principles and norms of good building practice should comply with these new Regulations. These Regulations are a guide on good planning and building practice. They set out, in the simplest and shortest way possible, requirements to ensure that planning will be so undertaken and buildings are designed and built in such a way that persons may live and work in a healthy, safe and convenient environment. The overall aim of these Regulations is to promote and enhance planning and its enforcement at all levels; to encourage optimal use of resources; enhance safety, health and convenience; and to improve acceptability and compliance of these Regulations. In order to ensure that these Regulations will remain valid and up-to-date, they will be reviewed and any necessary revision will be published at least 5 yearly intervals.  Any person intending to erect any building shall submit to the Authority the following  (a) a location plan;  (b) a site plan;  (c) drainage installation drawing;  (d) a fire installation drawing;  (e) particulars of any existing building which is to be demolished and details of the method of demolition to be used;  Such plans as required by the authority in respect of:  (i) general structural arrangements, subject to any requirement contained in these Regulations with regard to design of the structural system;  (ii) general arrangement of artificial ventilation;  (iii) a fire protection plan; (iv)any certificate contemplated in these Regulations; and any other particulars. | The project shall comply to the provisions of this act and ensure all constructions are up to approved designs and standards in order to promote a safe, healthy and convenient working environment for the Chakama mini-grid project. |
|  | PENAL CODE ACT (CAP. 63) | Section 191 of the penal code states that if any person or institution that voluntarily corrupts or fouls water for public springs or reservoirs, rendering it less fit for its ordinary use is guilty of an offence. Section 192 of the same Act says a person who makes or vitiates the atmosphere in any place to make it noxious to health of persons /institution, dwelling or business premises in the neighbourhood or those passing along public way, commit an offence. | The project will adhere to the provisions of this act and ensure that the designs, fittings and general performance of all installed equipment does not foul water or air.  The guidelines as set out in the environmental management and monitoring plan laid out in this report shall be adhered to, as well as the recommendation provided for mitigation/minimisation/avoidance of adverse impacts arising from the project activities. |
|  | WILDLIFE CONSERVATION AND MANAGEMENT ACT, 2013 | This Act provides for the protection, conservation, sustainable use and management of wildlife in Kenya and for connected purposes. The law has as one of its guiding principles the devolution of conservation and management of wildlife to landowners and managers in areas where wildlife occurs, through in particular the recognition of wildlife conservation as a form of land-use, better access to benefits from wildlife conservation, and adherence to the principles of sustainable utilization. | Chakama mini-grid power project will not be located in a wildlife conservation area or in an area with endemic or endangered wildlife species. |
|  | THE FOREST CONSERVATION AND MANAGEMENT ACT, 2016 | The Act led to the establishment of Kenya Forest Service which is charged with management of forests in consultation with the forest owners. The body enforces the conditions and regulations pertaining to logging, charcoal making and other forest utilization activities.  To ensure community participation in forest management, the service collaborates with other organizations and communities in the management and conservation of forests and for the utilization of the biodiversity.  Section 43 subsection 1 provides that if mining, quarrying or any other activity carried out in the forest, shall, where activity concerned is likely to result in forest cover depletion, the person responsible shall undertake compulsory re-vegetation immediately upon the completion of the activity. | Chakama mini-grid power project will not be located in gazetted forest area or in an area with endangered tree species. The Kenya Power & Lighting Company PLC shall plant some suitable trees around the mini-grid station to increase forest cover, minimize visual impacts and promote carbon sinks in the area. |
|  | WORK INJURIES AND BENEFIT ACT, 2007 | This Act provides for compensation to employees for work related injuries and disease contracted in the course of their employment and for connected purposes. Key sections of the Act include the obligations of employers; right to compensation; reporting of accidents; compensation; occupational diseases; medical aid etc. | In case of any accidents or incidents during the project cycle, this Act will guide the course of action to be taken. |
|  | TRAFFIC ACT CAP 403 OF 2009 | This Act consolidates the law relating to traffic on all public roads. Key sections include registration and licensing of vehicles; driving licenses; driving and other offences relating to the use of vehicles on roads; regulation of traffic; accidents; offences by drivers other than motor vehicles and other road users. Many types of equipment and fuel shall be transported through the roads to the proposed site. Their registration and licensing will be required to follow the stipulated road regulations. The Act also prohibits encroachment on and damage to roads including land reserved for roads. | The project shall observe the provisions of this Act in order to avoid traffic offenses and ensure safety in all public roads. |
|  | CIVIL AVIATION ACT NO. 21 OF 2013 | The provisions of this Act or any regulations made there under shall, except where expressly or by implication excluded, apply to—   * All aircraft whilst in or over any part of Kenya; * All Kenya aircraft and the crew and other persons on board wherever they may be; and * All aerodromes and service providers within aerodromes.   The provisions of this Act shall not, except where expressly included or if the Cabinet Secretary so directs by order published in the Gazette, apply to state aircraft or to any class or classes of state aircraft. All aircraft shall be subject to the requirements of this Act in respect of rules of the air. | The proposed mini-grid is not going to penetrate the atmosphere beyond 15 meters and is not proximal to any airstrip, thus this act will not be triggered. |
|  | SEXUAL OFFENCES ACT 2006 | This is a comprehensive law that criminalises a wide range of behaviours including rape, sexual assault, defilement, compelled or induced indecent acts with child imbeciles or adults, gang rape, child pornography, child trafficking, child sex tourism, child prostitution, exploitation of prostitution, incest by male and female persons, sexual harassment, deliberate transmission of HIV or other life threatening sexually transmitted disease, stupefying with sexual intent, forced sexual acts for cultural or religious reasons among others. The Act also has orders for medical treatment for victims including free HIV prophylaxis, emergency pregnancy pill and counselling. The Act provides stiff penalties in which most of the crimes attract minimum of ten years imprisonment which can be enhanced to life imprisonment.  Implementation of a project creates changes in a community in which it is implemented and is has potential to cause shifts in power dynamics between community members and within households. For instance, partner jealousy is a key driver of GBV which can be triggered by labor influx on a project when workers are believed to be interacting with community women. Hence, abusive behaviour can occur not only between project-related staff and those living in and around the project site, but also within the homes of those affected by the project. | The risk of GBV has been identified and mitigation measures have been proposed in the ESMP. The contractor shall comply to the provisions of this act throughout the project life cycle*.* |
|  | THE CHILDREN ACT, 2012 | Part 2 of the Act denotes the rights of the children and their welfare shall be protected from child labour and armed conflict i.e. Every child shall be protected from economic exploitation and any work that is likely to be hazardous or to interfere with the child’s education, or to be harmful to the child’s health or physical, mental, spiritual, moral or social development.  The Act also notes that a shall be protected from sexual exploitation and use in prostitution, inducement or coercion to engage in any sexual activity, and exposure to obscene materials.  This Act protects the welfare of children within the Country. The Act identifies Children as a person below the age of 18 years old and protects them from exploitation. Of particular importance to this project, is section 10, which protects the child from:  • Sexual exploitation  • Physical and psychological abuse  • Economic exploitation.  • Any work that interferes with his/ her education, or is harmful to the child’s health or physical, mental, spiritual, moral or social development. | Sensitization to the community on the need to ensure the protection of children has been done and will continue throughout the project cycle. In addition, the contractor will sensitize workers against abuse and exploitation of children. |
|  | PERSON WITH DISABILITY ACT, CHAPTER 133 | This Act provides for the protection of the rights of people with disabilities ensuring they are not marginalized and that they enjoy all the necessities of life without discrimination. The Act guarantees that (1) No person shall deny a person with a disability access to opportunities for suitable employment. (2) A qualified employee with a disability shall be subject to the same terms and conditions of employment and the same compensation, privileges, benefits, fringe benefits, incentives or allowances as qualified able-bodied employees. (3) An employee with a disability shall be entitled to exemption from tax on all income accruing from his employment. | The Act will be adhered to in order to ensure that persons with disability are included in all decision making that affects their lives. This will be monitored to make sure they are not excluded from project benefits and exposed to negative impact from the project that could adversely affect them. |

## RELEVANT PERMITS AND LICENSES REQUIRED BY THE PROJECT

The table below shows the relevant permits and licenses that the project proponent will require for the proposed project.

*Table 3‑3: Relevant Permits and licenses*

|  | **Sector** | **Legislation** | **Authority** | **Permit/license** | **Comments** |
| --- | --- | --- | --- | --- | --- |
| **Construction Phase** | Environment | EMCA | NEMA | EIA License | The EIA license will give the decision criteria for NEMA |
| EMCA (Waste Management) Regulations,2006 | NEMA | Ensure that the contracted waste handlers (Transport and disposal) are licensed by NEMA | During waste disposal |
| Land | Physical Planning Act,  1996 | Physical Planning Act,  1996 | Change of Land Use | Change of land  use approval is  given at the  County level |
| Occupational  Health and  Safety | Occupational Health  and Safety, 2007 | Directorate of  Occupational  Health and Safety  (DOSHS) | Registration of workplace | Prior to  construction and  during operation |
| **Operational Phase** | Environment | EMCA | NEMA | Initial Environmental Audit  Acknowledgement Letter  and Self-Audit  Acknowledgement  thereafter | Annual,  throughout the  operations phase |
| EMCA (Waste Management) Regulations,2006 | NEMA | Ensure that the contracted  waste handlers (transport  and disposal) are licensed  by NEMA | When disposing  waste |

## World Bank OP applicability

Like in any project financed by, or with financial participation of, the World Bank, the environmental and social safeguards as defined in the Bank's Operational Procedures (OPs) will be adhered to during the project implementation. WB classifies its projects into four Environmental and Social Assessment categories according to the likely impacts on the environment and community they will have. This classification is as summarized below:

*Category A:* A proposed project is classified as Category A if it is likely to have significant adverse environmental and social impacts.

*Category B*: A proposed project is classified as Category B if it’s potential adverse environmental and social impacts on human populations or environmentally important areas—including wetlands, forests, grasslands, and other natural habitats—are less adverse than those of Category A projects. These impacts are site specific; few if any of them are irreversible; and in most cases mitigation measures can be designed more readily than for Category A projects.

*Category C:* A proposed project is classified as Category C if it is likely to have minimal or no adverse environmental and social impacts. Beyond screening, no further environmental assessment action is required for a Category C project.

*Category FI:* A proposed project is classified as Category FI if it involves investment of Bank funds through a financial intermediary, in subprojects that may result in adverse environmental and social impacts.

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

|  |  |  |
| --- | --- | --- |
| ***S.No.*** | **Description of World Bank OPs** | **Applicability to Project** |
|  | OP 4.01 (Environmental and Social Impact Assessment) | OP 4.01 is applicable. The main potential environmental impacts anticipated are civil works that would be limited to construction of the site in the remote Chakama area and the construction of distribution lines to connect the area residents. |
|  | OP 4.10 (Indigenous People) | OP 4.10 is applicable due to the known presence of indigenous peoples (IPs)/vulnerable and marginalized groups (VMGs) at the project area (Orma and Waatha Communities). The Mijikenda are however the predominant inhabitants of Chakama area with Orma, Waatha and Somalis being the minority groups. |
|  | OP 4.12 (Land Acquisition and Involuntary Settlement) | The Chakama site does not envisage major physical or economic displacement of people. The sub-project will however utilize land acquired from the community for the mini-grid project, contractor facilities and workers camp, hence the OP 4.12 is applicable. |
|  | Natural Habitats OP/BP 4.04 | OP 4.04 is not triggered |

## Environmental and Social Management Framework (ESMF) for KOSAP

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

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.

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

## Resettlement Policy Framework (RPF) for KOSAP

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

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

## 3.8 Vulnerable and marginalized Groups Framework (VMGF) for KOSAP

As noted above the KOSAP project trigged O.P 4.10 policy on Indigenous People and therefore a Vulnerable and Marginalized Groups Framework (VMGF) was prepared for use by the Ministry of Energy (MoE) and the implementing agencies KP and REREC and other stakeholders. The framework was prepared then because was known that IPs are present in all the 14 target project counties. The VMGF describes the policy requirements and planning procedures that during the preparation and implementation of components especially those identified as occurring in areas where VMGs are present.

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

*In regards to the Solar Mini-grid in Chakama, the main inhabitants of Chakama are the Mijikenda (Giriama) with minority communities being Orma, Waatha and Somalis who are classified as VMGs in Kenya. The Somalis don’t meet the OP 4.10 as they moved to Chakama for business opportunities, don’t have any attachment to the natural resources and will benefit wholly from the project. The Orma are pastoralists who depend on natural resources; pasture and water for their daily livelihood; while the Waatha are traditional hunters and gatherers who still hunt while some are seasonal farmers with a few cattle.*

*The ESIA identified impacts on the two minority communities (Orma & Waatha) being possible further marginalization from benefiting from the project and threat to erosion of their traditional source of livelihood and their traditional culture. Elements of the VMGP such as the inclusion of these communities in the stakeholder engagement process as well as representation on the locational grievance redress committee will be incorporated in the ESMP, to ensure that they access culturally appropriate project benefits and opportunities, in a gender sensitive and intergenerationally inclusive manner.*

## Comparison between the World Bank and Kenyan Laws to this Project

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

Table 3‑4: *Comparison between the WB safeguard policies and the Kenya Legislation*

|  |  |  |  |
| --- | --- | --- | --- |
| **World Bank safeguard Policies** | **Kenyan laws** | **Comparison** | **Recommendation** |
| O.P 4.01 requires screening to determine level of environmental and social assessment to be done  An ESIA is prepared before project implementation | EMCA requires screening of project to determine level of environmental and social assessment to be done  An ESIA is required once determination is done | Similar both require screening | Screening has been done and the project is established as medium risk which requires and ESIA |
| ESIA is needed once determination had been established and should be prepared identifying all environmental and social impacts and mitigation measures proposed to address the impacts | ESIA is needed once determination had been established and should be prepared identifying all environmental and social impacts and mitigation measures proposed to address the impacts | Similar-both require ESIA depending on the project impacts | ESIA is prepared in line with EMCA /EIA regulations and makes reference to WB safeguard policies |
| O.P 4.12 Land Acquisition and Involuntary resettlement should be avoided wherever possible or minimized and exploring all alternatives | The Government and any other organization shall prevent internal displacement linked to development projects to the extent possible by exploring other alternatives. | **Similar-** displacement in projects should be avoided to the extent possible by exploring alternatives. | WB policy is more elaborate than the Kenyan Law. |
| O.P 4.10 on indigenous people seeks to promote the inclusion of these group in development project and especially through consultation to ensure they also share in the project benefits and ensure negative impacts do not disproportionately fall on them  The policy requires these groups to be consulted separately to enhance their participation | The COK 20.10 article 56 provides for the right of marginalized communities and the importance of their input in decision making that regards them.  National Gender and Equality Act and the Children’s Act and Persons with disability Act seeks to promote the inclusion of these persons in all issues as they are often overlooked and left out.  Emphasis is also on consulting with them | Similar-both seek to promote inclusion of these group so that they do can share the projects benefits and ensure that negative impacts of the project do not fall on them disproportionately  WB needs a social assessment to be conducted | WB policy more elaborate and the two are being used to compliment |
| Project affected persons should be meaningfully consulted and be given opportunities to participate in planning and implementing of projects and especially where there is resettlement | EMCA requires that the project owner seeks the views of the people who are affected and explain the project information to them and especially the impacts of the project and also obtain their opinions or comments | Both are similar | Consultation has been done and will be progressed in line with the two WB policy and Kenya legislation |

# BASELINE SETTINGS - ENVIRONMENT, ECOLOGY AND SOCIAL

## Area of Influence

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

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

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

**Air Quality**

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

**Noise**

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

**Water**

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

**Flora and Fauna**

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

Based on the above the AoI for environmental studies was limited to 5 km from the project site.

**Socio-economic/Social**

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

### Project Footprint Area

The proposed project is situated in Kanduru Village, Makongeni Sub location, Chakama location, Magarini Sub County in Kilifi County. The main economic activities include farming along the Galana river approximately 2km away from the site and charcoal burning and sale. The site is relatively flat; with gentle slopes towards Galana River. The area is largely semi-arid with about 70% grassland and 30% shrubs that is mainly located within Chakama. The site is located at the edge of the Chakama Shopping centre close to Chakama Primary School. Land is largely communal within Chakama area.

### Study Area

The project site is located in Chakama, Magarini Sub-County in Kilifi County. Based on the secondary information of the region, the sampling locations were identified to obtain the representative baseline information. Sampling points for air and noise were selected in proximity to the project site, vehicular traffic on main and access roads, settlements also taking consideration of the wind direction. Sampling locations for surface water quality was selected based on the drainage pattern of the area. Soil sampling locations were selected based on the land use and land cover of the study area but at the exact site location. Locations of ecological and social surveys were also selected based on receptor locations; in addition, special emphasis is given to areas within 1.5 km radius of the project site and distribution lines.

## Physical environment

### Land Use

The land-use and land-cover of the study area (1.5kms) has been interpreted from visual interpretation, survey maps of the area, and subsequently by ground checking during field surveys. The land use within 1.5 km radius of project site represent grassland and agricultural farmlands along Galana River whose access is approximately 3km away but gets to about 500m away from the village. The area is majorly semi-arid with a sparse population within the area.

### Topography

Kilifi County has four major topographic features. The proposed Chakama site is at the edge of the Nyika Plateau, which rises from 100m to 340m above sea level covering about two thirds of the county area on its western side. This plateau is characterized by a low population density, thin vegetative cover, shallow depressions and gently undulating terrain. It constitutes the arid and semi-arid areas of the county, which are suitable for ranching. Chakama locality is a semi-arid area but due to its positioning along river Galana, the community does active irrigation along the river banks.

### Hydrogeology and Drainage

Kilifi County is underlain with carboniferous rocks, Triassic formation, and other intrusive and

tertiary sediments towards the Indian Ocean in that order. The site is underlain with tertiary sediments. The drainage pattern of the county is formed by one permanent river and a number of ephemeral rivers and streams which drain into Indian Ocean. The permanent river is Sabaki / Galana River which is approximately 3km from the proposed site while the seasonal rivers are Nzovuni, Rare, Goshi and Kombeni. The streams include Wimbi, Kanagoni, Masa, Muhomkulu and Mleji.

### Ecology

The county is divided into five Agro-Ecological Zones (AEZ) defining areas with similar production related characteristics such as annual mean temperatures, vegetation and humidity. The area’s ecological conditions are influenced by the soil type, altitude, vegetation, rainfall pattern and human activities. A major threat to the vegetation cover is the destruction caused by human activities as charcoal burning is the second most popular source of livelihood in the locality.

The forests within the county, falls within the Eastern African coastal forests which are heterogeneous group of isolated evergreen or semi-green forests with high biodiversity. The county has 14 gazette forests with a total size of 220Km2 and 7 non-gazette forests with a total size of 25Km2. The main forest includes; Arabuko Sokoke, Mangrove and Dakacha woodlands. Marine life attractions include fish, turtles, dugongs and crabs. The Mida Creek forest has a high diversity of mangrove species that provide refuge to a variety of both resident and migrant bird species.

The project area is located west of the County in a livestock-millet Zone which is of lower agricultural potential with annual precipitation ranging from 700mm to 900mm. The area is suitable for dry land farming supporting drought tolerant crops and ranching activities but the community does irrigation in the nearby Galana river.

|  |  |
| --- | --- |
| **DSC02616** | **DSC02620** |

*Figure 4‑1: Project area flora presentation*

### Water Resources

With regard to water quality in the locality, water is sourced from Galana River and a community well although its salty. The water drawn from the river is considered clean by the locals and is used for drinking and other domestic uses. Some community members also buy drinking water at 5 shillings per 20 litre jerrycan.

A water sample was collected from the community well at coordinates; latitude 03°7'14.12"S and longitude 39°38'12.03"E and submitted to NEMA designated Laboratory for analysis of physio-chemical parameters. The results obtained and which are appended as an appendix in this report, show that the parameters tested did not meet the East African Standards for potable water due to high conductivity.

### Ambient Air Quality

The proposed project area is located at the edge of Chakama Shopping Centre with interfaces of natural vegetation and open unused lands. There are no major industrial developments. The air quality at the proposed project sites is therefore considered to be generally good.

### Soil Type

The county has a variety of soil types; vertisols, solonetz, cambisols, aerosols, ferrasols, luvisols, nitisols and fluvisols. The project site comprises of cambisols good for agriculture especially along the river for irrigation.

A soil sample was collected from the site and submitted to a NEMA designated Laboratory for analysis of Petroleum Hydrocarbons. The results obtained and which are appended as an appendix in this report shows that the pollutants of concern were not detected in the sample. The further indicates that the site has not been impacted by petroleum hydrocarbons.

### Climate and Meteorology

The proposed site has climate falling generally under general climatic conditions of Kilifi County. The average annual rainfall in the area ranges from 300mm in the hinterland to 1,300mm at the coastal belt. The coastal belt receives an average annual rainfall of about 900mm to 1,100mm with marked decrease in intensity to the hinterland. Areas with highest rainfall include Mtwapa area and to the north of the coastal strip around the Arabuko Sokoke Forest. Evaporation ranges from 1800mm along the coastal strip to 2200mm in the Nyika plateau in the interior. The highest evaporation rate is experienced during the months of January to March in all parts of the county. The annual temperature ranges between 21°C and 30°C in the coastal belt and between 30°C and 34°C in the hinterland.

## Socio-economic Environment

### Demographic Profile

The demographic profile indicates the details of total population, number of households, household size and sex-ratio of Chakama location. The county is predominantly inhabited by the Mijikenda community. Nevertheless, county residents constitute a representation of Kenya’s forty-four (44) tribes and a small population of foreigners.

Table 4‑1: Summary of demographic profile.

|  |  |
| --- | --- |
| **Attribute** | **Magnitude/Number** |
| Approx. population | 800 |
| Households | 150 |
| Gender. | Male – 60%  Female – 40% |
| Ave. No. per household | 8-10 per household |
| Vulnerable classes | * Male headed households (10 households) * Female headed households (20 households) * Child headed households (5 households) * Persons Living with Disabilities (Approximately 2) * The elderly (80 years and above) (4 households) |
| Dominant ethnic group | Giriama |
| Other groups | Orma, Waatha and Somalis |
| Primary religion | Christianity |
| Secondary religion | Islam |
| Employment (formal/Informal) | Formal – 10%  Informal – 90% |

### Educational Infrastructure

As per the observation and information sought from Chakama location, the area has two schools; Chakama Primary School which is next to the site and Chakama Secondary located about 1km from the site.

### Occupation and Livelihood Profile

The main livelihood activities undertaken by people in Chakama location are agriculture through irrigation, small scale anima keeping, charcoal burning and processing of aloe vera. All this culminate to small scale businesses. The business activities are undertaken at Chakama Market and they also use middle men to access Malindi town 70km away. The main formal jobs at the area are teaching and other civil services which accounts to approximately 10% of the population. The other 90% of the population is involved in informal employment.

### Social and Physical Infrastructure

Public and private institutions found in the project area include: religious institution, two schools and health facilities. The institutions observed in the area during the field visit include Chakama primary and secondary schools, Chakama dispensary. Religious institutions in the area are; Pentecostal Evangelistic Fellowship of Africa (PEFA), Africa Gospel Church ( AGC) and Full Gospel churches of Kenya within the locality. Water used in the areas is obtained from both surface and groundwater sources. The main source of surface water is River Galana which traverses Chakama shopping centre located at about 3Km from the project site. While the groundwater source is a community well.

### Vulnerable groups

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

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

* Male headed households (10 households)
* Female headed households (20 households)
* Child headed households (5 households)
* Persons Living with Disabilities (Approximately 2)
* The elderly (80 years and above) (4 households)

The vulnerable households can hardly access the basic needs and most of them rely on well-wishers within the community. The project should consider such households for electricity connection. Most of them cannot afford the one thousand shillings’ connection fees.

### Gender based vulnerability

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, minimal participation in household or economic decision making, lesser economic freedom and limited opportunity to socialize with other females in the village. 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 is the eldest male members, while the decision-making authority is the man. In addition to this, men are responsible for ensuring the financial security of the family. The women on the other hand are responsible for household activities such as fetching water, cooking, cleaning, taking care of the children. Female literacy was reported to be low among women over the age of 18 and higher among the younger girls.

### Gender Based Violence

Intimate partner violence is the most common form of GBV in Chakama and mainly affects married people. Based on the Focus Group Discussion with women, this is mostly attributed to drunkenness and even after reporting, these cases are mostly never solved.

### Culture and heritage

The county is the home of a rich cultural heritage including Mnarani ruins, Mtwana heritage site and Malindi cultural heritage consisting of classic Swahili architecture. However, no cultural site of significance was reported/observed within the project area.

### Religion in the project area

The community members confirmed that their culture is slowly fading away. This is due to community members converting to Christianity in large numbers. Hence the community members are predominantly Christian with churches such as Pentecostal Evangelistic Fellowship of Africa (PEFA), Africa Gospel Church ( AGC) and Full Gospel churches of Kenya within the locality.

### HIV/AIDs prevalence

According National AIDs Control 2018, HIV prevalence in Kilifi is (4.6%) lower than the national prevalence of 5.9% (Kenya HIV Estimates 2015). The county contributed 1.1% and 0.6 % of the total new HIV infections in Kenya among children and adults respectively. HIV/AIDS infections in Chakama were confirmed to be nonexistent by the Community Care Home Volunteers at the Chakama Dispensary.

# STAKEHOLDER ENGAGEMENT

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

1. stakeholder identification and analysis
2. planning for the stakeholder engagement;
3. disclosure of information;
4. consultation with stakeholders
5. addressing and responding to concerns; and
6. reporting to stakeholders.

## Stakeholder Consultation and Disclosure Requirement for the Project

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

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.

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

## Objectives of Public Participation

* To assess the level of stakeholder interest and support for the project
* To enable stakeholder’s views to be considered in project design and implementation
* To establish and maintain constructive relationships and means for effective and inclusive engagement with project affected parties on issues that could affect them
* To ensure appropriate project information on environmental and social risks and impacts is disclosed to stakeholders in a timely and accessible matter

## Stakeholder Characterisation and Identification

Stakeholders are classified in the following two categories;

* **Project Affected Persons** – Stakeholders who have a direct impact on or are directly impacted by the project.
* **Interested Parties** – Stakeholders who have an indirect impact or are indirectly impacted by the project.

### 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 Chakama, the stakeholders have been identified and listed in the table given below;

Table 5‑1: *Stakeholders Consulted*

|  |  |
| --- | --- |
| **Stakeholders** | **Consultation Tool** |
| Project Affected Persons i.e.,   * Residents of Chakama * Vulnerable Individuals and Households * Education and Health institutions | **Public Meeting**   * 1 public meeting was held in Chakama location, Makongeni S/location on 27/09/2021. * The meeting had an attendance of 75 people.   **Focus Group Discussions (FGD)**   * FG discussions were conducted with the conducted with the men, women and youth.   **Key Informant Interviews (KII)**   * KII were conducted with the key social groups in the area including the health centre and educational facilities through a one-on-one interview. * The chief was also interviewed on the Community Profile of Chakama. |
| Interested Parties:   * County Government of Kilifi * National Government agencies * National regulatory bodies | **Meeting**  A kick-off meeting was conducted with the County government officials, department of Energy and a notification letter was sent to the County commissioner prior to the exercise. |

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

*Table 5‑2: Stakeholder significance and engagement requirement*

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

### STAKEHOLDER ANALYSIS

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

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

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

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

*Table 5‑3: Summary of Stakeholder Influence*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Stakeholder** | **Category** | **Sub - Category** | **Magnitude of Influence** | **Urgency/Likelihood of Influence** | **Overall rating of stakeholder rating** |
| Interested Parties | Government agencies | National & County govt. | Large | High | Major |
| National regulatory bodies | NEMA | Large | Medium | Major |
| Project affected Persons | Individuals and households | VMGs & disadvantaged groups | Large | High | Major |
| Institutions | Education, religious and Health | Medium | Low | Minor |

## Summary of Community Consultation MeetingS

Project: Proposed Chakama Solar Mini-grid

Venue of meeting; Chakama Nyasa PEFA Church, Kanduru village, Makongeni sublocation in Chakama location, Magarini Sub County of Kilifi County

Date: 27/09/2021

The general stakeholder consultation was done in a public meeting (Barraza) organized at the Chakama Nyasa PEFA Church where 75 people were in attendance. The meeting was chaired by the area chief assisted by the assistant chief and the “Nyumba Kumi” leaders. The minutes and list of attendance have been appended in this report.

### Information Shared to the Community Members

The MoE representative assisted by the KP representative gave a description of the KOSAP project and clarified that its objective was to electrify Chakama because the area is not connected to the national grid. They also informed the community that they would access the electricity at a subsidized cost and that the public facilities such as the schools, hospitals and public boreholes would also be connected at the same cost (one thousand shillings). The environmental and social experts were shared with the community, the ESIA process and discussions on the potential impacts associated with the project and the proposed mitigation measures that would reduce the significance of the adverse impacts.

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

### Key feedback received during Stakeholder consultation process

**Benefits of the Project as understood by the community**

* The community was in support of the project. They noted that the project will beneficial to the community as it will:
  + Make it possible for the community to carry out various projects and businesses that need electricity
  + Improve their livelihood and enhance their living standards
  + Provide them with energy for domestic use in addition to helping them to improve their businesses.

**Community Concerns**

The community raised they following concerns:

* + The PLWDs were concerned that they might be left out of the project as it has been the case with major development agendas in the area. They insisted that they should be involved in the project decision making
  + Electrical safety; the community wants to be trained on the basic electrical and fire safety to mainly protect their children from any electrical shocks/ accidents.
  + Issues of employment and the ability of the contractor to give the job opportunities to the locals especially the unskilled and semi-skilled.

**Community Requests**

The community requested the following from the project:

* All employment opportunities especially the non-skilled labour during the construction and operation Phases. They noted that lack of job opportunities a major setback to the community. The men, women and youths are all in dire need of employment.
* Involvement of the youth group in the construction process and respect to the local grievance redress committee to ensure their grievances are recorded and sorted out.
* They inquired about the project's timeline because they were concerned that it would take too long to complete. It has already taken long time to commission the construction since the proponent initiated the land acquisition process and the community willingly gave out the land in anticipation the project would commence expeditiously.

|  |  |
| --- | --- |
| *Public participation “Baraza” Session* | |
| DSC02606 | DSC02603 |
| *Focused Group Discussion with the Men* | |
| P7 | DSC02649 |
| *Focused Group Discussion with Women* | |
| P11 | P10 |
| *Focused Group discussion with the Youth* | |
| P13 | P1 |

*Plate 3: Stakeholders engagement process*

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

|  |  |  |
| --- | --- | --- |
| **no** | **Issues/comments discussed** | **Response** |
| 1 | Inquiry on who will cater for any health costs of those injured at the site; be it a staff or community member. | The community was advised to stay away from the construction site as there will be barring signages. The site will only be accessible by authorised staff. Further, the contractor will have a functional first aid kit, trained first aider and serious cases will be transferred to the dispensary or nearby hospital. The contractor will cater for the expenses of staff who gets injured while on duty. |
| 2 | Indication that there would be no assurance that the contractor would give the job opportunities to the residents of Chakama but they really needed assurance so that the contractor does not bring in outsiders to especially do unskilled labour. | In response, the community in general was reminded the mandate of the Grievance Redress Committee that was formed specifically for this project. The GRC would work to ensure that such grievances are taken note of and discussed with the relevant officers in this case being the area chief and the social officer onsite. |
| 3 | Inquiry on the cost of electricity and if the figure is fixed per month. | In response, the community was informed that they will take care of wiring expenses in their houses, where they should use good quality wiring materials. After that, they will pay a one-off connection fee of 1,000/- and thereafter they will be buying electricity token and this will depend on an individual’s usage. |
| 4 | What are the next steps of the project since this is the third visit? | This being the last step in the community engagements, the report will be drafted and submitted to NEMA for review and licencing. Once this has been approved then the next thing would be the tendering and contractor coming onsite. This is if the site does not undergo the other SA and VMG phases. |
| 5 | Will there be any compensations to the land where the power poles would be erected? | The KP staff indicated that this would not be the case, as the agency will engage with the relevant road agencies on the issuing of wayleave permits, further, the contractor will try as much as possible to ensure no acquisition of private land but in case it is unavoidable, then privately acquired land must be compensated prior to installation works. |
| 6 | Two women indicated that the project should be one that would benefit the whole community and this is most definitely the healthcare. The existing dispensary should be facelifted and stocked with drugs so that they do not need to be referred to Malindi or Baolala for cases that their local dispensary can take care of. | |

The minutes of the meeting have been appended in Appendix 3 of this report.

## Disclosure of ESIA to the Stakeholders

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

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

## Stakeholder Engagement and Grievance Management Post ESIA

During implementation of the project or construction phase, stakeholder engagement will be progressed to ensure the community and other stakeholders are kept abreast of the progress of the project. For the target community this will take the form of meetings and focus group discussions between local community and the contractor which will also act as forums for the community to ask questions or provide feedback. Therefore, the contractor will prepare a stakeholder engagement plan to guide on the engagements with various stakeholders guided by the Stakeholder Engagement Plan prepared during ESIA.

**Objectives and Principles of Stakeholder Engagement**

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 KPLC 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 KPLC on monthly basis alongside the construction progress reports.

# IDENTIFICATION AND ASSESSMENT OF POTENTIAL IMPACTS AND PROPOSED MITIGATION MEASURES

## Introduction

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

## Impact Assessment Methodology

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

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

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

## Defining Impact

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

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

## ASSESSMENT OF SIGNIFICANCE

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

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

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

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

*Table 6‑1: Categories of Significance*

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

For environmental impacts the significance criteria used in this ESIA is shown in Table 13: .

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

## Magnitude of Impact

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

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

For biophysical impacts, the definitions for the spatial and temporal dimension of the magnitude of impacts used in this assessment are provided in Table 34

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

## Sensitivity of Resources and Receptors

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

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

## Likelihood

Terms used to define likelihood of occurrence of an impact are explained in the table below;

*Table 6‑2: Explanation of Terms Used for Likelihood of Occurrence****.***

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

## Definition of mitigation measures

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

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

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

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

## Assessing residual impacts

Impact prediction takes into account any mitigation, control and operational management measures that are part of the project design and project plan. A residual impact is the impact that is predicted to remain once mitigation measures have been designed into the intended activity. The residual impacts are described in terms of their significance in accordance with the categories identified in Table 14 above.

Social, economic and biophysical impacts are inherently and inextricably interconnected. Change in any of these domains will lead to changes in the other domains.

## KEY IMPACTS- PRE-CONSTRUCTION PHASE

### Impact on land acquisition

The ministry of Energy through the NLC shall acquire land for the mini-grid development and wayleaves while the contractor shall acquire land for contractor facilities such as yard and workers camp in the pre-construction phase before project begins. The proposed project entails the acquisition of a 0.7780 hectares land parcel. In addition to the land for the generation assets, way-leave consent for the distribution power-lines and other facilities like storage will also be progressed before construction.

#### Source of Impact and Overview of Baseline Conditions

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

#### Embedded/In-built Controls

Enabling the community to benefit from the project by supporting local projects e.g., improving education access by building more classrooms in Chakama Primary school.

##### Significance of Impact

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

#### Additional Mitigation Measures

* The Kenya Power & Lighting Company shall ensure that all land acquisition procedures align to the Resettlement Policy Framework prepared under this project.
* The project proponent will adequately compensate the community in kind for the land that will be acquired for the project.
* Community engagement to educate the public on the need to keep off the site because of the electrical installations and for public safety.

### Impact of wayleaves acquisition

Supply of electricity will involve passing of low voltage (LV) lines to connect the customers to power. It is estimated that a total of 13 km of LV circuit will be constructed mainly along the road reserve and along the boundaries to supply power. A way-leave trace of 10 meters will be required along the entire power line network. The project contractor will use existing access roads to set up the low-voltage power distribution lines and will seek access from PAPs and clients in whose property they will undertake electricity connection to the power grid. In an event that utilization of private land is inevitable, compensation will be made to the private land owners including compensation of vegetation that may be destroyed. If the affected persons voluntarily forego such compensation, the proponent will document such consents as voluntarily donated.

#### Embedded/In-built Controls

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

##### Significance of Impact

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

#### Mitigation measures

* Consultations with the community during construction of the low voltage lines
* Maintain the wayleaves along the road reserve and along the boundaries
* Community engagement to educate the public on the need to keep off the site and not to encroach way-leaves because of the electrical installations and to ensure public safety.

### Inadequate Stakeholder identification and consultations

Several risks and social impacts may be bound to occur in various stages of the project in relation to Project information disclosure and in stakeholder consultations process. These risks influence the way the project affected persons and interested parties understand the project, their roles and responsibilities and the overall sustainability of the project. The social risks include but not limited to:

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

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

**Mitigation Measures**

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

1. *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.

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

**Mitigation measures**

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

1. *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.

#### Embedded/In-built Controls

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

##### Significance of Impact

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

## Positive Impacts- construction Phase

### Impact on local Economy and Employment

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

Thus, anticipated benefits of the Project include Direct employment opportunities mainly during construction of the mini-grids; indirect employment generated by the procurement of goods and services for the Project; induced employment related to jobs ensuing from the expenditure of incomes associated with direct and indirect. The local community is likely to benefit from the economic opportunities to be created from the following:

* Civil works during construction phase including, construction of solar PV module mounting area, inverter room, internal roads, laydown areas, labour camp, distribution line,
* Self- employment options for individuals possessing vocational or technical training skills like electricians, welders, fitters etc;
* Contracting opportunities for local’s residents including men, women and youths. During the public meeting the community insisted that all the unskilled labour force must be given to the locals.
* Creation of indirect employment for local community through establishing small shops like tea stalls, supply of intermediate raw materials, repair outlets, hardware stores etc. However, these are likely to be temporary.

The area is characterised by major unemployment. This has affected the community members including the youths, men and woman as reported during Focused group discussion sessions. Thus, the contractor should develop and implement an employment management plan to promote local content. This will ultimately resolve conflict which can be arise if the community feels left out in employment opportunities.

#### Impact Significance

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

#### Enhancement Measures

* A significant segment of labour requirement during the construction phase will be sourced locally. While, the significance of the impact on economy and employment opportunities during the construction phase is understood to be positive, the following measures should be put in place to ensure that the local community receives maximum benefit from the presence of the project;
* Preference should be provided to local labour, sub-contractors or suppliers to pass on maximum economic benefit locally;
* Preference should be provided to the vulnerable population in the Study Area;
* The project proponent will establish a mechanism to audit sub-contractors and suppliers with respect to compliance of utilizing local labour and resources.

## NEGATIVE Impacts – Construction phase

### Change in Land Use

The study area is an unregistered community land that consists of unused open land with patches of scrubland. The internal distributions lines will be laid by Kenya Power. The land procured for the project site was uncultivated, and undeveloped. During consultation, it was established that the land belongs to the community of Chakama Location. The community has since offered to the land in kind for project use. The establishment of the mini grid will convert communal land to generation and distribution of electric energy for a long term.

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

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

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

#### Embedded/In-built Control

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

#### Significance of Impact

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

#### Additional Mitigation Measures

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

### Impact on Topography

The topography of the project site is an open area with gentle slopes and an elevation difference of about 10m observed within the project site. The general slope of the surrounding areas leads into seasonal wetland that is located on the Northern apart at about 1km from the project site. There are no water bodies that pass though directly the proposed project site. Galana River is located about 500m from the proposed site but 3km away in terms of access. 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 the vast-open area, study area may exhibit presence of micro drainage channels. Therefore, the impact magnitude has therefore been assessed as minor.

#### Embedded/In built Control

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

#### Significance of Impact

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

#### Additional Mitigation Measures

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

### Impact on Soil Environment

#### Project Phases and Associated Activities

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

**Construction Phase**

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

**Operation and Maintenance Phase**

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

**Decommissioning Phase**

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

#### Significance of Impacts

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

#### Additional Mitigations

* Vehicles will utilize the existing roads to access the site;
* No unauthorized dumping of used oil and other hazardous waste should be undertaken at site;
* All waste should be stored in a shed that is protected from the elements (wind, rain, storms, etc.) and away from natural drainage channels;
* Solid waste should be Segregated in color coded waste receptacles.
* In case of accidental/unintended spillage on small area, the contaminated soil should be immediately collected and stored as hazardous waste;
* Compacting of loose soil in excavated areas.
* Enclose the construction site and protect the soil to prevent the waste soils and other debris from being washed away by surface runoff and wind.
* All dug up soil that is not needed on-site to be removed promptly and disposed of to appropriate areas.
* Re-use the dug-up soil in backfilling and landscaping.
* Any soil potentially contaminated by chemicals, oils, fuels to be collected and disposed of by a NEMA authorized waste.

### Impact on Air Quality

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

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

#### Embedded/in-built control

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

#### Significance of Impact

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

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

#### Additional Mitigation Measures

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

### Impact on Ambient Noise

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

The main receptor will be the Chakama Market which is within 400m from the site. There are some residents within the 500m from the site and will most likely be affected by increasing noise levels. The receptor sensitivity is therefore considered as medium. Impact magnitude is considered to be minor to medium considering the construction period of the project that will last for not more than 12 months and proximity to Chakama Market.

#### Assessment Criteria for Impact on Ambient Noise

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

* + Construction activities including site preparation, piling work, construction of ancillary facilities;
  + Transportation of construction materials, machinery and personnel;
  + Operation of generator sets; and
  + Demolition activities during decommissioning phase.

#### Embedded/in-built control

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

#### Significance of Impact

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

#### Additional Mitigation Measures

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

### Visual Intrusions and Changes in Landscape Impact

The project site is located on plain terrain with slight undulation. There will be no significant change to visual quality of the area resulting from development or change in land use that will alter the landscape. Changes in the visual landscape will range from construction phase to commissioning of the mini grid and associated structures and further during operations. This Project is not the first major solar power Project in the vicinity of project area and therefore it will have not had a major impact on the surrounding area.

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

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

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

#### Embedded/In-built Control

Proper siting decisions can help to avoid aesthetic impacts to the landscape. The project site is located in open area with minimal settlement at the edge of Chakama Shopping Centre..

#### Significance of Impact

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

#### Additional Mitigation Measures

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

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

### Impacts on Waste Generation and Soil Contamination

General construction waste generated onsite will comprise of concrete, steel cuttings/filings, packaging paper or plastic etc. solid wastes consisting of food waste, plastic, glass and waste paper will also be generated by the construction workforce. A small proportion of the waste generated during construction phase will be hazardous and will include waste fuel, grease and waste oil containing rags. Used 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 lo since the proponent has managed other solar power projects as well and has effective management systems for waste and hazardous substances being generated or utilized during the project life cycle as part of their Environmental and Social Management Framework.

#### Embedded/in-built control

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

#### Significance of Impact

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

#### Additional Mitigation Measures

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

### Impacts on Water Environment

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

#### Significance of Impact

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

#### Mitigation Measures

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

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

### Impacts from Hazardous Materials

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

#### Significance of Impact

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

#### Mitigation Measures

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

### Fire Hazards

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

#### Significance of Impact

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

#### Mitigation Measures

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

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

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

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

#### Significance of Impact

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

#### Mitigation Measures

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

### Energy Consumption

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

#### Significance of Impact

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

#### Mitigation Measures

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

### Impact on Occupational Health and Safety

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

* + Safety risks such as: tripping; falling due to working at heights; potential fire due to hot work, smoking, failure in electrical installations; electric shocks.
  + Health risks: Injuries such as: lifting, lowering, pushing, pulling and carrying; temporary or hearing loss which usually comes from noise generated from machinery used for excavation or piling work and from compressors and concrete mixers etc.; heat stress and working during high temperatures
  + Occupational hazards due to dust and noise pollution from operating of heavy machinery and vehicular movement in the project sites.
  + Safety risk due to working at heights during installation of power lines
  + Risks of road accidents during the transportation of material and equipment to the project sites owing to the poor road network leading to Kanduru village.
  + The mini grid sites are located in ecological zones associated with flash flooding events. This poses a risk of washing away the mini-grid infrastructure including the power storage units i.e. the batteries making it necessary factor in site design considerations to mitigate against extreme flooding events.

#### Embedded/in-built control

* All construction activities will be carried out during daytime hours and vigilance should be maintained for any potential accidents;
* Personal Protective Equipment (PPEs) including safety shoes, helmet, goggles, ear muffs and face masks;
* Cranes and other lifting equipment are operated by trained and authorised persons;
* Training of the workers on climbing techniques, and rescue of fall-arrested workers;
* Excavated areas should be temporarily fenced to avoid access to outsiders and wildlife

#### Significance of Impacts

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

#### Additional mitigation measures

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

### Community Health and Safety

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

Construction activities will involve the use of machinery and installation of distribution power

lines. Furthermore, the movement of material and personnel via the access roads may result in damage to human life or livestock due to accidents. The major community health and safety risks include structural failure of project infrastructure e.g. power line, fire safety and management of emergency situations.

#### Embedded/in-built control

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

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

#### Significance of Impact

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

#### Additional Mitigation Measures

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

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

### Labour Influx

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

#### Significance of Impact

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

#### Additional Mitigation measures

* In contract documents for the Contractor, MOE/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.
* In selection of a Contractor, MOE/KP should refer to past performance in similar assignments as an indicator of future performance with respect to worker management, worker rights, health and safety as outlined in Kenyan law and international standards.

• Regular checks by MOE/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.

• All workers will have contracts which clearly state the terms and conditions of their employment and their legal rights. Contracts will be verbally explained to all workers where this is necessary to ensure that workers understand the provisions. Contracts must be in place prior to workers reporting to duty for the first time. The contract document will be enhanced by the Code of Conduct that will be provided by the Proponent.

• The Contractor will put in place a worker grievance redress mechanism accessible to all workers, whether permanent or casual, directly or indirectly employed. The Proponent worker grievance mechanism shall be open to the Contractor workforce in the event that their grievance is not adequately resolved by their direct employer. The Proponent will then have the authority to act to resolve this grievance.

• All project workers should have access to training on communicable diseases and STDs and community interactions in general. This training will be developed in collaboration with local health institutions.

• Carry out surveillance to ensure that no children are employed in the project, and to the extent possible by third parties related to the project and primary suppliers where such risk may exist

### Child labour

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

#### Significance of Impact

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

#### Mitigation measures

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

### Impacts on Cultural Heritage

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

#### Significance of Impact

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

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

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

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

### Gender Based Violence, SEA & SH

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

#### Significance of Impact

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

#### Mitigation measures

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

### Exclusion of VMGs, Vulnerable Individuals and Households

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

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

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

* Male headed households (10 households)
* Female headed households (20 households)
* Child headed households (5 households)
* Persons Living with Disabilities (Approximately 2)
* The elderly (80 years and above) (4 households)

#### Significance of Impact

Considering the high sensitivity of the VMGs of the minority groups in the locality identified in the project and medium magnitude, the impact significance is considered to be moderate. However, it important to put into account the project site inhabitants are predominantly the Giriama community and there are plans underway to prepare a VMGP that will take care of interests of the minority communities.

#### Mitigation measures

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

### Risk of Communicable Diseases; HIV/AIDS

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

#### Significance of Impact

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

#### Mitigation measures

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

### Increased Water Demand

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

#### Significance of Impact

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

#### Mitigation Measures

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

### Forced Labor

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

#### Significance of Impact

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

#### Mitigation Measures

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

## POSITIVE IMPACTS- OPERATION PHASE

### Impact on Economy and Employment

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

During the operations phase, the requirement for unskilled and semi-skilled labour is expected to reduce to 5 and 15 respectively. The locally procured services will include maintenance work of the facility, 24-hour security, bush and undergrowth cleaning and housekeeping activities. In addition to this, the community will improve their livelihood and businesses by using the electricity from the project.

#### Significance of Impact

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

#### Enhancement Measures

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

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

### Quality, Reliable Power Supply

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

#### Significance of Impact

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

#### Enhancement Measures

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

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

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

#### Significance of Impact

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

#### Enhancement Measures

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

### Improvement of Local and National Economy

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

#### Significance of Impact

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

#### Enhancement Measures

* KP should ensure that their contractors/suppliers remit taxes and have a tax compliance certificate
* Prioritise local purchases over imports.
* Remit taxes on behalf of employees

### 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.’

#### Significance of Impact

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

#### Enhancement Measures

* KP should consider having the transmission lines are closer to schools for them to benefit from the power supply;
* KP should consider partnering with the county government in providing street lighting to improve security for children and teachers leaving for school early or leaving late for home

### Health Benefits of the Project

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

#### Enhancement Measures

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

### Improved Standard of Living

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

#### Enhancement Measures

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

### Security

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

#### Enhancement Measures

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

### Communications

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

#### Enhancement Measures

Ensure that the power supply is reliable.

## NEGATIVE impacts – Operation phase

### Impact on Soil Environment

#### Soil compaction and Erosion

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

##### Embedded/in-built control

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

##### Significance of Impact

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

##### Additional Mitigation Measures

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

### Waste Generation and management

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

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

#### Embedded/in-built control

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

The hazardous wastes will be stored onsite at separate designated covered area provided with impervious flooring and disposed through NEMA approved hazardous waste handler.

During operation phase, the quantity of municipal waste and hazardous waste generated is less and probability of the hazardous waste generation is only during plant maintenance and therefore occasional. The waste generated would be routed through proper collection and containment.

#### Mitigation measures

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

#### Significance of Impact

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

#### Additional Mitigation Measures

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

### Impact on Water Environment

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

Discussions with the residents in Chakama confirmed that water is a major concern in the area. As noted earlier, the local community rely mainly on surface water sources; River Galana and a salty well with no feasible alternative. Therefore the receptor ( water resource) sensitive is assessed as high.

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

#### Embedded/in-built control

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

#### Significance of Impact

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

#### Additional Mitigation Measures

* Ensure proper cover and stacking of loose construction material to prevent surface runoff and contamination of receiving water point;
* The workforce will be given training towards proactive use of designated areas/bins for waste disposal and encouraged to use toilets. Open defecation and random disposal of sewage shall be strictly restricted;
* Construction workers to be sensitised about water conservation and encouraged use of water optimally;
* Regular inspection for identification of water leakages and preventing wastage of water from water supply tankers.
* Recycling/reusing water to the extent possible.
* The contractor should provide portable/mobile toilets for use on site

### Landscape and Visual Impacts

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

#### Significance of Impacts

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

#### Suggested mitigation measures

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

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

### Increased oil Consumption

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

#### Significance of Impact

The impact will be of minor significance.

#### Mitigation Measures

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

### Increased Storm Water Flow

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

#### Significance of Impact

The impact will be of minor significance.

#### Mitigation Measures

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

### Fire Outbreaks

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

#### Significance of Impact

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

#### Mitigation Measures

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

### Water demand

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

#### Significance of Impact

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

#### Mitigation Measures

* There is need to source for a sustainable water source for use
* Install water-conserving automatic taps
* Encourage water harvesting from rooftops and storage for cleaning purposes (washing the panels off dust)
* Any water leaks through damaged pipes and faulty taps should be fixed promptly.

### Sanitary waste

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

#### Significance of Impact

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

#### Mitigation Measures

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

### Flooding

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

#### Significance of Impact

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

#### Mitigation measures

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

### Noise and Vibration

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

#### Mitigation Measures

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

### Electric and magnetic fields (EMFs)

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

### Dust emissions

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

#### Mitigation Measures

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

### Vehicle exhaust emissions

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

#### Significance of Impact

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

#### Mitigation Measures

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

### Collision and Electrical hazards from Distribution Infrastructure

A number of birds’ species were identified during the impact assessment. These include Speckled Pigeon, Purple-crested Turaco, Common Swift, Black-headed Heron, Speckled Mousebird, European Roller, Cardinal Woodpecker, Black-crowned Tchagra, Red-backed Shrike, Hunter's Sunbird among others.

The distribution lines and poles can potentially constitute an electrocution and collision hazard to birds. Some birds could also utilize the distribution towers for nesting.

#### Embedded/ in-built Control

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

#### Significance of Impacts

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

#### Additional Mitigation Measures

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

* Design of distribution lines should be such so as to minimize the risks of electrocution of birds;
* The distribution poles should be raised with suspended insulators in order to reduce the electrocution of bird species; and

Marking overhead cables using bird-flight deterrents and avoiding use in areas of high bird concentrations of species vulnerable to collision.

### Impact on Occupational Safety and Health

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

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

#### Embedded/in-built control

* All maintenance activities will be carried out during daytime hours and vigilance should be maintained for any potential accidents;
* Personal Protective Equipment (PPEs) including safety shoes, helmet, goggles, ear muffs and face masks;
* Lifting equipment should be operated by trained and authorized persons;
* Training of the workers on climbing techniques, and rescue of fall-arrested workers;

#### Significance of Impacts

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

#### Additional mitigation measures

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

### Impact on Community Safety and Health

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

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

#### Embedded/in-built control

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

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

#### Significance of Impact

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

#### Additional Mitigation Measures

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

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

### Gender Based Violence, SEA & SH

Gender Based Violence (GBV), Sexual Exploitation and Abuse (SEA) may be committed against the communities by the staff during the operation and maintenance of the mini-grids. Incidences of Sexual Harassment (SH) may occur among the staff during operation and maintenance 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.

#### Significance of Impact

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

#### Mitigation measures

* Prepare an Awareness Raising Strategy, which describes how 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.

### Exclusion of VMGs, Vulnerable Individuals and Households

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

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

#### Significance of Impact

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

#### Mitigation measures

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

### Risk of Communicable Diseases

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

#### Significance of Impact

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

#### Mitigation measures

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

### Shocks and electrocutions to the PAPs

Majority of the 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.

#### Significance of Impact

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

#### Mitigation Measures

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

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

### 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.

#### Significance of Impact

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

#### Mitigation Measures

* Employ from the community to the extent possible
* Engage the community members and other stakeholders in a timely manner
* Work closely with the GRM committee members in solving the conflicts
* Solve all conflicts/grievances at the earliest time possible
* Ensure all grievances are logged and closed

Monitoring the pattern of grievances to come up will long term measures.

## Decommissioning Phase

### Preparation for decommissioning

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

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

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

### Employment Opportunities

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

#### Significance of Impact

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

#### Enhancement Measures

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

### Site Rehabilitation

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

## NEGATIVE impacts – Decommissioning Phase

### Impact on Soil Environment

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

#### Significance of Impacts

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

#### Additional Mitigations

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

### Impact on Air Quality

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

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

#### Embedded/in-built control

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

#### Significance of Impact

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

#### Additional Mitigation Measures

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

### Impact on Ambient Noise

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

#### Assessment Criteria for Impact on Ambient Noise

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

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

#### Embedded/in-built control

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

#### Significance of Impact

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

#### Additional Mitigation Measures

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

### Impacts on Waste Generation and Soil Contamination

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

##### Embedded/in-built control

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

##### Significance of Impact

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

##### Additional Mitigation Measures

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

### Impact on Economy and Employment

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

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

#### Significance of Impact

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

#### Additional Mitigation Measures

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

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

Reduction of worker will be done phase wise and corresponding to completion of each activity.

### Impact on Occupational Health and Safety

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

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

#### Embedded/in-built control

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

#### Significance of Impacts

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

#### Additional mitigation measures

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

### Gender Based Violence, SEA & SH

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

#### Significance of Impact

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

#### Mitigation Measures

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

### Exclusion of VMGs, Vulnerable Individuals and Households

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

#### Significance of Impact

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

#### Mitigation Measures

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

### Risk of Communicable Diseases

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

#### Significance of Impact

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

#### Mitigation Measures

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

## Cumulative Impacts

### Cumulative Impact Assessment

It was observed during the site survey that there are no other similar solar projects within the projects site. Thereore, 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.

# ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN (ESMMP)

## Environmetal and social management and monitoring plan

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

The key objectives of the ESMMP are:

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

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

## Monitoring

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

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

During construction phase, the Implementing agency shall monitor the contractor’s activities in order to verify that the management measures/procedures/specifications are implemented as contained in the ESMMP. Compliance will mean that the contractor is fulfilling their contractual obligation.

During operation phase, KPLC will monitor facility’s operations to ensure compliance with management measures in the ESMMP and operation procedures. As part of this monitoring, the KPLC will undertake or statutory initial environmental audit as required by the ESIA/EA Regulations, 2003 and subsequent annual environmental audits.

## Plan Monitoring

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

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

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

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

The Environmental and Social Management and Monitoring Plan (*ESMMP*) will provide the basis for monitoring of potential Environmental, social and health Impacts associated with the project. The ESMMP provides effective observation and documentation of monitorable parameters that will help in analyzing the effectiveness of the proposed mitigation measures with the advantages of improving operational efficiency, promoting competitive advantage, improving risk management, reducing liabilities and improving business performance.

## Environmental and Social Monitoring by Contractors

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. *PAPS e.g., community grievances*: grievance and date submitted, action(s) taken and date(s), resolution (if any) and date, and follow-up yet to be taken—grievances listed should include those received since the preceding report and those that were unresolved at the time of that report. Grievance data should be age and gender-disaggregated.
13. Major changes to contractor’s environmental and social practices.
14. *Deficiency and performance management*: actions taken in response to previous notices of deficiency or observations regarding E&S performance and/or plans for actions to be taken. These should continue to be reported until the proponent determines the issue is resolved satisfactorily.

A detailed Environmental and social management plan for pre-construction, construction, operational and decommissioning phase is well illustrated in the table 7-1.

Table 7‑1: Environmental and Social Management and Monitoring Plan

| **Potential Impacts** | **Recommended Mitigation Measures** | **Project phase** | **Responsibility** | **Monitoring Indicator** | **Frequency** | **Estimated Cost (Ksh)** |
| --- | --- | --- | --- | --- | --- | --- |
| **Local employment** | -Prioritize hire of locals for all unskilled labour.  -Implement a local recruitment plan that is fair and transparent (including recruitment processes that ensure inclusivity of both men and women, vulnerable individuals, minority clans, ethnic groups and VMGs.  -Adhere to labour laws, and labour management practices (timely renumeration, equitable compensation for both genders for equal work etc.)  -Create awareness to workers and the community on worker and project grievance redress mechanisms. | Construction  Operations  Decommissioning | Contractor  Proponent | -Fair and transparent local recruitment plan in place.  -Recruitment processes (job adverts, interviews, selection etc.).  -Number of locals employed based on gender, vulnerability, ethnic group, clan etc.  -Type of employment (skilled, semi-skilled and unskilled).  -Grievances raised, those aggrieved, status of resolution. | Quarterly | Contractor’s cost |
| **Local Sourcing** | -Source materials from local businesses/communities, and where necessary give opportunities to businesses owned or operated by vulnerable individuals. | Construction  Decommissioning | Contractor  Proponent | -Number and types of businesses sourced from, businesses owned and operated by vulnerable individuals, types and quantities of materials etc. | Quarterly | No additional cost |
| **Acquisition of public land for the project**  **Loss of use of public land by communities utilizing public land**  **Loss of improvements made on land** | Affected communities engaged, meaningfully consulted, and informed of their rights and entitlements, compensation options for loss of use on land and improvements made on land.  -Affsected communities to receive the community project they prioritized for loss of use on public land.  Improvements on land to be compensated in line with the provisions of the RPF.  -Affected communities to be given ample notice to vacate the sub-project site. s  -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.  The construction activities will be restricted to within the allocated land and the immediate surroundings only.  -The contractor will implement and adhere to agreements for temporal use of land and restoration of land after use.  -After construction work, any land taken for a temporary basis for storage of material will be restored to their original form. | Pre- Construction | Contractor- *(contractors’ facilities, workers camps)*  Proponent- *(project land for generation)* | - Type of community infrastructure project provided to communities utilizing public land.  -Land Acquisition and consultation report (consultation (minutes and lists of participants). | Quarterly | Value of the community project prioritized by the community in line with the Bill of Quantities. |
| **Labor Influx and related impacts (SEA/SH, HIV/AIDs and other STIs)** | -Tap into the local workforce to the extent possible to reduce labour influx.  -Recruit local workforce to the extent possible especially for unskilled and semi-skilled jobs.  -Consult with and involve local community in project planning and other phases of the project.  -Raise awareness among local community and workers on the need to have a good /cordial working relation  -Sensitize workers regarding engagement with local community.  -Make provision to provide resources needed by the workers if the need for such resources may result to competition e.g., water.  -Establish and operationalize an effective Grievance Redress Mechanism accessible to community members.  -The contractor and the project/community grievance redress committee to work closely address complains raised on time.  -Include gender considerations in employment opportunities.  -Provide appropriate compensation for work done.  -Respect for community values/culture.  -Prompt payment of workers as per the contractual agreements/terms. | Construction  Decommissioning | Proponent, Contractor | -Records of employees/updated employee register.  -Number of local community employees and external employees/ updated employee register. | Quarterly | 50,000.00 |
| **Child labour** | -Employ workers who are 18 years and above, and with a valid national ID at the time of hire.  -Implement and monitor the employment register regularly. Compliance with the national labor laws and labour management practices.  -Put visible signage on site “**No Jobs for children**”  -Do not allow children at the project site. | Construction  Decommissioning | Contractor, Proponent | -Updated employment register indicating locals employed, their ages, national identification numbers etc.  -Grievances raised, aggrieved persons and status on resolution etc. | Quarterly | 20,000.00 |
| **GBV- SEA and SH** | -Prepare an SEA/SH Prevention and Response Action Plan, to manage the SEA/SH risks.  -The Action Plan to be proportionate to potential SEA/SH risks, and to include measures such as awareness creation for communities and workers; identification of referral services for survivors and a GRM that ensures confidential reporting of GBV cases.  -Implement a code of conduct signed by all those with physical presence on site. | Construction  Operations  Decommissioning | Contractor  Proponent | -Minutes of awareness creation sessions for the community and workers on GBV-SEA/SH.  -Code of conduct signed by all those with physical presence on site.  -GRM that ensures confidentiality of GBV cases in place.  Documented referral services for survivors.  -Grievances raised, aggrieved persons and status on resolution etc | Quarterly | 50,000.00 |
| **Forced Labor** | -Adhere to the Employment Act which outlaws any form of forced labour.  -Report any form of forced labour at the site.  -Ensure that all workers have a national ID card or documentation to show they are adults (above 18 years). | Construction  Decommissioning | Contractor  Proponent | -Number of reported cases of forced labour. | Quarterly | 20,000.00 |
| **Risks related to Inadequate stakeholder engagement** | -Prepare a stakeholder engagement/consultation plan (SEP) that is proportionate to the subproject and the identified stakeholders.  -Timely and prior disclosure of project all project information, including project instruments, the full rights and entitlements of project affected persons, sub-project positive and negative impacts and opportunities, proposed subproject budget.  -In line with the SEP, undertake adequate consultations prior to construction and throughout the project cycle with all segments of the community and other relevant stakeholders.  -Prepare and implement a grievance redress mechanism to deal with grievances.  -The grievance redress committee to include representatives from the community.  -Sensitize stakeholders on SEP and GRM. | Construction  Operations  Decommissioning | Contractor | -Availability of and implementation of the Stakeholder Engagement Plan.  -# of stakeholder consultations held  -Record of stakeholder consultations held (minutes of meetings and list of participants).  -Information disclosed, to whom it was disclosed  (men women, PWD, youth, vulnerable individuals and households etc., methods and languages used in the disclosure (culturally appropriate and accessible), grievances raised and status on resolution etc.  -Concerns raised andactons raised. | Quarterly | 30,000.00 |
| **Exclusion of VMGs and vulnerable individuals and households** | In line with the provisions of the ESMF, VMGF and Social Assessment ensure the following.   * Early identification and inclusion of VMGs and disadvantaged groups. * Meaningful consultation to effectively participate in the project. * Timely and prior disclosure of relevant project information to VMGs and disadvantaged groups. * Adequate and ongoing consultations with VMGs and disadvantaged groups in line with the SEP. * All concerns or grievances raised are fully resolved in a timely manner. * Access to culturally appropriate project benefits and opportunities. | Pre-construction  Construction  Operations  Decommissioning | Contractor  Proponent | 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 |
| **Inaccessibility of project benefits to VMGs and other vulnerable individuals due to affordability challenges** | -Consult VMGs and Vulnerable individuals and households on charges for sub project services, and put in place specific interventions to ensure the vulnerable equally access project benefits. | Operations | Proponent;O&M Contractor | -Interventions to enable those vulnerable access project benefits.  -Number of complaints raised by VMGs/vulnerable individuals regarding access to project services.  -GRM that is culturally appropriate and accessible.  Grievances raised and status on resolution etc | Quarterly | No additional cost |
| **Inadequate grievances management** | -Constitute a Local Grievances Committee is in consultation with all community segments, and incorporates the existing local dispute resolution mechanism.  -Implement a workers grievances mechanism.  -Awareness on the culturally appropriate and accessible GRM to all community segments  including VMGs, vulnerable individuals and households and CSOs  -All reported grievances are logged, dated, processed, resolved and closed out in a timely manner.  -Proportionate representation of VMGs and vulnerable individuals in the local grievances committee.  -GRM provides for confidential reporting of particularly sensitive social aspects such as GBV, as well as anonymity. | Construction  Operations  Decommissioning | Contractor  Proponent | -Local Grievances Committee in place, composition of committee, awareness of community and workers on project and worker GRMs, updated GRM logs, types of grievances  -Availability of grievance redress process  -Number of grievances reported  -Number of grievances resolved in a timely manner  -Number of grievances escalated to national courts and the World Bank Grievances Redress Service and Inspection Panel. | Quarterly | No additional cost |
| **Environmental Impacts** | | | | | | |
| **Vegetation clearance** | 1. Clear only the necessary areas 2. Ensure proper demarcation and delineation of the project area to be affected by construction works. 3. Specify locations for vehicles and equipment, and areas of the site which should be kept free of traffic, equipment, and storage. 4. Designate access routes and parking areas 5. Re-vegetation including planting of trees around the plant/facility | Construction | Contractor | -Number of trees cleared  -Planted trees | Once off | 50,000.00 |
| **Soil erosion** | 1. Avoid groundbreaking during the seasons of high rainfall to avoid erosion. 2. Monitoring of areas of exposed soil during rainy seasons to ensure that any incidents of erosion are quickly controlled. 3. Construction related impacts like erosion and cut slope destabilizing should be addressed through landscaping and grassing, carting away and proper disposal of construction materials 4. Use silt traps where necessary 5. Cover soil stock piles 6. Landscaping with grass on areas without electrical installation (lower areas) 7. Monitoring of areas of exposed soil during rainy seasons to ensure that any incidents of erosion are quickly controlled. | Construction | Contractor | Assess size of rills or Gulleys forming from accelerated run off from compacted areas | Quarterly | Part of contractor’s fee |
| **Contamination of soil from fossil fuels** | 1. Ensure waste water generated is discharged or drained into approved drainage facilities 2. Construction vehicles must be maintained in good state and proper servicing to ensure no oils are likely to leak 3. Care must be exercised not to spill any fossil fuels 4. Any contaminated soil shall be scooped and disposed-off appropriately. 5. No servicing vehicles on site | Construction | Contractor | Records of any leakages from construction equipment/ vehicles. | Quarterly | 50,000.00 |
| **Dust emissions** | 1. The construction area should be fenced off to reduce dust to the public 2. Suppress dust during dry periods by use of water sprays; 3. Stockpiles of excavated soil should be enclosed/covered/watered during dry or windy conditions to reduce dust emissions. 4. Burning of woody debris & construction waste to be prohibited 5. Use of personnel protective equipment (PPE) -masks should be provided to all personnel in areas prone to dust emissions 6. Restrict speed on loose surface roads during dry or dusty conditions 7. Keep stockpiles and exposed soils compacted and re-vegetate as soon as possible. 8. Construction trucks moving materials to site, delivering sand and cement to the site should be covered to prevent material dust emissions into the surrounding areas 9. Plant short trees to break speed of wind | Construction | Contractor | -Visual Observation of dust  -Provision of PPEs especially masks | Daily | 100,000.00 |
| **Vehicle exhaust and emissions from Generator** | 1. Drivers of construction vehicles must be sensitized so that they do not leave vehicles idling so that exhaust emissions are lowered. 2. Maintain all machinery and equipment in good working order to ensure minimum emissions of carbon monoxide, NOX, SOX and suspended particulate matter 3. Maintain equipment in good running condition – no vehicles to be used that generate excessive black smoke 4. Use of diesel which is Sulphur- free to run the power producing generators to be encouraged 5. The stack chimney of the generators will be increased from its normal height of 3 meters to 6 meters | Construction | Contractor | -Engine maintenance records  - inspection of stacks | Quarterly | 100,000.00 |
| **Solid waste generation** | 1. Ensure spoil from excavations is arranged according to the various soil layers. This soil can then be returned during landscaping and then rehabilitation, in the correct order which they were removed that is top soil last; 2. Segregate waste 3. Provide litter collection facilities such as bins 4. Contractor to put in place and comply with a site waste management plan 5. The contractor should comply with the requirement of OSHA ACT 2007 and Building rules on storage of construction materials 6. Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of waste generated over time 7. Recovery of materials remains and return to stores 8. Re-use of materials where possible 9. Proper budgeting to avoid waste generation 10. Proper disposal of waste in line with solid waste regulation 11. Construction wastes to be managed in accordance with construction standards in Kenya | Construction | Contractor | Presence of well-maintained receptacles and centralized collection points | Quarterly | 100,000.00 |
| **Impacts on Water Resources and Water Quality** | 1. Clear the necessary areas only. 2. Appropriate remedial measures shall be implemented by the contractor in the event of erosion. 3. Infrastructure shall be designed to ensure that contaminated run-off does not reach water source i.e., earth dam. 4. Contractor to develop an oil-spill containment plan as part of the emergency response plan. In the event of an oil spill the procedures contained in the emergency response plan of the contractor will come into effect. 5. No vehicle maintenance and service shall be done at project site 6. Ensure that potential sources of petro-chemical pollution are handled in such a way to reduce chances of spills and leaks. | Construction | Contractor | -Oil spill containment plan.  -Provision of fuel/oil drip and spill trays | Quarterly | 150,000 |
| **Noise & vibration** | 1. Construction activities to avoid any unchanneled flow of water at the site 2. Storage areas that contain hazardous substances should be bunded with an approved impermeable liner and provision for a pit to be made in case of oil spill. 3. The excavation and use of rubbish pits during construction should be strictly prohibited. 4. A waste disposal area should be designated within the active construction area and this should be equipped with suitable containers i.e., skips or bins of sufficient capacity and designed to contain and prevent refuse from being blown by wind, 5. Areas contaminated by spilled concrete and/or fuels and oils leaking from vehicles and machinery should be cleaned immediately | Construction | Contractor | Noise levels-Records of noise measurements done by contractor within the project area and at distances of 30m from the Solar mini-grid | Quarterly | 150,000.00 |
| **Impacts from Hazardous materials -** | 1. Maintenance of construction vehicles will not be done on site 2. All hazardous products and waste should be labelled and handled properly to avoid contact with the ground 3. Dispose hazardous waste through a NEMA approved waste handler | Construction | Contractor | Presence of well-maintained receptacles and centralized collection points | Quarterly | 100,000.00 |
| **Accidental Oil Spills or Leaks** | 1. In the event of accidental leaks, contaminated top soil should be scooped and disposed of appropriately. 2. Refuelling and maintenance of vehicles will not take place at the construction site. 3. Create awareness for the employees on site on procedures of dealing with spills and leaks 4. Vehicles and equipment must be serviced regularly and kept in good state to avoid leaks. 5. In case of spillage the contractor should isolate the source of oil spill and contain the spillage using sandbags, sawdust, absorbent materials and/or other materials approved by materials. 6. All chemicals should be stored within the bunded areas and clearly labelled detailing the nature and quantity of chemicals within individual containers. | Construction | Contractor | Records of all accidental spills and number of Liters | Quarterly | 150,000.00 |
| **Fire Hazards** | 1. Create awareness to the construction workers on potential fire hazards 2. Provision of firefighting equipment on site during construction. 3. No smoking shall be done on construction site 4. ‘No smoking’ signs shall be posted at the construction site 5. A fire risk assessment and evacuation plan should be prepared and must be posted in various points of the construction site including procedures to take when a fire is reported. 6. Designate an assembly point | Construction | Contractor | -Records of any Fire incidences  -Fire equipment and evacuation plan | Quarterly | 100,000.00 |
| **Impacts of construction material sourcing (e.g., quarrying)** | 1. Source all building materials such as stone, sand, ballast and hard core from NEMA approved sites. 2. Ensure accurate budgeting and estimation of actual construction materials to avoid wastage. 3. Reuse of construction materials where possible. | Construction | Contractor | Sources of raw materials (from local community) | Quarterly | Part of contractor’s cost |
| **Increased water demand** | 1. Prudent use of available water 2. Consultations with the project local committee on use of water in the community to avoid conflicts with the community 3. Source and utilize a sustainable and reliable water supply for both construction and operation phase. | Construction | Contractor | Water usage records | Quarterly | Part of contractor’s cost |
| **Energy Consumption** | 1. Ensure responsible electricity use at the construction site through sensitization of staff to conserve electricity by switching off electrical equipment or appliances when they are not being used. 2. Proper planning of transportation of materials will ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts. 3. Complementary to these measures, they monitor energy use during construction and set targets for reduction of energy use. | Construction | Contractor | Energy consumption records | Quarterly | No additional cost |
| **Occupational Health and safety Impacts** | 1. Use skilled personnel for activities which demand skills/technical tasks 2. Awareness creation/Tool box talks on safety to workers while at construction site 3. Workers coming to the site should be knowledgeable on safety precautions to take 4. Appropriate PPE (helmet, safety harness, boots, masks, climbing irons) 5. Proper general house keeping 6. Close supervision of workers 7. Risk assessment by contractor of the construction activities and implement mitigation measures appropriately 8. Adherence to occupational Safety and Health Act 2007 9. Availability of equipped first aid box on site 10. Provide safe drinking water for workers 11. Engagement of trained first aider on site 12. Ensure the WIBA cover is taken for the staff 13. Establish safety committees | Construction | Contractor | Records of any near misses, incident, and accidents.  Records of corrective actions implemented if there was an accident. | Quarterly | 1,000,000.00 |
| **Community safety –access** | 1. Proper barricading 2. Hazard communication. 3. Controlled access to the site by designated personnel 4. Maintain records of any person who comes to site | Construction | Contractor | Presence of a controlled access and records of every person accessing the site | Daily | 20,000.00 |
| **Public Health Impacts** | 1. Sensitize workers and the community on prevention and mitigation of HIV/AIDS and other sexually transmitted diseases, through staff training, awareness campaigns and community *Barazas.* 2. Awareness creation and consultations with local communities prior and during construction on the dangers of these diseases 3. Informing workers on local cultural values and health matters. 4. Provision of condoms to workers 5. Allowing migrant workers time to be with their families 6. The contractor is impressed upon not to set a construction camp on site. 7. The contractor will provide public education/information about HIV/AIDS transmission and prevention measures. 8. Ensure equal treatment of workers 9. Provide all appropriate COVID-19 preventive measures including campaign to maintain individual measures at the workplace. | Construction | Contractor | Number of awareness creation sessions conducted.  -Availability of and distribution of condoms | Quarterly | 20,000.00 |
| **Sanitary waste** | 1. Construct/ install pit latrines for both genders clearly labelled | Construction | Contractor | Presence of separate and clean washrooms for both the gents and ladies | Quarterly | 300,000.00 |
| **Solid Waste Generation** | 1. Provide waste handling facilities such as labelled waste bins 2. Emphasis on prudent waste generation and give priority to reduction at source 3. Solid waste management awareness to operators 4. Operator to contract a NEMA licensed waste handler to collect and dispose solid waste | Operation | Proponent;O&M Contractor | Presence of well-maintained receptacles and centralized collection points | Quarterly | 50,000.00 |
| **Liquid Waste/Oils Generation** | 1. Proper storage of the oil is required to ensure no leakages 2. Frequent inspection and maintenance of the generator to minimize leakages. 3. No vehicles should be serviced or maintained at the Mini-grid area. 4. The waste oil or used oil must be disposed-off appropriately. 5. Proper training for the handling and use of fuels for the operators of the Mini-grid. 6. In the event of accidental leaks, contaminated top soil should be scooped and disposed of appropriately. | Operation | Proponent;O&M Contractor | -Engine maintenance records  -Oil spill containment plan | Quarterly | 200,000.00 |
| **Increased oil Consumption** | 1. Efficient energy consumption 2. Install an energy-efficient lighting system | Operation | Proponent;O&M Contractor | Energy consumption records | Quarterly | No additional cost |
| **Increased storm water flow** | 1. Construct the drainage system in a way to follow natural drain of the water 2. Concrete only the required area and leave the rest of the land with vegetation like grass 3. Construct rain water harvesting system on the control buildings/office and harness into storage tanks for use | Operation | Proponent;O&M Contractor | Provision of a drainage system and a rain water harvesting system | Quarterly inspections | 200,000.00 |
| **Fire Outbreaks** | 1. The power plant must contain firefighting equipment (Portable fire extinguishers) of recommended standards and in key strategic points 2. Detection/alarm systems that can detect fire should be and installed 3. A fire evacuation plan should be prepared and posted at strategic points and should include procedures to take when a fire is reported. 4. Workers especially operators of the plant must be trained on fire management 5. ‘No smoking’ signs shall be posted within the Mini-grid area 6. A fire Assembly point should be identified and marked | Operation | Proponent;O&M Contractor | -Provision of serviced fire equipment, evacuation plan and safety signages  -Records of fire safety training | Quarterly | 50,000.00 |
| **Visual Impacts** | 1. Fence round the solar Mini-grid to keep off/screen the solar panels. | Operation | Proponent;O&M Contractor | Presence of a perimeter fence | Quarterly inspections | No additional cost |
| **Water demand** | 1. Ensure prudent use of water. 2. Install water-conserving automatic taps. 3. Any water leaks through damaged pipes and faulty taps should be fixed promptly. | Operation | Proponent;O&M Contractor | Water usage records | Quarterly | 20,000.00 |
| **Sanitary waste** | 1. Provide sanitary waste facilities for both genders clearly marked 2. Disposal of waste through septic tanks | Operation | Proponent;O&M Contractor | Presence of separate and clean washrooms for both the gents and ladies | Quarterly | No additional cost |
| **Flooding** | 1. Ensure drainage channels are free of any obstruction at all times i.e., not blocked 2. Construct more channels and or expand existing ones 3. Raise foundations of the solar panels and ensure a proper and from concrete base 4. Create flooding diversions and or spill ways to divert water from getting into the solar power facility | Operation | Proponent;O&M Contractor | -Provision of drainage system  -Raised foundations for the structures | Quarterly | 100,000.00 |
| **Occupation health and Safety** | 1. Ensure only qualified staff are employed to work in the facility 2. All workers operating the Mini-grid must be equipped with appropriate and adequate person protective equipment (PPE) such as; safety footwear, helmet among others. 3. Operators must be skilled on firefighting management 4. Annual environmental audits should be done 5. WIBA cover for staff is mandatory | Operation | Proponent;O&M Contractor | -Provision of PPEs and WIBA cover  -Environmental audit reports | Quarterly | 100,000.00 |
| **Hazardous waste-damaged panels** | 1. Segregation from other waste streams 2. Proper disposal through a NEMA approved/licensed handler | Operation | Proponent;O&M Contractor | Presence of well-maintained receptacles and centralized collection | Quarterly | 200,000.00 |
| **Noise and Vibration** | 1. Generator room should be sound proof to ensure no noise of a nuisance level will be produced. 2. Monitor noise levels | Operation | Proponent;O&M Contractor | Noise levels-Records of noise measurements done by contractor within the project area and at distances of 30m from the Solar mini-grid | Quarterly | Part of contractor’s cost |
| **Shocks and electrocutions** | 1. Inspect the wiring of the houses before connecting power 2. Safety awareness campaigns to the community before connection of power on safety precautions such as:    * Require community to engage a certified technician to do wiring in the premises    * Use of quality materials while wiring    * Refraining from individual illegal extensions of power lines to other houses    * Observing safety measures while using electricity such as not 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 | Operation | Proponent;O&M Contractor, Consumer | -Records of awareness sessions conducted  -Incidences report | Quarterly | No additional cost |
| **Community Safety- Access to site by general public** | 1. Fencing off the facility to keep of community members, children and livestock from entering into the facility 2. Controlled access to the site only with prior approval 3. Maintain records of any person who comes to site | Operation | Proponent;O&M Contractor | Presence of a controlled access and records of every person accessing the site | Daily | Part of contractor’s cost |
| **Risks related to poor or inadequate stakeholder engagement (Conflict)** | 1. Employ from the community to the extent possible 2. Engage the community members and other stakeholders in a timely manner 3. Work closely with the GRM committee members in solving the conflicts 4. Solve all conflicts/grievances at the earliest time possible 5. Ensure all grievances are logged and closed 6. Monitoring the pattern of grievances to come up will long term measures | Operation | Proponent;O&M Contractor | Grievance records | Quarterly | 20,000.00 |
| **Gender Based Violence –SEA and SH** | To manage GBV risks, the contractor will prepare a SEA/SH Prevention and Response Action Plan that will include a GRM that ensures confidentiality. The plan will include the necessary measures for prevention and response and must ensure survivor-based approach | Operation | Proponent;O&M Contractor | -SEA/SH Prevention and Response Action Plan  -Grievance records | Quarterly | 20,000.00 |
| **Public Health Impacts –HIV/AIDs** | 1. Sensitize workers and the community on prevention and mitigation of HIV/AIDS and other sexually transmitted diseases, through staff awareness and awareness campaigns for the community 2. Provision of condoms to workers 3. Allowing migrant workers time to be with their families | Operation | Proponent;O&M Contractor | Number of awareness creation sessions conducted.  -Availability of and distribution of condoms |  | 20,000.00 |
| **Public health Impacts -Covid 19 disease** | 1. Social distance must be observed 2. Provision of hand wash facilities before access 3. Temperature check and monitoring of the temperature of workers and any other person coming to site 4. Enforce wearing of masks 5. Make provision for testing and treating especially of workers 6. Provision of contact numbers for the nearest health facility for testing and treatment 7. Adhering to any other measures from the ministry of health which may be issued from time to time | Operation | Proponent;O&M Contractor | Availability of hand washing facilities  Utilization of hand washing facilities  Number of Covid-19 cases reported | Quarterly | 30,000.00 |
| **Dust Emission** | 1. Trees can be planted around the plant/facility provided they do not cast shadows to the solar panels to act as wind breakers and hence decrease dust pollution 2. Ensure planting of grass around and within the facility compound | Operation | Proponent;O&M Contractor | Visual inspection | Quarterly | 50,000.00 |
| **Vehicle Exhaust Emissions** | 1. Drivers of the vehicles must be sensitized so that they do not leave vehicles idling so that exhaust emissions are lowered. 2. Company vehicles should be well maintained | Operation | Proponent;O&M Contractor | Engine maintenance records | Quarterly | No additional cost |
| **Noise and Vibration** | 1. Install portable barriers to shield compressors and other small stationary equipment where necessary. 2. Use quiet equipment (i.e., equipment designed with noise control elements). 3. Co-ordinate with relevant agencies in case the noise produced will require a license. 4. Limit pickup trucks and other small equipment to a minimum idling time and observe a common-sense approach to vehicle use and encourage workers to shut off vehicle engines whenever possible. 5. Demolish mainly during the day when most of the neighbours are out working. | Decommissioning | Contractor | Noise levels-Records of noise measurements done by contractor within the project area and at distances of 30m from the Solar mini-grid | Once off | 20,000.00 |
| **Solid Waste Generation** | 1. Demolition contractor to adhere to the various manufacturer’s guidelines and requirements regarding demolition and disposal 2. Segregation of waste in order to separate hazardous waste from non-hazardous waste and other streams of waste 3. Provision of facilities for proper handling and storage of demolition materials to reduce the amount of waste caused by damage or exposure to the elements 4. Adequate collection and storage of waste on site 5. Safe transportation to the disposal sites / designated area 6. Hazardous waste must be disposed by NEMA approved waste handler | Decommissioning | Contractor | Presence of well-maintained receptacles and centralized collection points | Daily | 700,000.00 |
| **Dust Emissions** | 1. Cover all trucks hauling soil, sand and other loose materials or require all trucks to maintain at least two feet of freeboard | Decommissioning | Contractor | Visual inspection | Daily | 20,000.00 |
| **Public Health- HIV/AIDS** | The project will sensitize workers and the surrounding communities on prevention and mitigation of HIV/AIDS and other sexually transmitted diseases, through staff training and awareness campaigns/ to the community. | Decommissioning | Contractor | Records of awareness creation sessions conducted.  -Availability of and distribution of condoms | Once off | 20,000.00 |
|  | Total |  |  |  |  | 4,380,000.00 |

Table 7‑2: *Institutional Framework and Compliance / Implementation of the ESIA/ESMMP*

|  |  |  |
| --- | --- | --- |
| **No** | **Institution** | **Role/Function** |
|  | The National Environment Management Authority (NEMA) | NEMA:   * Approves the ESIA Report; * Issues EIA License for project implementation; and * Carries out independent Audit to determine compliance with ESMMP. |
|  | Directorate of Occupational Safety and Health Services (DOSHS) | DOSHS:   * Provides OSH permits for workplaces of the project including campsites and quarries; and * Conducts inspections to ensure conformance to OSHA. |
|  | Water Resources Authority (WRA) | WRA:   * Provides necessary water abstraction permits for boreholes and surface water sources (rivers, streams etc.); and * Monitors water use in the region and provide guidance water use. |
|  | National Land Commission (NLC) | NLC:   * Exercise the powers of compulsory land acquisition and acquire the identified land for the purposes of project construction; and * Transfer of land ownership details to the proponent. |
|  | National Gender and Equality Commission | The Commission:   * Ensures that there is gender equality and equity throughout the implementation of the project; and * Representatives will monitor and evaluate gender quality and equity with regards to job provision and harassment cases on site to ensure compliance with the law |
|  | Department of Culture, Gender, Youth, Sports & Social services department of Kilifi County. | * Work with poor, marginalized, vulnerable and disadvantaged communities as its primary target group will ensure that this group is supported and is not left out of the project implementation. |
|  | County Government of Kilifi | County Governments will:   * Provide approval for the project & project site; * Approval of community land consent & verification; and * Provide support. |
|  | Supervision Consultant | Supervising Consultant:   * Will engage the following dedicated full-time safeguards staff to support risk management: * Supervising Engineer (RE) * Social Safeguards Specialist * Environmental Safeguards Specialist * Review and approval of the ESMMPs and other plans; * Day to day supervision of Contractor implementation of the ESMMPs and other plans; * Regular reporting on the ESMMP implementation; and * Has full time Environmental, Health and Safety and Social Specialists |
|  | Contractor | Contractor:   * Will engage the following dedicated full-time safeguards staff; * Environmental Safeguards Specialist * Social Safeguards Specialist * Registered Occupational Health and Safety (OHS) Expert * Community Liaison officer to act as link between the community and contractor and to support the social specialist. * Will Prepare the C-ESMPs informed by the proponent’s ESMMP and other plans before commencing construction; * Will Operationalize and implement the C-ESMPs; * Carries out day to day management of ES, H& S risks; and * Reports on incidents and accidents to the Resident Engineer and regulators. |

## Management Plan during Construction Phase

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

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

### Construction Management Plan

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

1. **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.

1. **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

1. **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.

1. **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.

1. **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 KP and the neighbours e.g., the wayleaves agreements signed between Kenya power and landowners will need to be respected by the contractors.

1. **Complaints Register**

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

1. **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.

### Rehabilitation and Site Closure Plan

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

### Local Recruitment Plan

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

In designing the local recruitment plan contractor shall:

* Comply with the provisions of Employment Act, 2007
* Wherever possible, give priority to qualified local people when hiring employees.

The mitigation measure is:

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

### Workplace Health and Safety Plan

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 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.

### Community Health and Safety Plan

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

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

### Emergency Preparedness Plan

The Contractor shall develop an emergency plan that will enable rapid and effective response to all types of environmental emergencies in accordance with recognized national and international standards.

The emergency plan shall include establishment of a network of communication between the Contractor and emergency services including police, ambulance services, and fire brigades among others.

### SEA/SH Prevention and Response Action Plan

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

The mitigation measures shall include:

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

### Stakeholder Engagement Plan

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

* To help improve project design and implementation
* To inform third parties about changes that affect them
* To take their views into account in the implementation of projects
* To identify adverse impacts and mechanisms to enhance project benefits
* To identify risks from and to a project
* To increase project ownership and sustainability
* To comply with Bank policies that require consultations

The plan shall put this measure in to consideration:

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

### Labor Influx Management Plan

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

The objectives of this plan are as follows:

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

The plan shall consider these measures:

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

### Grievance Redress Mechanism

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.

#### Grievance Mechanism

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

The Land Acquisition Tribunal established under the Land Act 2012 (Part VIIIA 133A) has the jurisdiction to hear and determine appeals from the decision of the NLC on the process of compulsory land acquisition of land. However, if a party is dissatisfied by the decision of the tribunal, they may appeal to the Environment and Land Court. The court will deal with land related disputes. However, the Land Act 2012 and Environment and Land Court Act 2011 advocates for Alternative Dispute Resolution (ADR) methods in tackling land related disputes. ADR approaches will be given preference and based on customary rules, arbitration, or third-party mediation. ADR will be promoted or defended as a resolution to disputes related to land. The affected persons and other stakeholders also have a right to access the World Bank Redress Service (GRS) and the World Bank Inspection Panel at no cost.

#### National Grievances Redress Committee (NGRC)

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

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

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

**Functions of the National Grievances Redress Committee**

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

#### County Grievance Redress Committees (CGRC)

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

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

1. Representative of NLC, to grant legitimacy to the acquisition process and ensure that legal procedures as outlined in Land Act 2012
2. Representative of the implementing agency
3. Representative of NEMA to handle environmental issues
4. The County Administration representative, which will provide the much-needed community mobilization, and support to the sub-project.
5. County Land Survey Officer will survey all affected land and produce maps.
6. The County Gender and Social Development Officer who will be responsible for ensuring gender programs are adhered to.
7. The County Lands Registrar will verify all affected land and validate the same.
8. Two PAP representatives from Location Grievance Resettlement Committee – act as voice for the PAPs
9. NGOs and CBOs locally active in relevant fields

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

1. Ensuring effective flow of information between PAPs and the implementing agency
2. Coordinate Locational Grievance Redress Committees (LGRC)
3. Coordinate activities between the various organizations involved; facilitate grievance and conflict resolution; and provide support and assistance to vulnerable groups.
4. Conducting extensive public awareness and consultations with the affected people so that they can air their concerns, interests, and grievances.
5. 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.

#### Locational Grievance Redress Committee (LGRC)

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

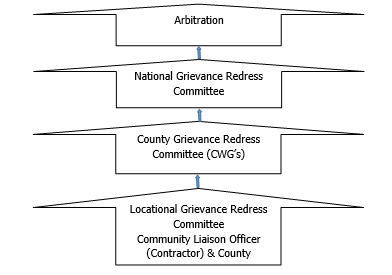
The LGRCs will work under guidance and coordination of CGRC and the implementing agencies. Their membership will comprise of the following:

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

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

**The roles of LRCCs** will include among others the following:

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



*Figure 7‑3: KOSAP Grievance Redress Mechanism*

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

It is expected that most disputes will be resolved at the lowest level-Locational Grievance Redress Committee and since most disputes arise during the Construction and operation period the contractor’s Environmental and Social Safeguard team specifically the Community Liaison Officer will work closely with the community to be able to resolve disputes.

Responsibilities of the Community Liaison Officer include:

* Monitor day to day Implementation of the Project
* Address grievances as they arise on the project
* A member of the Locational and County Grievances Redress Management Committee to respond on issues that may have been brought to the attention of the committee before escalating to the National Grievance Redress Committee
  + - * Escalate grievances internally to get a lasting solution

**Existence of a Local Grievance Redress Mechanism in Chakama**

A Local grievance redress committee was constituted in 2019. The LGRM that consists of 5 members, was not active during the site visit. It is anticipated that the committee shall become active during the construction and operation phase of the project. The LGRM is composed of the following members of the project committee:

* + - 1. The area chief;
      2. 1 Youth representative;
      3. 1 Female representative; and
      4. 2 Male representative.

# IMPACT SUMMARY AND CONCLUSION

## Introduction

This chapter gives a summary of impacts, conclusion and recommendations

## Summary of impacts identified and assessed

### Pre-construction Phase Impacts

A number of impacts have been identified as a result of the pre-construction of the proposed Chakama project. The impacts in this phase will be associated to land acquisition and stakeholder engagements.

The significance of the land acquisition is minor prior to the application of appropriate mitigation measures, while that of stakeholder engagement is of major significance. With the application of appropriate mitigation measures, the significance of all the identified negative impacts associated with this phase will be reduced to minor or negligible.

### Construction Phase Impacts

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

The significance of the identified negative impacts associated with the construction phase is moderate prior to the application of appropriate mitigation measures. The significance of two of the identified negative impacts associated with the construction phase, specifically: impacts related to labour and working conditions and visual impacts are minor prior to the application of appropriate mitigation measures. With the application of appropriate mitigation measures, the significance of all the identified negative impacts associated with the construction phase will be reduced to minor or negligible.

### Operational Phase Impacts

A number of impacts have also been identified to be associated with the operational phase of the proposed Chakama solar project. Of these impacts, four (collectively referred to as Impacts on Employment, Procurement and the Economy) will be positive impacts. Prior to the application of appropriate mitigation measures, none of the identified negative impacts will be of major significance during the operational phase. With the application of appropriate mitigation measures, the significance of all the identified negative impacts associated with the operational phase will be reduced to MINOR or NEGLIGIBLE.

All negative impacts associated with the project have been mitigated to a level which is deemed appropriate for the operational phase of the PV power facility to be sustainable.

### Decommissioning Phase Impacts

A number of impacts have been identified as a result of the decommissioning of the proposed Chakama project. The significance of the identified negative impacts associated with the pre-construction phase is moderate to minor prior to the application of appropriate mitigation measures. With the application of appropriate mitigation measures, the significance of all the identified negative impacts associated with the decommissioning phase will be reduced to minor or negligible.

## Conclusion AND RECOMMENDATIONS

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

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

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

# APPENDICES

|  |  |  |
| --- | --- | --- |
| **No** | **Appendix** | **Item** |
| 1 | Appendix 1 | Meeting Leading to Land identification and GRC Constitution |
| 2 | Appendix 3 | Minutes of the ESIA Meeting |
| 3 | Appendix 4 | Public Meeting Participants’ Lists |
| 4 | Appendix 5 | Focus Group Discussion Participants Lists |
| 5 | Appendix 6 | NEMA Experts Licences |

## APPENDIX 1 – MEETING LEADING TO LAND IDENTIFICATION AND GRC CONSTITUTION

**MINUTES OF COMMUNITY CONSULTATION MEETING LEADING TO VOLUNTARY LAND DONATION AND GRC CONSTITUTION FOR PROPOSED CHAKAMA MINIGRID HELD ON 26/09/2020 AT CHAKAMA VILLAGE**

**Min: 1 Agenda:**

* Preliminaries
* Project design
* Land acquisition consultations
* Positive and Negative impacts of the proposed project /mitigation measures
* Way forward
* A.O.B

**MIN 2 Meeting Preliminaries**

The meeting started at 11.30am with a word of prayer from an elder, the area chief welcoming the visitors to Chakama village. He then requested Ward administrator Mr Dominic to do the introduction part to the visitors. He welcomed the team from MoE, KPLC, REREC and Kilifi county government in a special way, he further welcomed the community members present for attending the developmental meeting in the community. He further emphasized the importance of having electricity in their community since it will improve their standards. The ward Admin thanked the visitors for finding time to come and share with the community details about the project, its economic benefits, electricity connection procedures and land requirements. He said the community was open to any project that was meant to uplift their livelihoods and their way of life stressing that the area was under developed. For many years the community had been yearning for electricity and pointed out that it was by the grace of God that this was about to be realised. The Ward Admin then invited the County Renewable Energy Officer (Mr. Abel) to address the community and then introduce the visiting team from the county government of Kilifi to address the Baraza.

The area Member of County Assembly (MCA) Stanley welcomed members to the meeting and urged the community to grab the opportunity and get connected. He stressed on the need for land donation, survey to be done by both county and PIU surveyor, need for the community engagement and partnership for the project implementation, he also talked urged the project proponent to start preparing and implement the project without delays because the community yearned to be connected to electricity supply.

**Min 3. Introduction of the Project Implementation Unit Team (PIU)**

Simon Mwangangi thanked all community members present and invited Eng. Isaac Kiva (Secretary for Renewable Energy, MoE) to address the baraza and introduce team members from MoE, KPLC and REREC. The visiting team introduced themselves as follows;

Irene Maina - Wayleaves Officer - KPLC

Simon Mwangangi - Environmental & Social Specialist - KPLC

Joseph Korir - Surveyor – KPLC

Samwel Olela - Environmental Officer – REREC

Eng Zadock Rotich - Engineer – KPLC

Dorothy Kagweria - Ministry of Energy

Eng. Kiva briefed the community on KOSAP, the benefits of the project, and why the government was undertaking the project. In his address, he reiterated that the project would be implemented with funding from the World Bank and that in order to make connection affordable, the connection cost would be one (1) thousand Kenya shillings per household. He further explained the need for the community to cooperate and facilitate land donation for construction of the solar mini-grid. He also mentioned the partnership between the county government and national government to develop each sector of the economy and the vision to increase electrification as one of the government priorities. He thanked members present for their overwhelming turn up and then invited Eng. Zadock to give a brief of the project details.

**MIN. 4 Project Design**

*Eng. Zadock* from KPLC explained to the meeting that the government of Kenya through vision 2030 was planning to have every household connected with power, and since Chakama village was many kilometres from the National Electricity grid, the government had come up with this project called Kenya Off Grid Solar Access Project (KOSAP) that is meant to connect Kenyans in the marginalized areas.

He went further to explain to the members present that the proposed mini-grid solar project would consist of Solar panels and a standby diesel generator and targets 554 residential households and 7 non- residential users through a proposed Low Voltage (LV) network of approximately 13 kilometres in length. He told them that connection of power will involve passing of electrical lines along the road reserves in order to reach their houses, business premises and public facilities and the route for passing the lines is called way leave. He noted that once the designs are done, the community will be notified of the exact routes during future consultations and that they will be required to give way leave consents.

*The County Business Manager* – Kilifi (Dr. Bomba) then addressed the occasion and mentioned that he was the KPLC manager in-charge of Kilifi County and he had started this journey from project conception, to implementation and see customers get connected to supply and thereafter progressing the journey through the Operation phase of the project. He explained that each household would be connected to power and the connection cost had been reduced from the current rate of Kshs 15,000.00 to 1,000.00. . He also explained that power is not all about switching but usage. The wiring should be done by a qualified person. He also mention that maintenance of the power lines and the mini-grid power station would be done by KPLC and all payments should be done to KPLC office in Kilifi or through M-pesa number that would be provided and customers should ensure all payments are directed to KPLC and official receipts or reference generated.

**MIN 5 Land acquisition process**

The Surveyor, Mr Joseph Korir told the Baraza that the land required for the construction of the Mini grid was a minimum of 2 acres. He said that the main purpose of the Baraza was to seek community consent for land acquisition for the project. He revealed that there are three land ownership categories in Kenya which are Community land, Private land and Public land. The Surveyor informed the meeting of the various forms of acquiring interest in land which include; allocation, land adjudication process, compulsory acquisition, settlement programs, transfers, donation and long-term leases. He noted that the government of Kenya had secured a loan from its development partners i.e. World Bank to implement the KOSAP project. He went on to explain that the national government together with the implementing agencies and the county government have to follow the law in acquiring land for the proposed mini-grid. He explained to the community that they have rights and entitlements regarding to their land and that the community has the freedom/right to decide on land donation to the proposed project.

He went on and explained the criteria to be followed once the community decided to voluntarily donate land which includes;

1. The impacts on the land donated should be minor and should not require physical relocation of individuals, households, institutions or business entities.
2. The land to be donated must be identified by the community and technical officers can help ensure that the land is appropriate for the project purpose and that the project will produce no health or environmental safety hazards
3. The land in question should be free of squatters, encroachers or other claims and encumbrances
4. Witnessed statements should be obtained from the people donating land. Further, the representatives of the community have to sign land donation forms for the project to show commitment to land donation by the community
5. If any loss of income or physical displacement is envisaged, verification of voluntary acceptance of community devised mitigatory measures must be obtained from those expected to be adversely affected. In this project we ask you to avoid donating land that will adversely affect community members
6. KOSAP project proposes to have the land donated to be registered under one of the implementing agencies of the project i.e. KPLC or REREC but be assured that public access to services is guaranteed. The proposed project solar Mini-grid to be set on the donated land is set to provide direct services (electricity) to the community members donating the land
7. It will be vital to have a grievance redress mechanism to guide resolution of grievances related to the project.

***Survey of the land***

The surveyor (Korir) explained to the community that he would pick the exact GPS points of the agreed portion donated for the solar Mini-grid which will be later physically demarcated, and the exact measurements meant known to the community members following the laid down procedures by law.

**Community rights and entitlements**

The surveyor explained to the community the various options that they were entitled to in terms of land acquisition for the proposed mini-grid.

The first option was that the community could donate the land freely without any expectations from the proponent.

The second option was donating land and the community gets compensation either in monetary terms or in kind. If compensation is done in terms of cash, the compensation monies would be held on their behalf in an escrow account by the County, and the monies plus accrued interest released to them upon registration. The other option of compensation explained to the community was that the community could also be compensated in kind. The community can request for compensation in kind by requiring the proponent to do a community project such as a well, or classrooms to be built or any other item that will benefit the community. Another option would be compensation of land for land. The community may request the Government to buy a similar piece of land for the community to compensate for land donated for the mini grid. He informed the meeting that they were at liberty to deliberate on the options given and they should not feel coerced to donate the land for the project.

With the remarks made he once again thanked the community for supporting the project. He further noted that the proposed project would benefit the community and requested for more community support and ownership of the project.

**MIN 7: Positive impacts of the proposed project**

The Team Environmental and Social Expert Simon Mwangangi once again thanked members for their corporation and reminded them to listen carefully to the input of all the team members. He reminded members to ensure that they write their names and sign the attendance list that was in circulation.

He further explained that, every project has both positive impacts and negative impacts. He explained the positive impacts of the project as follows:

**Up Scaling Electricity Access to the off-grid areas**

With the construction and operation of the mini-grid, the community will have access to modern energy solutions, get access to electricity tapped from green energy sources (Solar) and be able to enjoy the benefits of electricity. This will also be a business boost to Kenya Power as the number of customers will increase.

**Improved source of lighting**

Currently majority of Chakama residents use kerosene lamps and small solar systems that support one bulb for lighting their homes. The setting up of the mini-grid power station will provide opportunities to access clean energy for lighting.

**Benefits in the education sector**

Access to electricity at the household level and schools will create opportunities for children to study for longer hours. Additionally, children in households can also access education programs being aired through different radio and T.V. channels. Chakama primary school will take advantage of the electricity and enhance information technology and communication in its teaching especially with the government laptop project for schools.

**Increase of Business opportunities**

With the implementation of K-OSAP in the off-grid areas, and availability of power businessmen can scale up their businesses while making it is possible to set up businesses such as salons, barber shops, photocopying machines, cyber cafes, welding, and refrigeration of drinks, chicken incubators, and sharp cutters for improved livestock industry among others.

**Employment and wealth creation**

During construction and operation of the project, employment opportunities will be available to the locals. The employment opportunities will be in line with skills available in this area and basically unskilled job will be available to the people. Some of the work will involve high technical skills which might not be available in this community and such jobs will be done by non-local people. Most of the unskilled jobs will be available during the construction period and they will be temporary jobs.

**Local Material Supplies and other requirements**

Another positive impact of the project involves supplying local materials that may be available locally. In addition, people working in the site will source for services like food, drinking water, accommodation, fuel among others from the local shops.

**Dissemination of information on HIV/AIDs prevention and mitigation**

Community members will access HIV/AIDs awareness messages through use of radios and TV. Additionally, awareness on HIV/AIDs will be implemented by contractor through community awareness campaigns, staff inductions, posters and the project billboard.

**Health benefits of the project**

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

**Improved standard of living**

Electricity will promote lifestyle changes through use of small household appliances to make life easier. Examples include iron boxes, fridges, television sets, electric kettle, radios, air conditioning systems, fruit blenders among others.

**Improved Security**

Improved lighting through security flood lights and a 24-hour economy will deter crimes and also reduction of gender-based violence. The availability of ready power to charge mobile phones enhancing communication and promotion of use of CCTVs will help further in improving security.

**Access to information and improved Communications**

Access to electricity will lead to improved communication and information exchange. This will be enabled through sustainable charging of mobile phones, increased access to mass media like radio and T.V which will provide an opportunity for the households to access a wide range of information which is useful for decision making.

**Gender Considerations**

Access to electricity will benefit women in different ways. The benefits of the project will occur because women tend to spend more time at home, are responsible for household chores that can be carried out more productively with electricity, and because certain tasks are culturally defined as women‘s work. Majority of the PAPs will use the electricity mainly for lighting and powering low energy gadget such as TV, radio, phone charging, refrigeration and to some extent ironing and cooking. Electricity will replace use of candles and kerosene lamps, thereby reducing indoor air pollution, fire, burn risk and providing higher quality light. Women and girls will benefit more by avoiding the risk of air pollution from kerosene lamps because they spend more time in the kitchen. Lighting and television and radio use will improve access to information especially on health and nutrition, the ability to study after household chores can also benefit the women and girls if they take advantage of them. The project will also enhance security in the rural areas as most homes will be lit up, a benefit that is more appreciated by women. Using electricity for ironing, boiling water and cooking will save women and girls the man-hours lost in fetching firewood. Electricity will also be used in pumping water from community boreholes and shallow wells where mostly women draw water manually hence saving them energy and reducing the risk of falling or capsizing in wells.

**MIN 8: Negative impacts of the proposed project and possible mitigation measures**

Simon explained to the members the negative impacts and their associated mitigation measures as follows:

| Environmental/Social Impact | Mitigation measures |
| --- | --- |
| Site acquisition and change of use | * The project implementers would follow all the procedures for community land donation and explain to the community all the possible alternatives. * The project implementers would apply for Change of use and seek all necessary approvals from the County government, National Construction Authority, NEMA and all other interested stakeholders. |
| Vegetation clearance and disturbance at and around the construction site | The project implementers would:   * Ensure proper demarcation and delineation of the project area to be cleared * Specify locations and parking for vehicles and equipment. * Design and implement an appropriate landscaping program to rehabilitate the area after construction * Route the power lines along road reserves * Clear only necessary vegetation, where possible trim tree branches * Alternate use of road reserve giving preference to the side with least vegetation in settling on the fine route of the feeders * Leave cleared vegetation for use by the tree owners |
| Pressure on local water resources | * The project implementers would make arrangements for water supply that are independent from the public utility in order to avoid exerting additional pressure on such services * The yield loss due to dust build-up on the PV modules would be monitored to ensure that no surplus cleaning cycles are undertaken |
| Demand for Raw materials, extraction site impacts and transportation of materials to site | The project implementers would:   * Source building materials from local suppliers * Source raw materials from NEMA licensed sites * Ensure accurate budgeting and estimation of construction materials to ensure that only necessary materials are ordered * Ensure that damage or loss of materials at the site is kept minimal through proper storage * Use recycled, refurbished or salvaged materials to reduce amount of wastes taken to dumpsites where possible. |
| Increased storm run-off and Soil erosion | The implementers would:   * Apply soil erosion prevention measures by levelling site to reduce speed of runoff and increase water in filtration. * Plan site excavation works to ensure only necessary sites are excavated and excavated soil is used for backfilling or taken to NEMA approved dumpsites |
| *Risk of fire* | The project implementer would ensure that:   * No burning of litter/cleared vegetation on site * Avoid open fires on site * Maintain equipment in a good state of repair to avoid sparks which could be a potential source of fire * Provide appropriate fire-fighting equipment and have trained fire marshals |
| Air Pollution and Dust emissions | The project implementer would ensure that:   * Water is sprinkled to minimize dust generation * Speed limits are observed * Use of appropriate PPEs-dust masks is enforced * Operators and drivers switch off vehicle engines when not on motion * Drivers avoid unnecessary idling of vehicles and machines * Use of alternatively fuelled equipment where feasible is done * Maintain vehicles and equipment in a good state of service * Fuel and lubricants to be of standardized quality and sourced from approved suppliers |
| Visual impact | The project implementer would ensure that:   * Trees are planted to surround the mini grid power site. * Natural/earth colours for the buildings is used |
| Employment and business opportunities | The project implementer would ensure that:   * Contractor gives priority to local residents for labour they qualify for * Contractor considers one third gender rule requirement of the National government in employment. |
| Community health and safety risks | The project implementer would::   * Conduct public health campaigns addressing issues of behaviour change, water and sanitation, HIV/AIDS * Disseminate traffic management plans and other public safety information through campaigns in schools and communities * Ensure traffic on community roads should be restricted to low speeds to avoid exposing other road users to accidents and unnecessary air pollution triggered by dust from moving vehicles |
| *Security risks* | The project implementer would:   * Support local security systems to strengthen community policing and crime-handling measures * Ensure that the conduct of security personnel complies with good international practice |
| Child labour | * Kenyan labour laws should be adhered to * No one will be employed on site without the national Identification card or valid passport * Children below the age of 18 years will not be allowed to work in the proposed project site |
| Cultural property and chance find | * In case of chance find; contractor to inform local GRC, KPLC, REREC, MOE and national museums of Kenya * Contractor to respect community culture and there should be no interference with cultural property including sacred sites, graves etc. |

**MIN. 8 Grievance Resolution Mechanism (GRM)**

Simon informed the community members 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 Chakama community. Grievances which cannot be resolved by the local GRC shall be escalated to the sub-county GRC and the National GRC respectively. Any unresolved matter can then be referred for arbitration or to a court of law. World Bank’s GRS is also available to stakeholders to lodge their grievances. The GRC should constitute representation from all genders, youth and vulnerable persons. It should be structured in such a way that it provides multiple channels for lodging grievances, ensure anonymity and confidentiality. The following details shall be recorded for each grievance reported; and a close-out form issued to indicate the grievance registered has been closed.

* Date of complaint
* Name of complainant
* ID of complainant
* Telephone contact of complainant
* Nature of complaint
* Name of the Person handling the complaint
* Contacts of person addressing the complaint
* Action taken
* Date of conclusion of complaint

Simon reminded members that they would break into separate Focus Group Discussion for Men, Women and Youth and each group would elect representative(s) to the GRC. The following members were elected to be part of the GRC.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Name | DESGN. | 1D No. | Mobile No. |
|  | Bidii Karisa Kenga | Youth | 28530194 | 0701555108 |
|  | Nancy Nzingo | Women Rep | 28171835 | 0703 858 538 |
|  | Janet Yaa | Women Rep | 29450684 | 0715 014 872 |

**MIN. 8: Plenary Session**

The community members were given an opportunity to comment and seek clarifications concerning the project and the deliberations are as minutes below.

|  |  |
| --- | --- |
| QUESTION/COMMENTS | ANSWER/REMARKS |
| Samuel Kambi  We are thankful for the project. Will there be representatives from the community?  The second question is: Chakama has three sublocations. One is 15 Kilometres from here, how far will this power connection reach? | ***Simon:***  Yes. Once we break into Focus group discussions, you will elect a representative for men, women, youth and where necessary a representative for people living with disabilities. The elected members will also serve in the Grievance Redress Committee***.***  ***Zadock***  The radius for distribution is 3km from the generation point and in case an area is not covered it will be covered under another project.  ***Abel***  In addition there will be standalone projects that will supplement in case one is not covered within the radius of distribution. |
| Kaka Mure  What is the purpose of the one thousand shillings you have told has we need to pay? | ***Eng. Kiva***.  One thousand shillings is connection cost. |
| Mwambogho  Some areas like Macholani are far from here, how will they be connected? Secondly how many acres do you need for this project | ***Eng. Kiva***  The project requires a minimum of two acres and since the area is growing we will be happy to get land to cater for expansion, office space and storage. |
| Albert Chonde  Community land does not belong to one person, how do plan to acquire the land | ***Irene Maina***  That is the reason were called for this baraza and let you know we require land for the project. If you donate land, representatives from your community will append their signatures. The land will be surveyed and transferred to the implementer of the mini grid project. |
| Tausi (Mama)  We paid money to be allocated land, up to now we have nothing. | ***Kiva***  That is a very good question but we are sorry it is not related to this project. The area chief advised the concerned to visit his office for a solution to be sought. |
| Mzungu:  You don’t need private land, if I donate is a person; will you accept. | ***Irene***  This is a community project and we encourage the community to donate part of the community land. |
| Peter:  If tree are affected, will there be compensation. The second question is: How much will institutions pay for connection if an individual will be connected at Ksh. 1000.00 | ***Bomba:***  The connection cost at household level is 1000.00 shillings. Institutions that will require to be connected like schools, hospitals among others may benefit from Rural Electrification and Renewable Energy Corporation (REREC). They can also express interest by applying to KPLC and they will be given a quotation. |

### Focus Group Discussion with Men (Above 35 years of age)

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

Simon Mwangangi from KPLC explained the importance of holding a separate discussion with them so that they would have an opportunity to freely express themselves and inform the Project team how they would wish to be involved in the project. Simon reminded the men that as the heads of families, they played a crucial role in ensuring the project was a success or a failure. He explained the essence of the environmental and social screening of the proposed site was to check for its suitability in terms of environmental, technical, social and health requirements. The second objective was to undertake community engagement to sensitize the community on the project. The third objective was to explain the land requirements for the project and the need for a project grievance redress mechanism. Simon went further and summarized the project by explaining its positive and negative impacts and their mitigation measures and the requirements for donating land. He also explained the need for the men to elect a representative to the project committee who would represent their views/issues to the committee for redress and further action to ensure that the interests and needs of men were factored through-out all the phases of the project.

The men were further explained of their role and responsibility in terms of donating land for the project and the need to keep off the project land when construction and operation of the project began.

The men were allowed to ask questions, give suggestions and or seek clarifications.

**Question, Suggestions, feedback and response for Focus Group Discussion with Men**

|  |  |  |
| --- | --- | --- |
| **Name** | **Question, Comment, Suggestion** | **Feedback/Responses by project team** |
| Patrick Karissa | We want men to be represented in all issues concerning the community with regard to the project, We also want to be considered during the committee formation, we need jobs and those employed to be considered for NHIF registration and we also need to be considered for supply of building materials | Simon reminded the participants that they would elect a representative who will be a signatory to the land donation and member of the GRC. He went further and explained that the contractor will be bound by the Kenya Labour laws, and urged the community members to be on the lookout so that they can participate in bidding for supplies and construction works |
| Chengo Jeffa | How will men benefit from the project | Simon emphasized that the solar mini-grid would be for the benefit of the community through affordable access to clean energy. He reminded the community that the benefits are multi-faceted ranging from employed, supplies of materials, clean energy for lighting, iron, cooling & refrigeration among others but these would all be based on an individual’s interests and efforts and the only agreement that would be expected is a contractual agreement form between the customer and the power distributor/retailer. |
| Samuel Mumba | Will you connect to all houses considering some have iron sheets houses, others Makuti thatched and others grass? | Simon informed members present that they should engage qualified technicians to do wiring for their premises and be issued with wiring certificates. If all electrical safety procedures and considerations are followed, it will be safe to connect all houses. Further sensitization on safe use of electricity would be progressed in future organized from the County Business Managers office in liaison with KPLC SHE Department. |
| Shehe Mzungu | This village is big and some people here are from other villages. Will the other villages 15 kilometres from here be connected? | Simon Clarified that all customers who will be within 600-meter safe distance from a transformer will be connected. He added that the project would be implemented in different modules and those far from a transformer would be considered for stand-alone solar systems. |

### Focus Group Discussion with the women

A focus group discussion was held with women. The main objective of this discussion was to assess whether the women had understood the project and its requirements and to provide an opportunity for them to air their issues/give their opinions on the project.

Dorothy (MOE) explained to the women that it was important to hold a separate discussion with them so that they have an opportunity to freely express themselves. She explained the agenda of the visit by the officers from the National and County government was to undertake an environmental and social screening of the proposed site to check for its suitability in terms of environmental, technical, social and health requirements. The second objective was to undertake community engagement to sensitize the community on the project. The third objective was to explain the land requirements for the project and the need for a project grievance redress mechanism. Dorothy then gave a summary of the project in terms of its positive and negative impacts and their mitigation measures and the requirements for donating land. 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.

The discussion went further to bring out issues on how the women can take advantage of the project benefits rather than taking a back seat. She then explained to them that women would benefit more from the electricity because they are the ones who are more exposed to unclean energy as they spend more time in the kitchen. They would also benefit from access to information through use of radios and TVs that are powered by electricity enabling them to make informed choices on different issues. They were also set to benefit if they could set up small businesses such as salons, cold drink kiosks, selling frozen blocks to fishermen for fish storage; either individually or in Merry-go round groups in order to uplift their socio-economic status. Children will have time to study and enhanced security due to the fact that the area will be well lit among other benefits.

The women were allowed time to ask questions, give suggestions and or seek clarifications.

**Question, Suggestions, feedback and response for Focus Group Discussion with women**

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| **Name** | **Question, Comment, Suggestion** | **Feedback/Responses by project team** |
| Zawadi Kitsao | How often do we make payment? | **-T**his will be determined by your consumption and the number of units purchased |
| Rebecca Karisa | -What is the approximate cost of wiring my house? | -That will depend with the size of house; the number of rooms in the house. A standard 3bedroom house with a living room will cost approx. Kshs 2,500 |
| Riziki Charao | -How do we get the Electricity bill at the end of the month? | The meters to be installed are pre-paid. One has to buy the tokens in advance with your phone and feed them to the meter for one to access power. They will be no monthly bills. |
| Kafedha Kazungu | How soon do we get power back after being disconnected | Immediately  -Once the tokens have been fed to the meter then power gets back |
| Rose Safari | -Is the payment arrangement similar to that of D-Light? | -No  -There is no daily payment like D-light. The tokens you purchase can serve you a while depending on your consumption |
| Janet Yaa | -How safe is this power to our children? | We have put measures to ensure your safety is assured however caution must be exercised when dealing with power appliances. |

### Focus Group Discussion with the youth

Samwel - REREC and Zadock – KPLC were in charge of the youth discussion. They explained the importance of holding a separate discussion with them so that they would have an opportunity to freely express themselves and inform the Project team how they would wish to be involved in the project. Simon reminded the men that as the heads of families, they played a crucial role in ensuring the project was a success or a failure. Samwel explained the essence of the environmental and social screening of the proposed site was to check for its suitability in terms of environmental, technical, social and health requirements. The second objective was to undertake community engagement to sensitize the community on the project. The third objective was to explain the land requirements for the project and the need for a project grievance redress mechanism. Simon went further and summarized the project by explaining its positive and negative impacts and their mitigation measures and the requirements for donating land. He also explained the need for the men to elect a representative to the project committee who would represent their views/issues to the committee for redress and further action to ensure that the interests and needs of men were factored through-out all the phases of the project.

The youths were further explained of their role and responsibility in terms of donating land for the project and the need to keep off the project land when construction and operation of the project began. The youths were encouraged to give comments and asks question.

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| **Name** | **Question, Comment, Suggestion** | **Feedback/Responses by project team** |
| Maxwel | What are the benefit of the youths in regard to the project? Is there compensation in regards to properties or in case of death | Youths will benefit from employment in terms of direct and indirect employment, skilled and unskilled labour Audit to be done to certain the cause of loose. Necessary action will be taken thereafter |
| Samwel | The radius of the proposed systems is 3km, what happen to the town since the land proposed is far from the community and it will only cover 2km hence only few homestead | A survey of the land will be done, it’s advisable that land given or donated should be closer to the community to ensure the 3km radius and beneficial to the community. |
| David Ali | What will be done to noise and dust? | The project is a green energy hence noise pollution will be minimal. Watering of the place of work will be done to reduce dust and air pollution. |
| Kombo | What’s the charges of the power | Connection fee will apply of 1000 and usage will depend on individual since it will be prepaid system hence token form |

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| chakama public baraza |
| Public consultative meeting in progress |

**Way Forward**

Members present welcomed the project and requested that it be implemented the soonest possible so that their problems of staying without electrical power gets sorted once and for all. They further agreed that the land they were offering for the proposed project was a donation and no any form of compensation would be demanded by the community.

**MINUTE 9: A.O.B**

The GRC members elected were requested by the Environmental & Social Screening team to sign land donation form on behalf of the community.

**MINUTE 10: Closure of meeting**

There being no other business, the Chairperson thanked all the attendants for turning up and their contributions. Members agreed to keep in touch and clarify on any necessary information as regards the intended projects. The meeting ended with a closing prayer at 13:20 p.m.

## APPENDIX 2 – MINUTES OF THE ESIA MEETING

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| **MINUTES OF EIA CONSULTATION FOR THE PROPOSED KENYA OFF-GRID SOLAR MINI GRID PROJECT HELD AT CHAKAMA, MAGARINI SUB-COUNTY, KILIFI COUNTY** | |
| **Date**: 27th SEPTEMBER 2021  **Venue**: PEFA CHURCH-CHAKAMA | **Time**: 12.06pm |

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| **PRESENT**  List of attendants is appended herein. |
| **AGENDA**   1. Introduction 2. Opening Remarks 3. Remarks by the consultant 4. Concerns/Issues from participants 5. Responses to the issues raised 6. Acceptance/rejection of the proposed project 7. Adjournment |

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| **Item No** | **Description** | **Action by** |
| **Min 1/21** | **Introduction** | |
| 1.1  1.2 | The meeting was opened with a word of prayer from one of the participants  Chengo Mure a village elder led the introductions and welcomed the visitors to Chakama area and explained the area chief was on his way to the meeting. | Julius  Chengo Mure |
| **Min 2/21** | **Opening Remarks** |  |
| 2.1  2.2 | Habel Mwarabu the CREO Kilifi County gave a brief overview of the project explaining the project was receiving funding from the World Bank and will be implemented by the Ministry of Energy.  The CREO further explained that during the land acquisition meetings there was a concern on the return on the community land and there will be a compensation in kind project. The project is to be chosen by the community and should be among three admissible namely health, education and water. | CREO  CREO |
| **Min 3/21** | **Remarks by the consultant** |  |
| 3.1  3.2  3.3 | Henry introduced the consultants from Norken International Limited and Centric Africa together with the representatives from the Ministry of Energy and Kenya Power.  He further explained the ESIA process that is a constitutional requirement. He also explained the importance of Public Participation process.  He explained that baseline data will also be collected from the project site to ensure that the contractor leaves the environment as it is in its current state.  He explained that a report will be written by the consultants and submitted to NEMA for licensing and approval. Upon approval by NEMA the tenders will be advertised for interested contractors to bid.  Lavina explained the project benefits to the members present which include reliable electricity supply in rural communities, enhanced local ownership of infrastructure, employment opportunities among others.  She further explained some of the anticipated environmental and social impacts and their mitigation measures. The anticipated negative impacts include solid waste generation, impact on air quality, increased noise levels, impact on local biodiversity, occupational health and safety risks, impact on cultural heritage, child labour will not be allowed, labour influx, risk of communicable diseases and explained the mitigation measures.  A training on health and safety will be carried out and there will be awareness creation on safety measures.  She also noted that the chief will help in identifying the Vulnerable and Marginalized Groups in the community.  Mark explained the compensation in kind projects further noting that the maximum price for the projects to be implemented is 1 million Kenya Shillings.  The project to be chosen should also benefit all the community members. The project should also be within a 10km radius from the mini grid project site. | Henry Karanja  Lavina Omondi  Mark Oyier-Ministry of Energy |
| **Min 4/21** | **Concerns / Issues from participants** |  |
| 4.1  4.2  4.3  4.4  4.5  4.6  4.7  4.8  4.9  4.10  4.11  4.12 | Mwambegu enquired if the project for the compensation in kind will be a new project or an improvement of an existing project.  How will the people living with disability be included during the project implementation phase?  Samson noted that there is no maternity ward in Chakama and the residents have to travel for long distances to deliver children. He also noted that the boreholes in the area are not operational due to the salinity of the water.  Kaka Mure asked what will be the mitigation measures of impacts such as noise and dust to the residents.  He also inquired if the project contractor will cater for those injured at the project site or it is the injured to cater for themselves.  He recommended a maternity extension for the ladies as the compensatory project.  Chengo stated that the compensatory project rules were very intimidating to the residents.  He seconded Kaka Mure on the maternity ward issue and the hospital should be improved to include a maternity ward wing.  He further questioned the issue on employment asking what assurance was there that the contractor would employ the locals to work at the mini grid stating that previously contractors have taken advantage of the locals since they are not educated and source people from far.  Patience urged the residents to choose a project that would benefit the whole community.  She stated that the contractor will not employ the locals but will source people from outside or first employ the locals then terminate their contracts after a few days. She said that this had been observed in an already existing project. The residents need assurance that they will be employed.  Rachel stated that there was no power in the community health centre hence the doctors have to use a torch in case of any emergency at night.  She asked if the health centre can be improved or be reconstructed and more doctors and medicine be incorporated.  Esther, headteacher Chakama Primary, stated that the school is currently not in the same level as other schools in Kenya and the small children have to sit on the floor since there are no desks. She also noted that they are understaffed and have less classes. She proposes the compensatory project to be on education to improve the school.  Joshua, a BOM member in a school in Kibora commented that the school is understaffed with only 6 teachers hence education becomes challenging. There is also no fence around the school. However, his first priority for the compensatory project is healthcare.  Francis, asked upon completion of the project how will the residents get electricity in their houses. He also asked if there will be any connection fee.  Stanley, inquired on the project timelines  Tunja, asked if reticulation can be done from the river Galana since the water is clean and safe to use.  Shali asked if there will be compensation to the owners of the land where the distribution lines will traverse. | Mwambegu Kiponda  Samson Zia Kahindi  Kaka Mure  Chengo Mure Tayari  Patience Kwekwe  Rachel Chengo  Esther Kabibi-Headteacher Chakama Primary  Joshua  Francis Fondo  Stanley Kenga-ADN MCA  Mwahunga Tunje  Shali Konde |
| **Min 5/21** | **Responses to concerns/issues raised** |  |
| 5.1  5.2  5.3  5.4  5.5  5.6 | Pius explained that the project should be an existing project and not a new project for example a borehole without power, a hospital without useable wards  The 1 million to be given will only be for one project. The amount is not much and not little. Therefore, they should all agree on one project.  Henry explained the report will have an ESMP which will guide the contractor on the mitigation measures for anticipated negative impacts. For dust the contractor can sprinkle water after maybe every 4 hours and for noise the contractor can work during the day (0800hrs to 1700hrs.  The cost of injury for the employees will be on the contractor and a first aid kit will be available at the project site.  The Grievance Redress Committee will be available in case of any grievances from the community to the contractor.  He also added that the compensatory project should be an existing project.  The contractor will also follow a labour management plan when it comes to issuing jobs. The locals should be considered for both skilled and unskilled labour and the GRC should report in case the labour management plan is not being follow. During the operational phase the site may need 2-3 technical personnel to work at the site.  The people living with disabilities and the vulnerable and marginalised groups will be given special attention.  Habel explained that the report will be taken to NEMA immediately after completion for approval and bidding for the contractor will start after approval.  The project site land is on community land hence no one owns it.  KP will discuss wayleave permits with relevant road agencies and in an event that private land must be acquired for distribution lines, they will engage the land owners on compensation details prior to installations. However, the project will try as much as possible not to traverse private lands that may need compensation.  The distance coverage of the project is 1.5km radius from project site.  He explained that water reticulation can be done however there are conditions for pumping the water. The conditions include if the river is seasonal, how far the river is from the project site and if the water from the river is clean.  He explained the connection fee is 1000 Kenyan Shillings and the wiring will be on one’s bill. Thereafter, a monthly bill will be paid in the form of tokens depending on one’s usage.  The wires to be used for the connection should also be standard wires. | Pius Nyaga-Kenya Power  Habel- CREO  Henry Karanja  Habel – CREO  Mark Oyier-MOE  Pius Nyaga- Kenya Power |
| **Min 6/21** | **Acceptance/Rejection of the project** |  |
| 6.1 | All the members present accepted and welcomed the project | All |
| **Min 7/21** | **Adjournment** |  |
| 7.1 | The meeting was adjourned at 3.40pm and the members proceeded to focus group discussions. |  |
| Minutes Prepared by: …NGUGI SHARON WATIRI; Associate ESIA Expert. Date…27/10/2021…………….. | | |

## APPENDIX 3 – PUBLIC MEETING PARTICIPANTS’ LISTS

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| **IMG-1787** |
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| **IMG-1795** |
| **IMG-1794** |
| **IMG-1793** |
| **IMG-1798** |
| **IMG-1799** |
| **IMG-1797** |

## APPENDIX 4 – FOCUS GROUP DISCUSSION PARTICIPANTS LISTS

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| **IMG-1789** |
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| **IMG-1791** |

## APPENDIX 5 – NEMA EXPERT LICENCES



