MINISTRY OF ENERGY
Republic of Kenya

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

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

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

REPORT: 2023

Norken International Limited

Centric Africa Limited

CERTIFICATION

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

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

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Abbreviations

ACRONYM	DEFINITION
ADR	Alternative Dispute Resolution
AIDS	Acquired Immunodeficiency Syndrome
AoI	Area of Influence
AP	Administration Police
BD	Biological Diversity
BP	Bank Procedures
CBOs	Community Based Organizations
CoK	Constitution of Kenya
CDI	County Development Index
CDF	Constituencies Development Fund
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
ECD	Early Childhood Development
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
ESMS	**E**nvironmental and Social Management System
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
GBV	Gender Based Violence
GDC	Geothermal Development Company
GoK	Government of Kenya
GSU	General Service Unit
Ha	Hectare
HDPE	High Density Poly Ethylene
IAs	Implementing Agencies
IPPs	Independent Power Procedures
IPs	Indigenous Peoples

JV	Joint Venture
KETRACO	Kenya Electricity Transmission Company
KeNHA	Kenya National Highway Authority
KII	Key Informant Interviews
KOSAP	Kenya Off-Grid Solar Access Project
KP	Kenya Power Company
LEP	Labour and Employment Plan
LGRCs	Local Grievance Redress committee
MGs	Mini Grids
MoE	Ministry of Energy
MSDS	Material Safety Datasheet
NEMA	National Environmental Management Authority
NGOs	Non-Governmental Organizations
NLC	National Land Commission
NTSA	National Transport and Safety Authority
OHS	Occupational Health and Safety
OM	Operation and Maintenance
OP	Operational Policies
PAD	Project Appraisal Document
PAPs	Project Affected Persons
PCU	Project Co-ordination Unit
PPAs	Power Purchase Agreements
PPEs	Personal Protective Equipment
PV	Photo-voltaic
REREC	Rural Electrification and Renewable Energy Corporation
RPF	Resettlement Policy Framework
SA	Social Assessment
SEA	Strategic Environmental Assessment
SERC	Standards and Enforcement Review Committee
SHS	Solar Home Systems
SIA	Social Impact Assessment
SOP	Safe Operation Procedure
STDs	Sexually Transmitted Diseases
STI	Science, technology and innovation
SMMP	Social Management and Monitoring Plan
ToR	Terms of Reference
TSC	Teachers Service Commission
VMGF	Vulnerable and Marginalised Groups Framework
VMGs	Vulnerable and marginalized groups
VMGP	Vulnerable and Marginalised Group Plan
WB	World Bank
WIBA	Work Injury Benefit Act
WMP	Waste Management Plan
WRA	Water Resources Authority
UTI	Urinary tract infection

URTI	Upper respiratory tract infection

EXECUTIVE SUMMARY

E.1 Introduction and Project brief

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

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

In Turkana County, one of the target counties, the Proponent is proposing to develop 19 No. mini grid facilities including Kaikor 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 Kaikor 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 Kaikor 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).

Most of environmental management statutes are sector specific, covering issues such as public health, soil conservation, protected areas conservation and management, endangered species, public participation, water rights, water quality, air quality, excessive noise control, vibration control, land use among other issues. The regulatory framework directly governing the proposed mini-grid project include:

1. The Energy Act, 2019 and its supplementary regulations including:
    - The Energy (Energy Management) Regulations, 2012, and
    - The Energy (Solar Water Heating) Regulations, 2012.
2. The Environmental Management and Coordination Act (EMCA) 1999 and its 2015 amendment and its supplementary regulations including:
    - Environmental (Impact Assessment and Audit) Regulation, 2003,
    - EMCA (Waste Management) Regulations, 2006,
    - EMCA (Water Quality) Regulations, 2006,
    - EMCA (Air Quality) Regulations, 2016,
    - EMCA (Fossil Fuel Emission Control) Regulations, 2006,
    - EMCA (Noise and Excessive Vibrations Pollution Control) Regulations,2009,
    - EMCA (Emissions Control) Regulations,2006,
    - EMCA (Wetlands, Riverbanks, Lake Shores and Sea Shore Management) Regulations, 2009,
    - EMCA (Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing) Regulations,2006
3. The Water Act 2016 and its supplementary regulations, including:
    - Water Resources Management Rules, 2007.
4. The Lands Act, 2012;
5. The Urban Cities Act No. 13 of 2011;
6. The HIV/ AIDS Prevention and Control Act, 2006;
7. The Occupational Safety and Health Act, 2007 and its supplementary regulations and rules, including:
    - Factories (First Aid) Order 1963,
    - Factories (General Register) Order 1951,
    - Factories and other places of Work (Safety and health committees) Rules 2004,
    - Factories and other places of Work (Medical Examination) Rules 2005,

- Factories and other places of Work (Noise Prevention and Control) Rules 2005,
- Factories and other places of Work (Fire Risk Reduction) Rules 2007,
- Factories and other places of Work (Hazardous Substances) Rules 2007.

8. The Work Injury Benefits Act (WIBA) of 2007;
9. The Public Health Act (Cap 242);
10. The County Government Act 2012;
11. The Physical Planning Act (Cap 286);
12. The Urban and Cities Act No. 13 of 2011;
13. The Climate Change Act of 2016;
14. The Wildlife Conservation and Management Act 2013;
15. The National Construction Authority (NCA) Act of 2011;
16. The Building Code By-Laws; and
17. The Traffic Act Cap 403 of 2009.

This ESIA is guided by the Environmental Management and Coordination Act (EMCA) 1999 and its 2015 amendment as well as its supplementary regulations.

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 are shown in the table below.

•	**Safeguard Policies**
•	Environmental and Social Impact Assessment (**OP/BP 4.01**)
•	Indigenous People (**OP/BP 4.10**)
•	Land Acquisition and Involuntary Settlement (**OP/BP 4.12**)
•	Natural Habitats (**OP/BP 4.04**)

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

Physical Environment

The project area has a hot, dry climate with temperatures ranging between 20ºC and 41ºC and with a mean of 30.5ºC. Rainfall in the area is bimodal and highly variable (Opiyo et al., 2015). The long rains occur between April and July and the short rains between October and November.

The topography of the project site is relatively flat with mild undulations. The elevation difference of about 3m is observed within the project site. The site slopes gently to the east towards a *lagha* near the project area, The soil in the project area is skeletal soil i.e., they are rocky, shallow and stony and contains gravel and sand.

Water used in the areas is obtained from underground sources. There are four boreholes supplying water to the community, four from St James mission church and one drilled in the community. Most of the areas are sparsely vegetated and there are no major industrial developments. The air quality at the proposed project sites is therefore considered to be generally good. The project area is next to a trading centre setting where the main source of noise is from motorists and from machines such as maize milling machine.

Plant species identified during ESIA study in Kaikor location were; Balanites pedicellaris (Elamash), Borscia coriacea (Edung),Dobera glabra (Edapal), Fiscus sp. (Echoke), Grewia bicolor (Epat),Maerua subcordata (eerut),Acacia nubica (Epelet), Acacia senegal (Ekunoit), Balanites orbicularis (Ebei), Cordia sinensis (Edome), Dobera glabra (Edapal), Fiscus sp. (Echoke), Grewia bicolor (Epat), Grewia tenax (eng'omo),Maerua subcordata (eerut), Salvadora persica (esokon), Tamarindus indica (Epederu), Zizyphus mauritiana (Ekalale) and Acacia tortilis (Ewoi).

Wildlife and birds identified during ESIA study in the project location includes; Dik-dik, common ostrich (stuthio Camelus), African Cuckoo (Cucus Gularis), lappet-faced vulture, isabelline wheatear among others.

Socio-economic settings

According to KPHC 2019, The project area has an estimated population of 6633 people and 1026 households with an estimate of 7 persons per household. The average gender ration for the population within the project area is estimated to be 51% female and 49% male. As per the observation and information sought from Lokolio location, the area has one primary school and one secondary school; Loitanit primary school and Kaikor Secondary school located at about 1km to the south east part of the project site, Kaikor Sub-Location has one sub county hospital. Kaikor hospital is located 500m from the project site, there are four churches (Full Gospel Churches of Kenya, Catholic Church, salvation army and outreach church) and a Mosque in the project area. There are no sacred places/historical sites in/near the proposed Kaikor Mini-Grid site, The main livelihood activities undertaken by people in Lokolio village are pastoralism, small scale farming, and small-scale businesses. Men practice pastoralism by moving with their livestock in search of pasture and water to areas as far as Ethiopia and south sudan,200 km away. Women practice small-scale subsistence farming of maize, millet, water melon and green grams, animal grazing in their home compounds and some are employed as casual labourers in St James Catholic mission and Some are charcoal burners and fuelwood sellers. The facilities named above will highly benefit from the project.

Land Use

Land in Kaikor is under unregistered community land and is considered as communal land where every member of the community has the right to use it.Land in Kaikor area is used for small scale

subsistence farming and Livestock grazing. Domestic animals kept in the area are Sheep, goats, cows, donkeys and camels. Men practice pastoralism by moving with their livestock in search of pasture and water during dry season to areas near South Sudan and Ethiopia, Over 200km away.

E.6 Project Description

The Kaikor Mini Grid project aims to provide electricity to approximately 623 residential and 11 nonresidential consumers in Kaikor Village at Kaikor Sub-location, Kaaleng/Kaikor Ward in Turkana County. The project will utilize solar photovoltaic panels, a Battery Energy Storage System, and a Diesel Generator to generate electricity.

A Low Voltage Power Distribution Network will be established to distribute the power to customers. The project utilizes solar panels with a total capacity of 175 kWp to harness solar energy. Solar power is a clean and renewable energy source that will provide a significant portion of the electricity needed for the project. A 438 kWh Battery Energy Storage System is incorporated to store excess solar energy during the day, ensuring a consistent power supply even during cloudy or nighttime conditions. A 120 kVA diesel generator is included to serve as a backup power source for periods of low solar generation or in case of battery depletion. It provides reliability and backup in the event of extended periods of cloudy weather or high demand. A 2,000-liter fuel tank is provided to store diesel fuel for the generator, ensuring continuous operation during extended periods of low solar or high demand. Additionally, PV Inverter: A 175 kW solar PV inverter is used to convert the direct current (DC) electricity generated by the solar panels into alternating current (AC) electricity suitable for consumer use. The estimated cost of the project is around USD 1.262,970.43, although this amount may change as more detailed plans are developed.

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

To develop the Mini Grid, approximately 1.267 hectares of land will be compulsorily acquired by the Proponent from the community. This land is part of the community's designated public purposes area. The Proponent engaged with the community during the land acquisition process, and there were no objections to transferring 1.267 hectares of land to REREC for the management of the solar mini-grid. In accordance with the World Bank's Operation Procedure 4.12 on Involuntary Resettlement, an abbreviated Resettlement Action Plan (A-RAP) was prepared, outlining the principles and procedures for land acquisition and compensation. This plan is annexed to the project report. (Appendix 6)

E.7 Analysis of project alternatives

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

E.8 Stakeholder Engagement

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

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

During the ESIA stakeholder engagement public meeting, which took place on January 18, 2022, a total of 53 stakeholders attended. The meeting provided an opportunity to discuss project details, including the preliminary design, positive and negative impacts, and mitigation measures. Stakeholders were encouraged to share their views and provide feedback on the project. Some of the concerns raised by stakeholders included;

a) Timelines of the project;
b) Wiring fee of each household; connection fee to solar power and payment methods;
c) Electricity connection distance coverage in Kaikor;
d) Compensation for PAPs/ displaced households.

The study team addressed these concerns as follows;

a) Public participation is part of Environmental impacts assessment and that ESIA is the last process before a project is implemented. The proponent will set the timelines upon receiving NEMA License. This might take 6 months or so.
b) Each household will pay for their own electrical wiring and that they should engage an EPRA licenced electrician. Connection fee for each drop will be Ksh 1000.
c) The power connection will be within 1.5 km radius from the project location/3km diameter.

d) Land has already been acquired and since it is a community land, compensation will be in kind. The community will choose a project in education, health or water sector. Displacement of people is not anticipated.

E.8 Potential Impacts and Mitigation Measures

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

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

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

Tables 0-1 to 0-2 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 Employment	Not Applicable	Positive	Positive

Impact	Pre-construction	Construction phase	Decommissioning phase
Impact on local trade	Not Applicable	Positive	
Change in land use	Not Applicable	Moderate	Positive
Topography	Not Applicable	Minor	Not Applicable
Impact on soil	Not Applicable	Minor	Minor
Impact on Air Quality	Not Applicable	Moderate	Moderate
Impact on 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 resource and water quality	Not Applicable	Minor	Not Applicable
Fire hazards	Not Applicable	Moderate	Minor
Increase in competition for scarce resources and strain on public utilities	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
Impact related to Labor influx	Not Applicable	Minor	Minor
Child labor and forced labor	Not Applicable	Minor	Negligible
Impact on 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

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
Improvement of local and National Economy	Positive	Positive
Quality, reliable power supply	Positive	Positive
Improved Education	Positive	Positive
Health benefits of the project	Positive	Positive
Improved standard of living	Positive	Positive
Improved Security	Positive	Positive
Improved Communication	Positive	Positive

Impact	Significance Of Impact (Pre-Mitigation)	Residual Impacts (Post-Mitigation)
Impact on soil	Minor	Negligible
Waste generation and management	Minor	Negligible
Impact on 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
Flooding	Negligible	Negligible
Noise and Vibration	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.9 Environmental and Social Management and Monitoring Plan

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

These measures emphasize a proactive approach, prioritizing prevention rather than reaction. They encompass various aspects such as proper waste handling and disposal to prevent pollution, engaging stakeholders to address grievances, providing personal protective equipment (PPE) for workers, ensuring adequate supervision, and emphasizing good workmanship from the

contractor. Specific plans are also outlined to address specific issues that may arise. The ESMMP also highlights environmental performance indicators that should be regularly monitored. Monitoring serves as a means to detect and draw attention to any changes or problems in environmental quality. It involves continuous or periodic reviews of the ESMMP implementation progress, allowing for adjustments and improvements as necessary.

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

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

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

E.11 Conclusion

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

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

1 INTRODUCTION

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

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

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

1.1 CONTEXT

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

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

Due to the remoteness and sometimes dispersed nature of the target populations and considering the lifestyles and socio-economic status of those residing in underserved Counties, the Project is designed to address low affordability of the potential users, and sustainability of service provision. Therefore, sustainability of the proposed approach to energy access expansion beyond the

Nationally owned power network is predicated on two primary factors - public funding, local community participation; and institutional capacity of Kenya Power and, Rural Electrification and Renewable Energy Corporation (REREC) and the Ministry of Energy (MOE) as the implementing agencies.

The project components are:

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

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

1.2 PROJECT JUSTIFICATION

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

1.3 PROJECT OVERVIEW

The project site is located near Kaikor trading centre, Lokolio Sub-location, Kaaleng/Kaikor Ward in Turkana County at latitude 4°31'18.2"N and longitude 35°24'59.16"E .The proposed solar mini grid will be located on a 1.267 hectares piece of land about 500 metres from Kaikor shopping Centre. The solar mini grid will comprise Solar panels, batteries, inertors, perimeter fence and 19.7 kilometers distribution line to cover a radius of approximately 1.5km. The project is expected

to serve 436 consumers of which 623 are residential and 11 are non residential.None residential consumers of the project are business people and civil servants e.g teachers, business people and health workers.

1.3.1 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.

1.4 PURPOSE AND SCOPE OF WORK

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

1.5 ESIA METHODOLOGY

1.5.1 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.

1.5.2 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.

1.5.3 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 (PAD) and the four main safeguard framework documents prepared under KOSAP- these are Social Assessment (SA), Vulnerable and Marginalized Group Framework (VMGF), Resettlement Policy Framework (RPF) and the Environmental and Social Management Framework (ESMF).

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

1.5.4 Project Description

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

1.5.5 Impact Assessment (IA) Prediction

The anticipated impacts generated by the project and subsequent evaluation of their significance is provided by this report. A suite of field data collection methods was deployed including public forums discussions, Focus Group Discussions, Key Informant Interviews incorporating questionnaires for social risks assessment. Based on the outcome of the evaluation, the need for emphasis on critical areas was discussed. In order to accomplish this task an initial listing of the range of all issues and concerns identified during the study has been undertaken subsequently followed by analysis of the identified potential environmental and social impacts in terms of type (direct, indirect, cumulative, positive, negative), magnitude (local, widespread, random, severity) and duration (temporary, permanent, long term, short term). Consequently, an evaluation system was used to categorize these impacts and evaluate them. This aided in determining the

significance of the identified potential impacts in relation to established criteria or standards, geographic extent of effects, cumulative nature of the impact, community tolerance and preferences, etc. This culminated into generation of a short list of the most critical issues in terms of environmental, ecological and social impacts both positive and negative associated which the different phases of the project activities that are likely to affect the baseline environmental and social conditions presently occurring at the mini-grid sites.

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

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

1.5.6 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 PAPs, government officers and the general public in the vicinity of the proposed project be identified and their opinion considered during project planning, design, construction, operation and decommissioning phases. Consequently, public consultations were carried out in the project area in a bid to inform the public and other interested parties on the proposed project and obtain their views on the same. The consultations also presented an opportunity for the community to raise issues and concerns pertaining to the project.

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

1.5.6.1 Stakeholder Identification and Mapping

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

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

1.5.6.2 Mobilization for the Community Meeting

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

1.5.6.3 Public Forum/Meeting

The project team undertook community engagement forums with the target PAPs and the communities where the solar Mini-grids will be set. The main objective was to explain the project details including need for land identification and solicit broad community support and acceptability of the project. One open meeting with all the community members was held. The (KOSAP team) explained to the community members about the project and other related information as discussed in the minutes. The meeting was then opened up for a plenary session.

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

1.5.6.4 Focus Group Discussions

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

1.5.6.5 Key Informant Interviews

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

1.5.6.6 Stakeholder Engagement Schedule

The ESIA team identified four categories of stakeholders namely; government officials, opinion leaders at local level, elders and the general community. Stakeholder engagement began early in the planning phases of the project. The stakeholder consultations were undertaken on the 17th January 2022. During these meetings, project information in terms of preliminary design, positive impacts, negative impacts, mitigation measures among others were discussed with various stakeholders. The stakeholders gave their views in to the project.

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

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

1.5.7 Sampling

1.5.7.1 Soil Sampling and Analysis

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

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

1.5.8 Environmental and Social Management and Monitoring Plan (ESMMP)

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

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

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

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

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

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

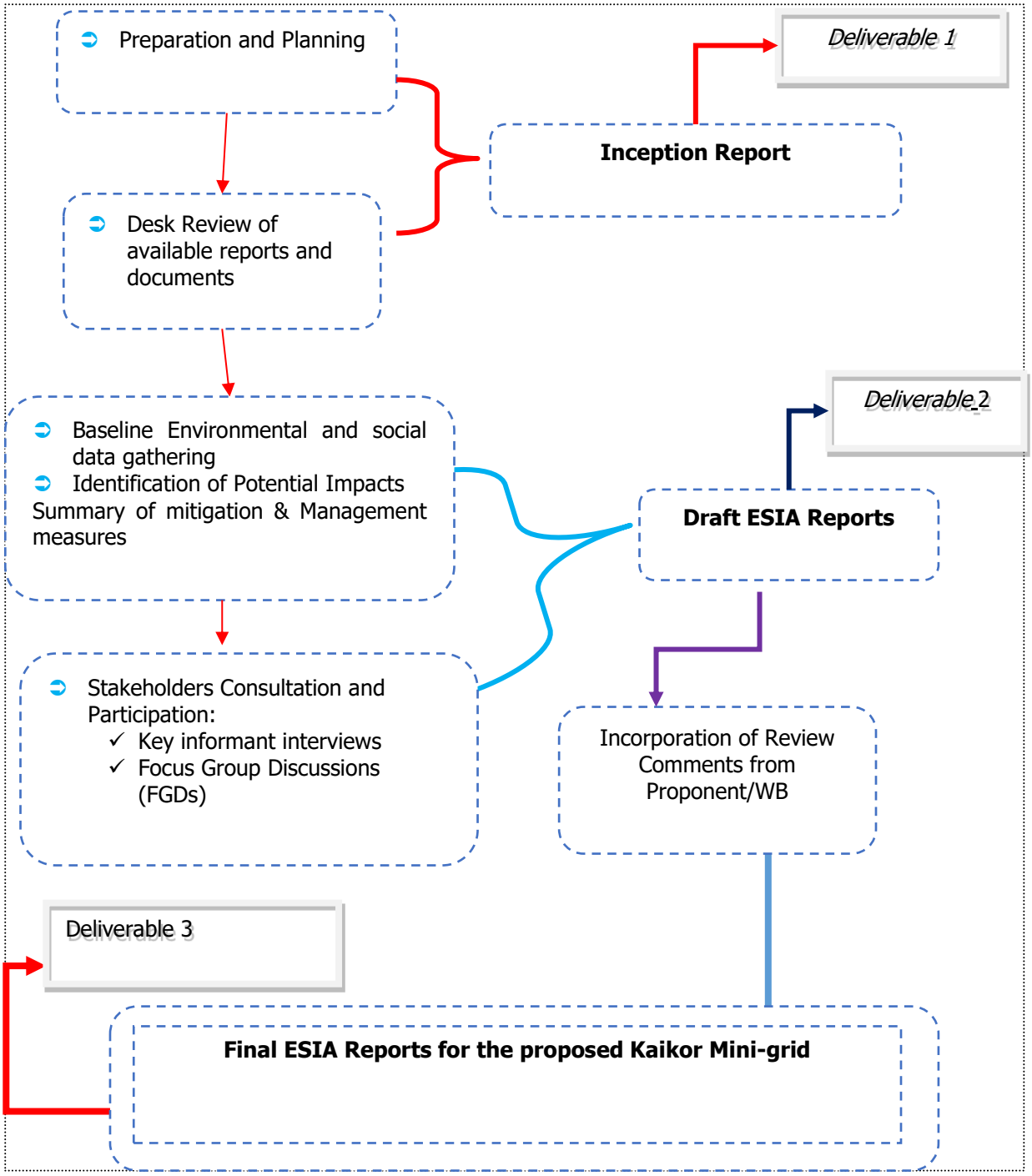


Figure 1-1: *Summary of ESIA Methodology*

Table 1-1 *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 and analysis of project alternatives	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	Outlines Environmental 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 and Monitoring Plan	Outline of the ESMMP 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	References	List of references
Senction 10	Appendices	This section includes all attachments including NEMA licences,layout plan,Minute of the meeting,list of participants and Baseline measurements.

1.7 STUDY TEAM

This ESIA study was conducted on 17th January 2022 by the following team of experts;

Table 1-2 study team

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

1.8 STUDY LIMITATIONS

The limitation experienced during the study are illustrated below.

- ✓ Some data which the consultants sought from the community could not be assertained eg. the number of the VMG's, orphans,rate of HIV infections, number of cases of GBV, population of the location etc.
- ✓ Limited information on some environmental aspects e.g. acquifers, rivers etc.
- ✓ The communication barrier. It was mitigated through having a translator on the team
- ✓ Risk of being infected or transmitting COVID-19. The teams had to adopt preventive measures by wearing face mask and providing the community members with face mask and sanitizers during the public meetings and interactions.
- ✓ Due to drought that was being experienced the community members were engaged in looking for water and pasture thus delaying in attending public participation meetings. This was mitigated by starting the meeting early enough.

2 PROJECT DESCRIPTION AND ALTERNATIVES

2.1 INTRODUCTION

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

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

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

S. NO.	PARTICULARS	DESCRIPTION
1.	Project location	The project is located in Lokolio village near Kaikor Shopping Centre at Kaikor sub-location, Kaaleng/Kaikor Ward in Turkana County. Geographically, the site is located on latitude 4°31'18.2"N and longitude 35°24'59.16"E at altitude of 1931 fts above the sea level.
2.	Proponent	Ministry of Energy
3.	Land Size/Tenure	The proposed solar mini grid will be located on a 1.267 hectares piece of land next to Kaikor Shopping Centre on.
4.	Mini-grid Capacity	PV Array (DC-kW) of 175kw; 438kWh Battery
5.	Mini-grid Power	LV Circuit of 35 km
6.	Distribution line	Approximately 1.5km radius
7.	Target Consumers	634 (623 Residential and 11 Non-Residential)
8.	Climatic condition	Turkana has a hot, dry climate with temperatures ranging between 20ºC and 41ºC and with a mean of 30.5ºC. Rainfall in the area is bimodal and highly variable. The long rains occur between April and July and the short rains between October and November. Annual rainfall is low, ranging between 52 mm and 480 mm with a mean of 200 mm (Turkana County Investment Plan, 2016-2020). Rain patterns and distributions are erratic and unreliable. Rain usually comes in brief, violent storms that result in flash floods. The driest periods (akamu) are in January, February and September and the county is highly prone to

S. NO.	PARTICULARS	DESCRIPTION
		drought. 80% of the county is categorised as either arid or very arid
9.	Site Conditions	The side is generally in open area with minimal fauna and flora.
10.	Road Accessibility	Murram road.
11.	Nearest Airport	Kakuma Airport at about 97.7km
12.	River/canal/nallah/ pond present in project footprint	None
13.	Protected areas (National Park/ Sanctuary)/ Forest land within 10 kms	None
14	Estimated Project cost	USD 1,262,970.43

The project site is located in Lokolio village at Kaikor Location, Kaaleng/Kaikor Ward in Turkana County. Geographically, the site is located on latitude 4°31'18.2"N and longitude 35°24'59.16"E. The proposed power MG will be constructed on approximately 1.267 hectares of land 500m from Kaikor Shopping Centre. The site is located approximately 22KM from Kaaleng Town. The site is neighboured Kaikor shopping centre to the west. The site soil is primarily sandy within the area. Figure 2-1 below present the location of the proposed project site.

2.2 PROJECT LOCATION

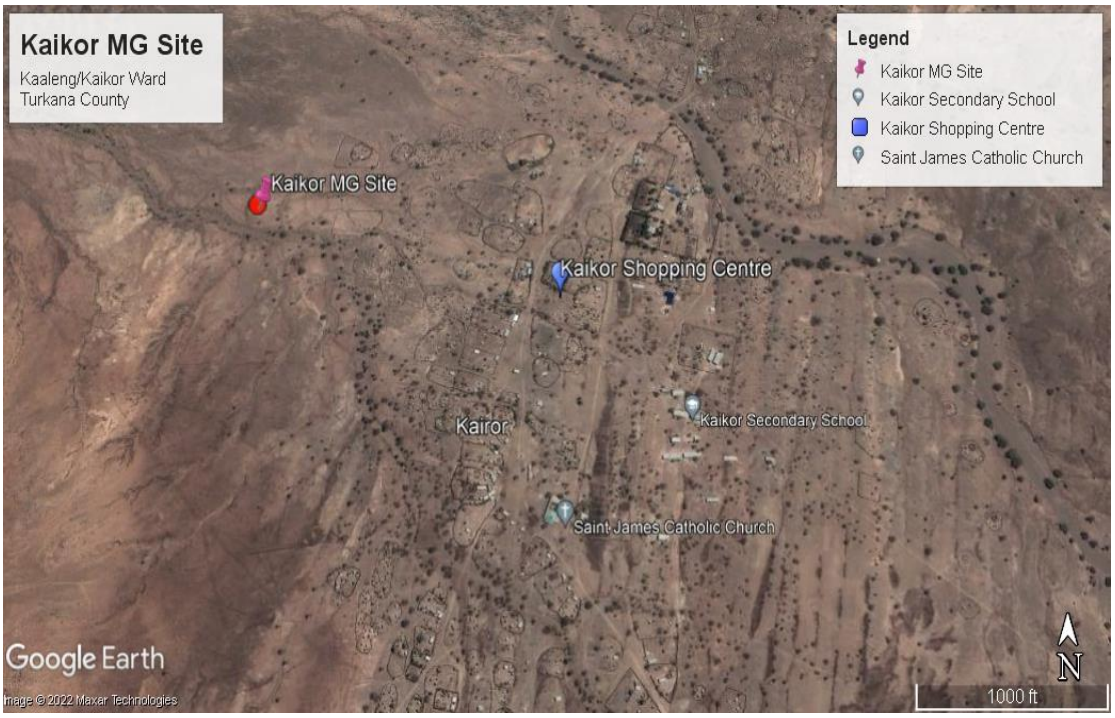


Figure 2-1: Project Location

2.3 DESCRIPTION OF PROJECT FACILITIES AND COMPONENTS.

2.3.1 Description of the Proposed Solar Mini-grid

Based on an aerial survey done in 2019, Kaikor has a potential customer base approximated at 634 households, and a 175KWp solar Mini-grid to supply power to the community will be installed. This will entail generation of electricity from solar, distribution of power within a 1.5-kilometer radius using wooden or concrete poles and retailing the same to the community. The total length of LV distribution network will be 35Km. The community members will pay a connection fee of KES. 1000 once they apply for electricity.

2.3.2 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 Turkana 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. Interviews, discussions, photography, observations and check lists are some of the methods employed in gathering the data.

2.3.1.1 Nature of the Project

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

PV Hybrid Mini-Grid Sizing

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

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

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

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

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

2.3.2.2 Architecture and Basic Design Specifications

This hybrid power generation site is projected to generate 175(kWp) and is meant to serve between 600-700 households (customers). The proposed mini-grid installations will be built to comply the International Electro technical Commission (IEC) standards. It will have an installation of solar panels of with a capacity of 175 (kWp) and battery house with 438 kWh. The solar panels will have a connection to the batteries through underground cables. The standby generator will also be connected to the system as a backup.

This generator will be a capacity of 120 kVA capacity with a fuel tank of 2000ltrs capacity. To optimize this hybrid system the HOMER software will be used. The goal of the hybridization of diesel systems is to reduce fuel consumption by switching off diesel generator set(s) for several hours a day, in order to reach a PV energy, share in the final mix of at least 60% or more. The power will be distributed to the customers by overhead lines. The project site is expected to serve clients within a radius of 1.5km from the site (generation source).

The PV plant and the battery capacity have been sized accordingly to the daily demand and the solar resources. In addition to this Design architecture, the project site shall have a site office that shall also have a Control Room adjacent as well as a guard house. The guard house shall be constructed using concrete and masonry works whereas the control room and office can also be a containerized facility.
The Solar PV hybrid system is based on a centralized photovoltaic plant connected to a 3-phase 415V AC busbar line, where the multi-mode battery inverter and the diesel generator are also connected.

The plant is configured such that a significant portion of daytime loads is fed directly from the solar generator (grid-tie inverter) without intermediate battery storage usage. The solar PV power plant is also equipped with a Diesel Generator, which is normally used as reserve power. The diesel generator switches on automatically whenever the battery state of charge reaches a certain defined DOD (Depth of Discharge). The diesel generator comprises of 120 kVA unit in three-phase operation and it's equipped with automatic startup function controlled by the battery inverter charger. The figure 2 below illustrates the preliminary data for the mini-grid in Kaikor.

Figure 2: The preliminary Data for Kaikor Solar Mini-grid

Name	Residential	Nonresidential	Circuit(km)	Peak demand (kw)	Daily demand (KW)	Monthly demand (kWh)	PV(DC-KWp)	Genset fuel Tank	Batteries	Generator (kva)	Cost (USD
Kaikor	623	11	35	104	562	16,860	175	2000	438	120	1,262,970.43

Key Components of the Project:

Power Generation Sources:

Low Voltage Power Distribution Network:

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

Monthly Energy Demand: The project is expected to meet a total monthly energy demand of 16,860 kWh.

Daily Energy Demand: The average daily energy demand is approximately 562 kWh, ensuring a consistent supply for the consumers.

Peak Demand: The peak demand of the system is 104 kW, which is the maximum power requirement during any given moment.

PV Capacity: The solar photovoltaic panels have a total capacity of 122 kWp.

Battery Capacity: The Battery Energy Storage System has a capacity of 438 kWh, providing energy storage and ensuring a continuous power supply.

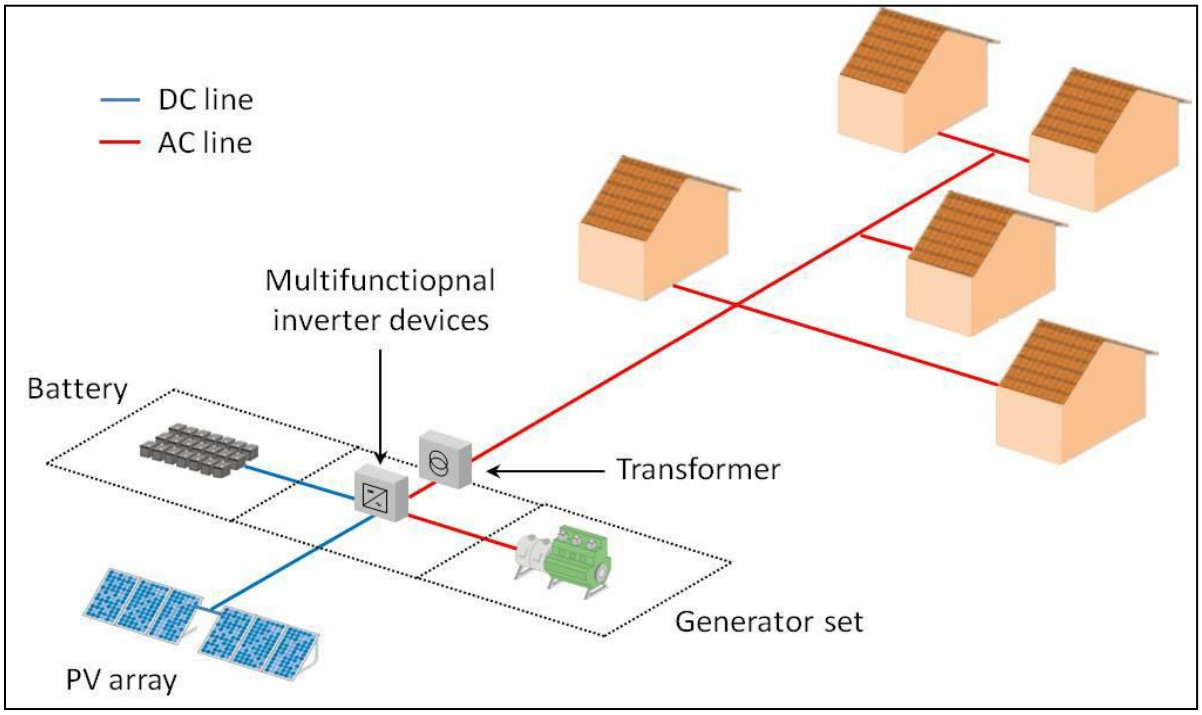
Generator Capacity: The diesel generator has a capacity of 120 kVA, serving as a backup power source.

LV Network Length: The low voltage distribution network spans a length of 35 kilometers, connecting consumers to the power source.

Estimated Project Cost:

The estimated cost of the Kaikor Mini Grid project is approximately USD 1,262,970.43. It's important to note that this cost may be subject to change as more detailed plans and implementation phases are developed. The investment is expected to provide long-term benefits to the local community, improving their quality of life, economic opportunities, and access to modern amenities.

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



2.3.3 The PV Generator

The project utilizes solar panels with a total capacity of 175 kWp to harness solar energy. Solar power is a clean and renewable energy source that will provide a significant portion of the electricity needed for the project.. The PV modules should comply with the norms IEC 61215 and IEC 61730. The outside junction box with the positive and negative terminals shall incorporate bypass diodes that have the function of preventing any possibility of the electrical circuit inside the module being broken due to the partial shading of a cell and shall be at least IP 65 and UV resistant.

The module support structure shall be ground-mounted on arid soil with a base made of concrete. The support shall have a tilt angle between 10° - 15° from the horizontal. No soil tests have been performed, at this stage of the proposed project design, but from the site inspection during the pre-feasibility study, ramming or screw foundations could be used. The support frame shall be of either lightweight aluminum or galvanized steel and it shall be easy for installation, maintenance and disassembly at the end-of-life cycle. These materials will be possibly sourced locally or from abroad and shipped to Mombasa port and transported via road to the site town.

Cables used within the PV generator shall have a voltage rating of at least 1,2 VOC; have a temperature rating higher than 40°C above ambient temperature; they will be UV-resistant; water resistant and it is recommended that they be flexible (multithreaded) to allow for thermal/wind movement of modules. The PV inverter shall be of type current source grid-tied to convert DC to

an AC Sinusoidal current. String inverters shall be installed indoors or outdoors with a cover and suitable for desert conditions with high ambient temperatures and dust.

2.3.4 Powerhouse

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

2.3.5 Inverter

Inverters and Chargers:

PV Inverter: A 175 kW solar PV inverter is used to convert the direct current (DC) electricity generated by the solar panels into alternating current (AC) electricity suitable for consumer use.

Battery Inverter Charger: A 120 kW battery inverter charger is employed to manage the energy flow to and from the battery storage system. It ensures efficient charging and discharging of the battery, maximizing the system's overall performance.

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

2.3.6 Battery Energy Storage System

A 438 kWh Battery Energy Storage System is incorporated to store excess solar energy during the day, ensuring a consistent power supply even during cloudy or nighttime conditions.
The battery considered is lead-acid, deep discharge type with a permissible repeated deep discharge without damage. Automotive or starting type batteries are not acceptable. It shall be of the open "vented" OPzS type with recombination caps and transparent enclosure for easy inspection of electrolyte level.
OPzS stands for:

O = Ortsfest (stationary)
Pz = PanZerplatte (tubular plate)
S = Flüssig (flooded).
Other batteries can be considered:

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

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

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

2.3.6.1 Battery Rating

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

2.3.6.2 Battery Performance

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

2.3.6.3 Lifetime

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

2.3.6.4 Battery Cabling and Protections

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

2.3.7 Diesel Generator

A 120 kVA diesel generator is included to serve as a backup power source for periods of low solar generation or in case of battery depletion. It provides reliability and backup in the event of extended periods of cloudy weather or high demand. The rated consumption will follow a 0.25 L/h/kW curve at stand-by power. It should include a highly corrosion resistant enclosure, control panel and monitoring, fuel tank and circuit breaker protections. The Diesel Genset shall be suitable for indoor or outdoor installation and shall perform accordingly with Multi-mode Inverter and the mentioned architecture model. The Diesel Genset shall be working in a fully automatic manner with the above stated components. The diesel gensets will have base mounted fuel tanks that

will be factory tested for leaks. There will also be an external reserve fuel tank with a capacity of 2000 liters. The proponent, through the operating entity will have regular inspection by the manufacturer. The noise rating for the generator set will be 75dBA @ 1 meter at 75% load under free field conditions. The generator sets will have a high-quality noise absorbent and fire-retardant grade acoustic insulation material complying to IS 8183.

2.3.8 Distribution Line and Energy Meters

Kaikor site will have a distribution line circuit of 35 km in total. The electricity distribution from the generation plant to the end consumers will be done by means of a distribution line formed by low voltage (LV) line at 415V for three phase and 240V for single phase. All lines shall be over-head mounted on concrete poles or eco poles. The project implementing agency will seek way leaves for the LV lines which will run along road reserves and boundaries within the supply area.

2.3.9 Cable Requirements

The cables used in the site shall fulfil these requirements:

- The cables shall be suitable for laying on racks, in ducts, trenches, trestles, conduits and under-ground buried installation with chances of flooding by water.
- All cables of module area if laid on cable trays shall be covered. If cables are to be laid underground, laying shall be as per latest relevant code.
- Cables with Copper conductor on DC side & that with aluminum conductor in AC side to be used as power cables shall have tensile strength as per relevant standards. Conductors shall be stranded.
- Cables with XLPE insulation, PVC sheathed & armored suitable for a continuous conductor temperature of 90^0C and short circuit conductor temperature of 250^0C shall be used.
- PVC insulation shall be suitable for continuous conductor temperature of 70^0C and short circuit conductor temperature of 160^0C.
- Only terminal cable joints shall be accepted. No cable joints to join two cable ends shall be accepted.
- Cables inside the control room shall be laid in suitable Cable Trays of approved type.
- Cable terminations for LT cables shall be made with suitable cable lugs & sockets etc. crimped properly and passed through brass compression type cable glands at the entry and exit point of the cubicles.
- The panels' bottoms shall be properly sealed to prevent entry of snakes / lizard etc. inside the panel.
- The terminal end of cables and wires are to be fitted with good quality letter and number ferrules of proper sizes so that the cables can be identified easily.

2.4 PROJECT ACTIVITIES

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

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

2.4.1 Pre-Construction Phase Activities

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

2.4.2 Construction Phase activities

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

2.4.2.1 Construction Activities Outline

Construction activities will involve the following:

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

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

2.4.3 Operation Phase Activities

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

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

2.4.4 Project's Decommissioning Activities

REREC shall submit a decommissioning plan to NEMA in good time prior to decommissioning. The decommissioning plan should include a restoration plan.
At the decommissioning/demolition phase, the following activities will take place;

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

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

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

2.5 CONSTRUCTION MATERIALS, EQUIPMENT AND SERVICES

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

2.5.1 Input Materials and Equipment & Machinery

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

- Lorries
- Plumbing equipment

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

2.5.2 Land requirements

The proposed works will be carried out on a 1.267 ha proposed site which the community identified for setting up the project. Stakeholder engagement with the community on this matter has been conducted. The proposed site land falls in Kaikor Community Land owned by the Kaikor community. The sub-project site will be acquired by NLC compulsorily and affected communities compensated in-kind through their community project of choice

Kaikor site will have a distribution line (DL) circuit of 19.69 km in total. Construction of the distribution line will involve the acquisition of land. It is likely that the DL will pass through communal land. Additional information is required on the routing of the DL to enable a proper impact assessment of the wayleave acquisition. At the time of the study, the consultants did not have this information. Additionally, it is recommended that extensive consultations should be carried out with the stakeholders affected by the DL and those who reside near the wayleave.

2.5.3 Compensation Details

Compensation for the land acquired for the proposed project will be in kind. NLC will acquire the 1.267 ha land in Kaikor compulsorily, The MOE will pay compensation in kind through implementation of projects in water, education and health sectors.The compensation in kind project will cost 1,000,000. Kaikor community requested for the following projects in order of priority as shown in the table and plate below.

Table 2-2 Sub Project details

No	Identified Project	Location from the site	Project description	Coordinates
1	Construction of additional classrooms in Loitanit Primary school.	500m	The school has been active since 1979, it has no electricity, insufficient classrooms and it lacks a fence.	N04°31'04.5" E 35°25'26.1"
2	Water reticulation to the dispensary at kaikor	600m	The borehole has been in operation since 2918 and serves about 3000 people. The water is accessible to the locals but far from the borehole.	N04°31'19.8" E35°25' 17.2"

Plate 2: Loitanit Primary School / Kaikor Borehole

Further, A-RAPs has been prepared for the sub project. The A-RAP stipulates procedures and actions for acquiring land and compensating affected communities. An A-RAP applies where affected persons are not physically displaced and less than 10% of their productive assets are lost, or fewer than 200 people are displaced. In the case of this sub project, there is no physical displacement of affected persons, and the foreseen impacts on livelihoods such as grazing occasioned by min-grid construction, way leaves acquisition and implementation of community projects are considered minor. An A-RAP outlining the principles and procedures for land acquisition and compensation is annexed in this report. (See annex 6)

2.5.4 Access to the Site

It is proposed that the Kaikor Solar Mini-grid will have one access road, which will be designed according to REREC's standards, taking into account the Ministry of Road's requirements. The Solar Mini-grid will be accessed from Lokitaung-Kaaleng-Kaikor road. The road is well maintained murram road, this is advantageous because no new road will be required. However, a proper

access to the site and drainage will be constructed to safely access the Mini -grid site and to avoid flooding.

2.6 RESOURCE REQUIREMENT

2.6.1 Workforce Requirement

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

2.6.2 Water Requirement and Source

2.6.2.1 Construction Phase

Water is key in the construction of this project. Water will be required for potable use and in the construction of the foundations for the control room, guard house and any other works. The contractor will source water from elsewhere rather than the community dam because water may not be enough for the community for use during construction and operation

2.6.2.2 Operation Phase

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

2.6.3 Raw Material Requirement

2.6.3.1 Construction Phase

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

2.6.3.2 Operation Phase

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

2.6.4 Power Requirement

Power will be essential for the proposed project both during construction and operation. The contractor will have to have a portable generator during construction for fabrication and welding where necessary but REREC will provide electricity for operations from its constructed Solar Mini-

grid electrical network in the area since the area will be well served with power after competition of the Solar Mini-grid.

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

2.6.5 Products, By-Products and Waste

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

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

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

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

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

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

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

2.6.6 Fire Safety and Security

2.6.6.1 Construction Phase

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

emergency response plan with all the emergency numbers will be well displayed at the project site.

2.6.6.2 Operation Phase

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

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

2.6.7 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.

2.6.8 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.

2.6.9 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.

2.7 ANALYSIS OF ALTERNATIVES AND PROJECT JUSTIFICATION

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

2.7.1 Present Power Supply Position

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

Turkana County receives between 4 and 6 kWh/m2 of daily solar radiation based on the national atlas and therefore has a vast potential for solar energy production (Turkana County Government 2015). There is need to tap this source of energy in Kaikor location to promote economic growth in the area.

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

If the project does not go on, it will involve several losses both to Kaikor village and Location as a whole. The village and the surrounding area will continue to have no electricity and this will not help in maximizing and utilizing the area facilities thus leading to:

- The economic status of the local people remaining unchanged.
- Employment opportunities not created.

  Unchanged poverty in the area

2.7.2 Land identification criteria

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

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

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

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

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

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

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

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

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

2.7.3 Alternate 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:

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

Kaikor was identified as the most suitable area for the establishment of the proposed minig-rid based on the following factors:

Primary Resource: Kaikor 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 Kaikor location.

2.8 ALTERNATIVE POWER DISTRIBUTION LINES

The project requires the distribution of generated power into the settlement points within Kaikor through optimal access points, therefore all possible options for power distribution have been assessed.

The identified viable option for power distribution within Kaikor village for the solar mini-grid project is overhead distribution lines. Although other alternatives, such as underground lines and passing the power lines off established community public access routes, may have been considered, they are not feasible for this specific project due to technical and practical reasons. A mini-grid connection with enough capacity and material was recommended due to the anticipated increasing demand for connections. This eliminates the need to overhaul the proposed mini-grid connection when the population increases in Kaikor.

Underground distribution lines involve the installation of power cables beneath the ground, typically in trenches or conduits. While this option may be visually appealing and minimize the impact on the environment, it presents challenges in terms of cost, maintenance, and accessibility. Excavation for underground lines can be difficult and costly in Kaikor village due to challenging terrain, and maintenance and repair of underground lines may require specialized equipment and labour. Additionally, accessing underground lines for routine maintenance, fault detection, and repairs can be challenging, especially in remote or inaccessible areas of the area. Furthermore, scalability and flexibility may be limited with underground lines, making future

expansions or changes in power demand more complicated and costly.

Passing the power lines off established community public access routes may not be practical in Kaikor village due to community settlement patterns, existing infrastructure, and environmental considerations. Establishing new routes or modifying existing ones to accommodate power lines may require significant resources, land acquisition, and community consultations, which can be time-consuming and costly.

Additionally, the appropriateness of potential mini-grid site identified by the Proponent was also assessed in terms of various suitability criteria and technical restrictions as outlined below:

Parameter	Comment
Seismicity	According to the Seismic Distribution Map by WHO (2010), generally Turkana county's seismic hazard is categorized as "Very Low". It is however recommended that the civil and structural infrastructure for the project should be designed in compliance with the national seismic regulation embedded within the Building Code
Land Use	The parcel of land earmarked for the project is community land with vegetative cover being natural trees and bushes. At present, the land is unutilized.
Terrain	Consideration is given to the topography of potential sites whereby flat or gently sloping topography is preferred. An ideal gradient for the natural ground is 1:100. A gentle slope facilitates surface drainage and movement of vehicles and people on site during construction. A steep slope requires costly leveling (cut and fill) for the construction of the solar mini-grid and increases the potential for environmental impacts during construction as well as operations i.e. steeper slopes have higher surface water flow rates and therefore higher erosive potential. The proposed site is slightly slopy and cost-effective during construction. The proposed site and distribution alignment does not exhibit significant slopes that may impact on the construction/installation activities.
Hydrology	Consideration is given to the proximity of potential sites to adjacent water courses and wetlands where there may be potential impacts in terms of erosion and siltation of water courses, as well as implications associated with storm-water control at the solar mini-grid site. The site is not close to water resources or wetland and so there will be no impact to water sources through siltation.
Geology and soils	Consideration is given to the soil type present within the potential site whereby stable soil and founding conditions are preferable. Less stable soils, i.e. shallow, dispersive soils and soils with poor drainage present an erosion hazard if not managed correctly, and also require the installment of additional, costly foundation infrastructure. The site has sandy soil which drain more readily than other types of soils.

Flora and Fauna	The potential sites need to be assessed in terms of their ecological value at both a macro and micro sale i.e. within the site and the environment surrounding the site to ensure the protection of endemic and red data species and their habitat, should they be present. The proposed site is not of a high ecological value.
Visibility	Highly visible sites i.e. on a ridge / elevated terrain are considered less favorable in that they have a high visual impact on the surrounding landscape. Sites that are hidden or out of site e.g. behind a hill, may be considered more suitable. The proposed site is on flat and may not create sharp visual impact because it is not on an elevated point.
Accessibility	The proposed site is accessible by existing public roads which will avoid the need for construction of new access roads. Access is also important particularly as it relates to the transportation of the solar panels, batteries and generator to the site, which are heavy weights. As such the site should not be located in an area that has excessively steep inclines or declines that could hinder access particularly during periods of heavy rainfall.

Considering these technical and practical challenges, the identified option of overhead distribution lines along Kaikor access routes is the most feasible for the solar mini-grid project in Kaikor village. Overhead lines, which involve the installation of power cables on poles, are more cost-effective, easier to maintain, and provide greater flexibility for future expansion. Proper design, installation, and adherence to safety and environmental standards can ensure reliable and efficient power distribution to the consumers on the area, making overhead distribution.

2.8.1 Alternate Method of Power Generation

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

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

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

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

Solar energy was a desirable option because:

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

2.8.2 Alternative Sources of Energy

2.8.2.1 Thermal Power Generation

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

2.8.2.2 Hydro Electric Power – HEP

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

2.8.2.3 Other Sources of Energy:

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

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

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

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

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

The No Project option in respect to the proposed project implies that the status quo is maintained. This option is the most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions. This option will however, involve several losses both to Kaikor village and the community as a whole. The target PAPs will stay without electricity and the government objectives of bring electricity in order to open up the area and provide better public services will not be realized. The No Project Option is the least preferred from the socio-economic and partly environmental perspective due to the following factors:

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

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

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

2.8.4 Analysis of Alternative Construction Materials and Technology

The proposed solar Mini-grid 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. So, the task was to assess alternative water and Diesel generator oils and fuel sources for the project.

2.8.5 Solid Waste Management Alternatives

Solid wastes will be generated from the proposed project. An integrated solid waste management system is recommendable. First, the REREC will give priority to reduction at source of the materials. This option will demand a solid waste management awareness program in the management and the staff. Recycling and reuse options of the waste will be the second alternative in priority. This will call for a source separation program to be put in place. The third priority in the hierarchy of options is combustion of the waste that is not recyclable. Finally, the REREC will need to establish partnership with NEMA approved waste handlers for regular waste removal and disposal in an environmentally-friendly manner. In this regard, a NEMA registered solid waste handler would have to be engaged. This is the most practical and feasible option for solid waste management.

2.8.6 Conclusion

Based on the above-mentioned suitability criteria and technical requirements, the proponent decides to put up the Solar Mini-grid within Kaikor. Relocation option to a different site is an option available to the proponent. The project proponent can look for alternative land to accommodate the scale and size of the project. However, this will be a costly venture, may take a long time although there is no guarantee that the land would be available in the targeted area. It is recommendable that the proponent be allowed to install the project in the proposed site.

3 POLICY, LEGAL AND REGULATORY FRAMEWORK

3.1 INTRODUCTION

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

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

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

3.2 KENYA ELECTRICITY SUPPLY INDUSTRY (ESI)

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

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

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

  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 Kaikor site.

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

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

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

3.3 ENVIRONMENTAL POLICY FRAMEWORK

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

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

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

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

3.4 INSTITUTIONAL, REGULATORY AND LEGAL FRAMEWORK

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

a) National Environment Management Authority (NEMA)

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

b) County Environment Committees

According to EMCA (Amendment), 2015, every governor shall, by notice in the Gazette, constitute a County Environment Committee (CEC) of the County. The County Environment Committees are

responsible for the proper management of the environment, development of county strategic environmental action plan, every five years including implementation of the plans among others.

c) National Environmental Complaints Committee

The Committee performs the following functions:

- ✓ Investigate any allegations or complaints against any person or against the authority in relation to the condition of the environment in Kenya and on its own motion, any suspected case of environmental degradation and to make a report of its findings together with its recommendations thereon to the Council.
- ✓ Prepare and submit to the Council periodic reports of its activities which shall form part of the annual report on the state of the environment under section 9 (3) and
- ✓ To perform such other functions and excise such powers as may be assigned to it by the Council.

d) National Environment Action Plan Committee

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

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

e) Standards and Enforcement Review Committee

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

f) National Environment Tribunal

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

g) National Environment Council (NEC)

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

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

3.5 NATIONAL POLICY AND LEGAL FRAMEWORK REVIEW

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

Table 3-1: Policy and Legislative Framework

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

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

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

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

		Additionally, this regulation provides for the local enforcement of the International Convention on Biological Diversity (CBD).	
8	Environmental Management and Coordination, (Fossil Fuel Emission Control) Regulations 2006	These regulations are described in Legal Notice No. 131 of the Kenya Gazette Supplement No. 74, October 2006. These regulations include internal combustion engine emission standards, emission inspections, the power of emission inspectors, fuel catalysts, licensing to treat fuel, cost of clearing pollution and partnership to control fossil fuel emissions. The proposed project will generate fuel emissions linked to the back-up generator. This will only happen when the sun rays are poor.	This legislation gives caution to proponent on proper handling and management of fuels. The REREC will adhere to the ESMMP while handling and managing the fuels.
9	Licenses and Permits Required Under The EMCA	The subsidiary legislations under the EMCA are partially monitored using permits and licenses. Subsequently all licenses and permits required during the construction phase shall be the responsibility of the individual contractors and their agents. During the operational phase, all permits, and licenses required to operate the project will be the responsibility of the proponent.	The following permits to be available for inspection during the construction and operational phases of the project: ✓ EIA License under Environmental Management and Coordination Act, 1999; ✓ Workplace Registration under Occupational Safety and Health Act, 2007; ✓ Construction Permit by the County Government; and ✓ Noise Permit under Legal Notice 61: The Environment Management and Coordination (Noise and Excessive Vibration Control) Regulations, 2009.
10	Occupational Health and Safety Act, 2007	The Occupational Safety and Health Act (OSHA) was enacted to provide for the health, safety and welfare of persons employed in workplaces,	The contractors will be required to fully comply with Legal Notice 40 titled: Building Operations and Works of Engineering Construction Rules, 1984 (BOWEC).

		and for matters incidental thereto and connected therewith.	Each contractor will develop and implement a formal construction health and safety plan.
11	L.N. 31: The Safety and Health Committee Rules, 2004	These rules came into effect on April 28, 2004, and require that an Occupier formalize a S&H Committee if there is a minimum of 20 persons employed in the workplace. The size of the S&H Committee will depend on the number of workers employed at the place of work	The contractor will be required to constitute Health and Safety Committee to oversee safety and health at the construction site.
12	L.N. 24: Medical Examination Rules, 2005	These rules provide for Occupiers to mandatorily undertake pre-employment, periodic, and termination medical evaluations of workers whose occupations are stipulated in the Eighth Schedule to the OSHA and the First Schedule to this Rules. Workers that fall under the above two schedules are required to undergo medical evaluations by a registered medical health practitioner duly registered by the DOSHS.	The contractor should ensure that the workers exposed to hazards and or accidents undergo requisite medical examinations as required by these rules.
13	L.N. 25: Noise Prevention and Control Rules, 2005	The rules set the permissible level for occupational noise in any workplace (which includes construction sites) The Proponent is to ensure that • any equipment brought to the site for use shall be designed or have built-in noise reduction devices that do not exceed 90 dB(A). • those employees that may be exposed to continuous noise levels of 85 dB(A) are medically examined as indicated in Regulation 16. If found unfit, the occupational hearing	The contractor to ensure that equipment is serviced properly and/or use equipment that complies with the threshold noise values provided in the act. Alternatively, each contractor will be required to develop and implement a written hearing conservation programme during the construction phase.

		loss to the worker will be compensated as an occupational disease.	
14	L.N. 59: Fire Risk Reduction Rules, 2007	Several sections of the rules apply to the proposed project as enumerated below. - Regulation 16 requires Proponents to ensure that electrical equipment is installed in accordance with the respective hazardous area classification system. It is also a requirement that all electrical equipment is inspected every six months by a competent person and the Proponent is required to keep records of such inspections. - Regulation 22 provides a description of the functions of a fire-fighting team. - Regulation 23 requires Proponents to mandatorily undertake fire drills at least once a year. - Regulation 34 requires Proponents to develop and implement a comprehensive written Fire Safety Policy - Regulation 35 requires a Proponent to notify the nearest Occupational S&H area office of a fire incident within 24 hours of its occurrence and a written report sent to the Director of DOSHS within 7 days.	The proponent is expected to comply with the requirements of L.N. 59: Fire Risk Reduction Rules, 2007 by i. Carrying out, and record, a fire risk assessment identifying any possible dangers and risks. ii. Reducing, or where possible remove, the risk of fire and take precautions to deal with the remaining risks. iii. Developing an emergency plan should a fire occur which includes evacuation procedures etc.
15	The Energy Act, 2019	The Energy Act of 2019 deals with all matters relating to all forms of energy including the generation, transmission, distribution, supply and use of electrical energy as well as the legal basis for establishing the systems associated	The proponent is in line with the Energy act regulations in the following ways. • The proponent has identified an available site

		with these purposes. The Act also established the Energy and Petroleum Regulatory Authority (EPRA).	• Alignment of the Mini-Grid Project to County development plans. • The Mini-Grid proponent has the technical and financial capability to conduct the project • The proponent has conducted the necessary engagement with the community.
16	Water Act, 2016	Part 2 section one of the Act notes that every water resource is vested in and held by the national government in trust for the people of Kenya. Section 143 (1) notes that; A person shall not, without authority conferred under this Act- (a) 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.	All construction, operation and decommissioning phases will take caution to refrain from polluting any water resource and will endeavour to prevent pollution in line with the ESMMP.
17	The Energy (Solar Photovoltaic Systems) Regulations, 2012	These regulations shall apply to a solar PV system manufacturer, importer, vendor, technician, contractor, system owner, a solar PV system installation and consumer devices. The Regulations prohibits any person from	The Regulations regulates the design and installation of PV systems. The persons engaged in the designing and installation of the Mini-Grid shall be licensed by EPRA

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

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

		provides that 'county governments shall hold in trust all unregistered community land on behalf of the communities for which it is held'. Furthermore, Section 6(2) maintains that 'the respective county government shall hold in trust for a community any monies payable as compensation for compulsory acquisition of any unregistered community land'. Section 30(1) states that 'Every member of the community has a right to equal benefit from community land'. Section 26(1) provides that 'a community may set aside part of the registered community land for public purposes and Sub-section (2) holds that 'where land is set aside for public purposes under Sub-section (1), the (Land) Commission shall gazette such parcel of land as public land'. These provisions offer a window for the proposed project to acquire land for project works legally for communities as necessary and to convert the same into public land. This is useful for the project as once done powerful groups will not have opportunity to exclude them on account of their socio - economic statuses. In any event, Section 35 holds that, 'subject to any other law, natural resources found in community land shall be used and managed- (a) Sustainably and productively.	the proponent has therefore acquired land for project use. The establishment of the mini-grid will convert communal land to generation and distribution of electric energy for long term. Further, based on community need assessment the proponent will undertake in kind development project to support the community education or Health needs.

		(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 PAPs and thus their rights secured in this Act	
23	Land Registration Act, 2012	Section 27 (2) provides that a transfer without valuable consideration shall have the same effect as a transfer for valuable consideration when registered.	Once the KOSAP PIU finalizes stakeholder engagements in all the identified counties, the transfer process shall be commenced to ensure that the land rights are secured. This gives the project the required land security to allow project implementation, which is in compliance with this legal requirement.
24	Land value amendment Act 2019	It aims at standardizing the value of land in Kenya for the primary purpose of enhancing efficiency and expediting the compulsory land acquisition process for public projects. It introduces Section 107A into the Land Act, which provides the criteria for the valuation of freehold and community land that is the subject of compulsory acquisition. Community Land, like freehold land, shall be valued based on the criteria outlined in Section 107A and the Land Value Index which will be jointly developed by the national government and county	Land in Kaikor is a community land. The 1.267 hectares allocated by the community for the proposed mini-grid will be acquired for the project. The MOE will pay compensation in kind through implementation of projects in water, education and health sectors. The community has chosen a project in education or health sector.

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

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

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

		transmission of HIV or other life threatening sexually transmitted disease, stupefying with sexual intent, forced sexual acts for cultural or religious reasons among others. The Act also has orders for medical treatment for victims including free HIV prophylaxis, emergency pregnancy pill and counselling. The Act provides stiff penalties in which most of the crimes attract minimum of ten years imprisonment which can be enhanced to life imprisonment.	behaviour can occur not only between project-related staff and those living in and around the project site, but also within the homes of those affected by the project.
35	The Children Act, 2012	Part 2 of the Act denotes the rights of the children and their welfare shall be protected from child labour and armed conflict i.e. Every child shall be protected from economic exploitation and any work that is likely to be hazardous or to interfere with the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral or social development. The Act also notes that a shall be protected from sexual exploitation and use in prostitution, inducement or coercion to engage in any sexual activity, and exposure to obscene materials.	Sensitization to the community on the need to ensure the protection of children has been done and will continue throughout the project cycle. In addition, the contractor will sensitize workers against abuse and exploitation of children.
36	Persons with Disability Act, Chapter 133	This Act provides for the protection of the rights of people with disabilities ensuring they are not marginalized and that they enjoy all the necessities of life without discrimination. The Act guarantees that (1) No person shall deny a	The Act will be adhered to in order to ensure that persons with disability are included in all decision making that affects their lives. This will be monitored to make sure they are not excluded from project benefits

		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.	and exposed to negative impact from the project that could adversely affect them.

3.6 LICENSES AND PERMITS REQUIRED

The subsidiary legislation under the EMCA is 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.

Before the contractor mobilizes to the site, there are certain permits that he will need to put in place. Some permits may be obtained during construction since they will be determined as need arises. Table 3-2 overleaf lists the environment-related permits required for this project.

Table 3-2: Project Permit and License Requirements

No.	Relevant activity	Statute	Permit and License Requirement	Competent Authority	Responsible Agency for Obtaining Clearance	Date of Acquisition	Duration
Pre-Construction Stage							
1	Construction and operation of the solar mini grid	Environmental Management and Coordination Act (EMCA) Cap 387, Rev 2018	Need to submit ESIA report to obtain EIA license	NEMA	Proponent	Upon approval of ESIA report	Max 90 Days from date of submission of ESIA Report
2	Construction activities	Occupational Safety and Health Act (OSHA), 2007	Need to apply registration of premises	DOSHS	Contractor	Before commencement of construction	1 – 4 weeks
3	Setting up of construction camp sites	Environmental Management and Coordination Act (EMCA) Cap 387, Rev 2018	Need to submit Project report for the Camp Sites to obtain EIA License	NEMA	Contractor	Before commencement of construction	1– 1.5 months

No.	Relevant activity	Statute	Permit and License Requirement	Competent Authority	Responsible Agency for Obtaining Clearance	Date of Acquisition	Duration
6	Storage, transport and disposal of ordinary domestic and office waste	Environmental Management and Coordination Act (EMCA) Cap 387, Rev 2018	Need to obtain waste license through submission of Waste Management Plan	NEMA	Contractor	Before commencement of construction	1 – 1.5 months
7	Storage, transport and disposal of hazardous waste	Environmental Management and Coordination Act (EMCA) Cap 387, Rev 2018	Need to obtain hazardous waste license through submission of Waste Management Plan	NEMA	Contractor	Before commencement of construction	1 – 1.5 months
Construction stage							
4	Food handling in the campsite	Public Health Act	Obtain Food Handler Certificate	County Government	Contractor	Before handling of food in the campsite	6 months
5	Workplace registration	Occupational Safety and Health Act, 2007	Apply for Registration of a Workplace	DOSHS	Contractor	Before utilizing the campsite	Annual

3.7 WORLD BANK ENVIRONMENTAL AND SOCIAL SAFEQUARDS POLICIES

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

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

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

Table 3-3: World Bank Operational Ops

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

		policy dialogue and economic and sector work. The Bank supports, and expects borrowers to apply, a precautionary approach to natural resource management to ensure opportunities for environmentally sustainable development. Natural habitats are land and water areas where most of the original native plant and animal species are still present. Natural habitats comprise many types of terrestrial, freshwater, coastal, and marine ecosystems. They include areas lightly modified by human activities but retaining their ecological functions and most native species.	
3.	Indigenous Peoples (Operational Policy 4.10)	The objective of this policy is to (i) ensure that the development process fosters full respect for the dignity, human rights, and cultural uniqueness of indigenous peoples; (ii) ensure that adverse effects during the development process are avoided, or if not feasible, ensure that these are minimized, mitigated or compensated; and (iii) ensure that indigenous peoples receive culturally appropriate, gender and inter-generationally inclusive social and economic benefits.	The policy is applicable because the inhabitants of Kaikor who are Turkana are classified as a marginalized group in Kenya. The Turkana community are main inhabitants of Kaikor and the sole PAPs of the proposed solar mini-grid. Further the proponent will continue to engage the PAPs in a culturally appropriate way and allow for decision making in a free, prior and informed consent manner throughout the phases of the project.
4.	Involuntary Resettlement (Operational Policy, OP/BP 4.12)	The objective of this policy is to (i) avoid or minimize involuntary resettlement where feasible, exploring all viable alternative project designs; (ii) assist displaced persons in improving their former living standards, income earning capacity, and production levels, or at least in restoring them; (iii) encourage community participation in planning and implementing resettlement; and (iv) provide	The policy is applicable to the entire project because there is land acquisition for the Mini-grid, Wayleaves, contractor facilities and worker's camps.

		assistance to affected people regardless of the legality of land tenure.	

3.8 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 Kaikor Project Site is guided by this KOSAP ESMF.

3.6 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 KOSAP component 1 (Mini-grids for Community Facilities, Enterprises, and Households) which involves installation of mini-grids will require land acquisition.

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

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

3.7 VULNERABLE AND MARGINALIZED GROUPS FRAMEWORK (VMGF) FOR KOSAP

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

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

The VMGF is applicable because the main inhabitants of Kaikor are the Turkana community who are classified as VMGs in Kenya. The Kamba,Maasai, Somalis,kalenjins, kikuyus and luos communities are also present in Kaikor and they will all be PAPs of the proposed solar mini-grid. However,they do not qualify for OP 4.10 because their population is low and their livelihood is from businesses and employment salary. The ESIA did not identify any adverse impact on the communities therefore, a separate Indigenous Peoples Plan will not be required but the proponent will continue to engage the PAPs in a free, prior and informed manner.

3.8 SOCIAL ASSESSMENT (SA)

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

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

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

3.9 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 4.04 Natural Habitats- conservation of natural habitats is essential to safeguard their unique biodiversity and to maintain environmental services and products for human society and for long-term sustainable development.	Environmental Management and Coordination, (Conservation of Biological Diversity) (BD) Regulations 2006 – requires conservation of biodiversity which includes conservation of threatened species, inventory and monitoring of BD and protection of environmentally significant areas, access	Similar- both require conservation of natural habitats	This policy and law will not be applicable to the project because the proposed site has minimal vegetation that will be disturbed during project implementation.

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

4 BASELINE SETTINGS – PHYSICAL AND SOCIO-ECONOMIC ENVIRONMENT

4.1 INTRODUCTION

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

4.2 AREA OF INFLUENCE

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

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

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

Air Quality

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

Noise

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

Water

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

Flora and Fauna

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

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

Socio-economic/Social

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

4.2.1 Project Footprint Area

The project falls in Lokolio Village, Kaaleng/Kaikor ward in Turkana County. The area has some indigenous forest mainly composed of shrubs. The site is generally flat of average estimated slope of 0.8%-0.4%. Apart from shrubs, the area is largely semi-arid with some scattered shrubs. The site is located at a close proximity to Kaikor shopping centre that is at about 500m away. Land is largely communal within the area.

4.2.2 Study Area

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

4.3 PHYSICAL ENVIRONMENT

4.3.1 Topography

The topography of the project site is relatively flat with mild undulations. The elevation difference of about 3m is observed within the project site. The site slopes gently to the east towards a lagha near the project area. There is no rock outgrowth on the proposed parcel of land and no scenic features of value were observed within the project vicinity. The slightly slopy can make the drainage very good, avoiding flash floods during heavy rains. There are no lakes, swamps or dams in the project area.

4.3.2 Project site flora and Fauna

Plant species identified at the project area surrounding during ESIA study were;Balanites pedicellaris (Elamash), Borscia coriacea (Edung),Dobera glabra (Edapal), Fiscus sp. (Echoke), Grewia bicolor (Epat),Maerua subcordata (eerut),Acacia nubica (Epelet), Acacia senegal (Ekunoit), Balanites orbicularis (Ebei), Cordia sinensis (Edome), Dobera glabra (Edapal), Fiscus sp. (Echoke), Grewia bicolor (Epat), Grewia

tenax (eng'omo),Maerua subcordata (eerut), Salvadora persica (esokon), Tamarindus indica (Epederu), Zizyphus mauritiana (Ekalale) and Acacia tortilis (Ewoi). The proposed site falls mainly within arid and semi-arid lands. The area is characterised by semi-arid conditions. The area is mainly semi-arid with sparse vegetation mainly indigenous shrubs and a few ebei trees.

No wild animals were observed at the site. The area and its environs are not a known breeding site for any endangered species. The site does not present natural ecosystem for wildlife habitation. The project area is largely pastoral land which is a major form of livelihood for the local community. Some of the livestock include cows, goats, sheep, donkey, chicken and domestic pets such as cats and dogs. Other animals found in the project area are common ostrich, snakes etc. as mentioned by the community members. No other notable wild animals were sighted in the area.
There is also diversity of bird life in the area mostly concentrated in shrubs vegetation including stuthio Camelus), African Cuckoo (Cucus Gularis), lappet-faced vulture, isabelline wheatear among others..

4.3.3 Water Resources

According to information sought from Kaikor residence,Water used in the areas is obtained from underground sources. There are four boreholes supplying water to the community, four from St James mission church and one drilled in the community. During the time of ESIA public consultation, the four Church mission boreholes were not functional and the community was sourcing water from kaikor community borehole located within the shopping centre. Water obtained from the borehole source is hard salty water. Water sample of the community borehole was collected for analysis. The analysis results are appended in annex 3.

4.3.4 Ambient Air Quality

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

4.3.5 Ambient Noise Quality

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

4.3.6 Soil Type

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

areas in the kaikor that has sandy-Loam soil that is good for crop farming. The residents practice small scale irrigation agriculture.

A soil sample was collected from the site and submitted to a NEMA designated Laboratory for analysis of Petroleum Hydrocarbons. The results obtained shows that the pollutants of concern were not detected in the sample. It further indicates that the site has not been impacted by petroleum hydrocarbons. Soil sample analysis results are appended in annex 3.

4.3.7 Climate and Meteorology

According to Turkana CIDP,Turkana has a hot, dry climate with temperatures ranging between 20ºC and 41ºC and with a mean of 30.5ºC. Rainfall in the area is bimodal and highly variable (Opiyo et al., 2015). The long rains occur between April and July and the short rains between October and November. Annual rainfall is low, ranging between 52 mm and 480 mm with a mean of 200 mm (Turkana County Investment Plan, 2016-2020). Rain patterns and distributions are erratic and unreliable. Rain usually comes in brief, violent storms that result in flash floods. The driest periods (akamu) are in January, February and September and the county is highly prone to drought. 80% of the county is categorised as either arid or very arid.

4.4 SOCIO-ECONOMIC ENVIRONMENT

4.4.1 Demographic Profile

According to Kenya Population and Housing Census (KPHC) 2019 Lunga Sub County has an area of approximately 5300Km^2 and with a population estimate of about 36,769 people and population density of about 2 people per square kilometre. The project area has an estimated population of 6633 people and 1026 households with an estimate of 7 persons per household. The average gender ration for the population within the project area is estimated to be 51% female and 49% male. Table 4-1 below presents a summary of demographic profile of Kaikor.
Table 4-1 below presents a summary of demographic profile of Kaikor.
Table 4-1: Summary of demographic profile

Attribute	Magnitude/Number
Approx. population-Location	6633
Households	1026
Gender.	Male – 49% Female – 51%
Ave. No. per household	6 per household
Vulnerable classes	• Poor Single mothers • Orphans • Persons Living with Disabilities • The elderly-over 60 and poor • Persons with HIV/AIDs
Dominant ethnic group	Turkana
Primary religion	Christianity
Other groups	Somalis, Kalenjins, luhya, kisii, Kikuyu,luo, Maasai
Employment (formal/Informal)	Formal – 10% Informal – 90%

4.4.2 Educational Infrastructure

As per the observation and information sought from Lokolio location, the area has one primary school and one secondary school; Loitanit primary school and Kaikor Secondary school located at about 1km to the south east part of the project site. Boys and girls in Kaikor community have equal opportunities on education and can generally read and write, however, men and women above 40 years cannot read and write. As per key Informant interview at Loitanit Primary school, the project will improve learning, security and increase enrolment of pupils in the school. The school has 8 TSC employed teachers and 544 pupils (337 boys and 207 girls). School completion rates for boys is higher than girls due to early marriages and the Turkana cultural believes that girls should not be educated since they will end up getting married-'exchanged with cows. The main constrains to children accessing education in Kaikor location are;

a) Inadequate electricity supply;
b) Water scarcity
c) Girls drop outs due to early marriage;
d) Poverty/lack of finances by their parents;
e) Lack of food hence malnutrition;
f) Insecurity due to boarder conflicts.

According to the FGD with the youth, 85% have completed secondary school and 40% have completed colleges.

4.4.3 Health Facilities

Kaikor Sub-Location has one sub county hospital. Kaikor hospital is located 500m from the project site. As per KII with one of the health officers ,the hospital is opens 24/7 and offers free service delivery. They serve Kaikor community and its environs and

offer the following services; Out and in-patient services, Immunization, nutrition, maternity, antenatal and post-natal care, family planning, Lab and diagnosis among others. Kaikor hospital expressed their dire need of electricity for lighting and to power hospital equipment which include; Fridge, Oxygen concentrator, nebulizer and sterilizer. Top three problems facing Kaikor community are listed below;
Table 4-2: Top three health problems in Kaikor

Table 4-2

	Men	wemen	Children	Vulnerable
1	URTI	UTI	Gastroesophageal	Malnutrition
2	Pneumonia	URTI	Pneumonia	Pneumonia
3	Malnutrition	Malnutrition	Malnutrition	Malaria

Prevalence rate for malnutrition in Kaikor location is moderate since most residence of Lokorio can afford a balanced diet. HIV/AIDs prevalence rate is low, this is attributed to their cultural practices and minimal rural-urban movement. Maternal-infant mortality rate is very low, this is attributed to availability of accessible and reliable health care in the location. Common mental issues in Kaikor are depression and schizophrenia which majorly affect the women. According to the nurse in charge, this is attributed to stress since women are overall providers in Turkana community. Life expectancy for men and women in Lokolio location is between 60-70 years.
The main gaps in the dispensary are lack of electricity and emergency vehicles. Men and women in the community prefer going to the hospital for medication that traditional medicine, they however supplement hospital drugs with traditional herbs. Implementation of the project will be of great importance to the hospital.

4.4.4 Religious Institutions

The community members confirmed that their culture is slowly fading away. This is due to community members converting to Christianity, Muslim and modern way of life in large numbers. There are four churches (Full Gospel Churches of Kenya, Catholic Church, salvation army and outreach church) and a Mosque in the project area. There are no sacred places/historical sites in/near the proposed Kaikor Mini-Grid site.

4.4.5 Occupation and Livelihood Profile

According to the FGD with the community members, the main livelihood activities undertaken by people in Lokolio village are pastoralism, small scale farming, and small-scale businesses. Men practice pastoralism by moving with their livestock in search of pasture and water to areas as far as Ethiopia and south sudan,200 km away. Women practice small-scale subsistence farming of maize, millet, water melon and green grams, animal grazing in their home compounds and some are employed as casual labourers in St James Catholic mission and Some are charcoal burners and fuelwood sellers. Youths in Kaikor community earn their living by engaging in small scale businesses and Motorcycle business (Boda-boda). They engage in sporting and socializing activities during their leisure time.

Business activities are undertaken at Kaikor shopping centre by mainly Somalis and some Turkana communities. There are 20 general shops, 5 restaurants, one guest house and two wine and spirit shops. Women traders at Kaikor have a trading association known as Kaiyegole Women group. The association is meant to empower women in business to save money and invest in property. The Traders buy their goods from Lodwar town and have them transported to their shops by lorries.

The main formal jobs at the area are teaching, nursing and other civil services which accounts to approximately 10% of the population. The other 90% of the population is involved in informal employment. According to FGD with the youth,40% of the youth have completed higher education but lack employment. Implementation of the project will be a source of income to some of the community members in the project area.

4.4.6 Transport and Communication

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

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

Safaricom is the main network sevice provider in the area.Network coverage is however unstable particularly during rainy season. Availability of network in the area has enabled the community to embrace mobile banking due to unavailability of banks in the location. Men and women in the community reveive information on local issues through public meeting and directly from their local leaders. There is no operational post office in Kaikor location.

4.4.7 Energy Access

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

Turkana County receives between 4 and 6 kWh/m2 of daily solar radiation based on the national atlas and therefore has a vast potential for solar energy production (Turkana County Government 2015). There is need to tap this source of energy in Kaikor location to promote economic growth in the area.
In Kaikor, majority of the households use solar solutions (including Sun-king and D-light), torch and firewood for lighting and mobile phone charging purposes and fuel wood for cooking and heating water. During the Focus Group Discussions with both men and women, it was reported that they face challenges accessing power. The main challenge being lack of money to pay for accessible sources of power in the area.

4.4.8 Land Use

Land in Kaikor is under unregistered community land and is considered as communal land where every member of the community has the right to use it. Most of the land in Turkana County are non-functional and lack policies to guide on land use, this has resulted to unplanned human settlement in kaikor area. The project land has minimal vegetation cover. Land in Kaikor area is used for small scale subsistence farming and Livestock grazing. Domestic animals kept in the area are Sheep, goats, cows, donkeys and camels. Men practice pastoralism by moving with their livestock in search of pasture and water during dry season to areas near South Sudan and Ethiopia, Over 200km away. Turkana men obtain herbs and traditional medicine and the woman obtain firewood and *manyatta* building materials from Ekatorong'o forest located over 5 km away (2-3 hours work). The traditional herbs include; Aloe Veran (Ekaye), Neem Tree (Euthugu), etc.

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

4.4.9 Housing Types

The main housing types in the county are permanent units, semi-permanent and temporary units of housing. Permanent houses are mainly found in the urban centres, while temporary house units, known as 1.8.2 Housing types manyattas, constitute 91% of housing in both rural and urban areas (KNBS, 2013).50% of houses in Kaikor location are semi permanent with walls being made of mad,floor-earth and roofed with ironsheets.40% are *manyattas* and 10% permanent housing.

4.4.10 Social and Physical Infrastructure

Public institutions found in the project area include: schools and a health facility. Loitanit Primary school and Kaikor Sub- County hospital both located 1km from the site. There are four Churches at the project area; Full gospel Churches of Kenya ,St James Catholic church, Salvation army and Outreach church. There is also one mosque within the location. St James Catholic mission conduct the following projects in Kaikor community;

a) Irrigation -providing water to the community, the facility has four drilled boreholes.
b) Education-providing ECD education. (St Bakita ECD).
c) Supply water to the community for domestic use.
d) Heath care-Hasan dispensary.
e) Faith-conducting prayers in the community.

The area has an active women community-based organization dubbed Kaiyegole women group. The women group is meant to empower women in business to save and invest in property. Active NGOs at the project area are Worldwide Concern, Red Cross and World fund protection. They empower women financially, donate nutrition supplements to children under 5 years and cash transfers to women.

4.4.11 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:

a) Poor female headed households;
b) Child headed households;
c) Persons Living with Disabilities;
d) The Poor elderly;
e) Persons living with HIV/AIDs.

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

4.4.12 Gender Based vulnerability

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

responsible for household activities such as fetching water, cooking, cleaning, taking care of the children. Female literacy was reported to be low among women over the age of 18 and higher among the younger girls.

4.4.13 Gender Based Violence

The most common form of GBV in Kaikor area is intimate partner violence that mainly affects married people, Early marriages and psychological violence among women. Based on the Focus Group Discussion with women at Kaikor, intimate partner violence and early marriages among girls are common in the area and is mostly attributed to male chauvinism and Turkana culture. This has led to low school attendance among girls and very low completion rates. Sexual exploitation and abuse are not common in the area. GBV cases are normally reported to village elders and the chiefs

4.4.14 Culture and heritage

No cultural site of significance was reported/observed within the project area, the nearest site of cultural significance is located 20km away from the Kaikor site. Kaikor location is predominantly made up of Turkana community, other tribes in the area are settlers who are in the location for business and employment purposes. They include Somalis, kalenjins, Luhyas and kikuyus. Turkana community is made up of 95% of the total population. The community in the project area are a patriarchal society; men typically speak for women and make decisions in the family. The Turkana community members still practice polygamy and encourages early marriages for young girls.

4.4.15 HIV/AIDS prevalence

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

5 STAKEHOLDER ENGAGEMENT

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

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

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

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

5.1 OBJECTIVES OF PUBLIC PARTICIPATION

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

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

5.2 STAKEHOLDER CONSULTATION AND DISCLOSURE REQUIREMENT FOR THE PROJECT

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

The summaries of ESIA findings will be disseminated to the affected persons in a languaguage that they can understand using baraza and focus group discussions.Disclosure process will also consider any mobility, disability and literacy challenges affected persons may have.ESIA report will also be made available in public places that are accessible to project-affected groups and local NGOs (NEMA website and Respective NEMA County offices).
A documented record of stakeholder engagement, including a description of the stakeholders consulted, a summary of the feedback received, and a brief explanation of how the feedback was collected, has been presented below. The consultations were conducted in form of:

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

5.3 STAKEHOLDER CHARACTERISATION AND IDENTIFICATION

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

5.3.1 Stakeholder Mapping

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

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

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

Table 5-1: Identified Stakeholders

Stakeholder Category	Stakeholder Group	Connection to the KOSAP	Consultation tool
Project Affected Persons	Local Community	➲ Local communities to be affected either directly or indirectly by the project ➲ Vulnerable Individuals and Households ➲ Health institutions ➲ Education institutions	**Public Meeting** ✓ 2 public meeting were held in Kaikor shopping Centre on 15/3/2021 and 17/01/2022. **Focus Group Discussions (FGD)** ✓ The FGDs were conducted with the men, women, youth. **Key Informant Interviews (KII)** ✓ The KIIs for Loitanit Primary school. The chief was also interviewed on the Community Profile of Kaikor.
Interested parties	National Government and county government	➲ National Government are of primary importance in terms of establishing policy ➲ County government are also of primary importance in county energy requirements and proposed interventions. ➲ They will play an important role in implementation and sustainability of the project	**Meeting** During the first consultation a meeting was held with the County Governor and county officials.

The significance of a stakeholder group is categorized considering the magnitude of impact (type, extent, duration, scale and frequency) or degree of influence (power and proximity) of a stakeholder group and urgency/likelihood of the impact/influence associated with the particular stakeholder group in the project context. The magnitude

of stakeholder impact/influence is assessed taking the power/responsibility and proximity of the stakeholder group and the group is consequently categorized as negligible, small, medium or large. The urgency or likelihood of the impact on/influence by the stakeholder is assessed in a scale of low, medium and high. The overall significance of the stakeholder group is assessed as per the matrix provided in Table 5-2 below.

Table 5-2: Stakeholder Significance and Engagement Requirement

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

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

5.5 APPROACH AND METHODOLOGY USED IN CARRYING OUT THE PUBLIC PARTICIPATION

ESIA consultants employed various methods in engaging different categories of the stakeholders, these methods included; face to face discussions for the government officers, focused group discussions with men, women, youth and people living with disability (PLWDS) and a public baraza/meeting for the community members.

5.5.1 Stakeholder engagement schedule

The ESIA team identified four categories of stakeholders namely; government officials, opinion leaders at local level and elders and the general community. Stakeholder engagement began early in the planning phases of the project. A letter was written from the Ministry of Energy to Turkana County commissioner informing them about the need to undertake public participation for the proposed project. Stakeholder consultations for land identification was undertaken on 15th March 2021 and Stakeholder consultation for ESIA was undertaken on 20th Jan 2022. During this time project information in terms of (preliminary design, land identification, positive impacts, negative impacts, mitigation measures among others were discussed with various stakeholders. Different categories of stakeholders gave their views on the project.

5.6 SUMMARY OF STAKEHOLDER ENGAGEMENT DURING THE LAND IDENTIFICATION PROCESS

A Consultative meeting was held with the Kaikor community on 15th March 2021, to discuss the details of the proposed mini-grid project, the project's land requirements, the impacts of the project and grievance redress. Focus Group Discussions were also carried out separately with men, women and the youth. The FGDs were to allow the groups to freely express themselves and to ensure that they understood the project.

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

Table 5-4 Some issues raised during Land identification stakeholder engagement.

Issue category	Comments/ issues by the community	Response by the project team
Benefits of the project	Since the land belongs to the community, what are the advantages we will get.	connection fee is reduced, 1000 instead of 15000.
Positive impacts of the project	Electricity has many positive impacts; I was in a training and we were enlightened about importance of solar powered boreholes.	Noted
Land identification	3 individuals claiming to be from REA came to our school proposing about government plan to get land to install many power panels to light up the school and whole town. We even surveyed and put beacons on the land parcel. Is this the same programme?	Yes, it is
Benefits of the project to the community	Greatest challenge, any time projects are being brought in this area, most projects don't benefit us. Why in turkana isn't there a project that gives the community 10% as future earnings/loyalty? Even power will be purchased	Noted

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

Minutes of the meeting are appended at the end of this report(Appendix 4).

5.7 SUMMARY OF STAKEHOLDER ENGAGEMENT DURING ESIA

5.7.1 Information Shared to the Community Members

The MoE representative assisted by the REREC representative gave a description of the KOSAP project and clarified that its objective was to electrify Kaikor because the area is not connected to the national grid. They also informed the community that they would access the electricity at a subsidized cost and that the public facilities such as the schools, hospitals and public boreholes would also be connected at the same cost (one thousand shillings). The Environmental and Social experts from Norken International Ltd and Centric Africa shared with the community the ESIA process and discussed the potential impacts associated with the project and the proposed mitigation measures that would reduce the significance of the adverse impacts.
It was also explained that compensation for the land identified by the community for the proposed project will be done in-kind; as a community project chosen from education, health or water sector. The Ministry of Energy through its implementing agency would undertake a project for the community in water, health or education sector up to a cost of the value of the cost of the land taken and informed by the NLC valuation criteria. The community was to choose the project of their own choice in the three sectors. Other methods compensation for community land is payment in cash and land for land.

5.7.2 Key Feedback Received During Stakeholder Consultation Process

The general stakeholder consultation was done in a public meeting (Baraza) organized at St James catholic church social hall and over 80 members were in attendance. The meeting was chaired by the area Village chief assisted by the assistant chief and the village elders. The feedback received during the stakeholder consultation process have been summarized below:

Benefits of the Project;

- The community was in support of the project. They noted that the project will beneficial to the community as it will:
    - Create employment opportunities to the locals;
    - Business growth in the area;
    - Enhance security in kaikor Village;
    - Improve their livelihood and enhance their living standards;
    - Access to E-learning by pupils in Loititanit primary school;
    - Provide them with affordable energy for domestic use;
    - Improve health care delivery services;
- The community raised the following concerns:
    - Timelines of the project;
    - Connection fee of each household to solar power and payment methods;
    - Need for the contractor to have an insurance cover in case of accidents during construction;

- Electricity connection distance coverage in Kaikor;
- Reliability of the proposed Mini-grid.
- Compensation for PAPs/ displaced households.

- The community requested the following from the project:
  - Employment opportunities especially the non-skilled labor during the construction and operation Phases;
  - The contractor to renovate the impassible roads as a CSR.
  - Fencing /constructing a perimeter wall in the project area to minimise accidents and theft incidences;
  - Need for all workers to be tested for infectious diseases for monitoring purposes;
  - Educating the community on electrical safety;
  - Construction materials to be sourced from the community;
  - 70% of employment to come from the locals;
  - The contractor to pay the employees in good time;
  - Borrow pits to be backfilled and rehabilitated to the community's satisfaction

Public participation "Baraza" Session

FGD with youth and men

Focused Group Discussion with women and KII the Chief

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		Issue	Response
1.	Project timeline Wiring fee	project starting dates and wiring fee.	The CREO explained that public participation is part of Environmental impacts assessment and that ESIA is the last process before a project is implemented. He added that the proponent will set the timelines upon receiving NEMA License. This might take 6 months or so. The CREO added that each household will pay for their own electrical wiring and that they should engage an EPRA licenced electrician.

2.	Continuous consultations Materials sourcing	The contractor to involve the community when recruiting workers. Construction materials to be sourced from the community.	The consultant and the client responded by assuring the community that they will be involved by the contractor during the project life and that the GRC formed will ensure that all grievances are handled to community's satisfaction. The consultant added that some construction materials e.g., water, sand, gravel, stones etc will be sourced from the community. The materials will be tested to ascertain the quality before use.
3.	CSR coverage	The contractor to rehabilitate Kaaleng-Kaikor road which is impassable during rainy seasons, Connection coverage	The consultant the client will set the project timelines upon receiving NEMA license, the consultant added that the rehabilitation of the road is not in the project scope but the request was well noted and it will be forwarded to Moe. The power connection will be within 1.5 km radius from the project location/3km diameter.
4	Spread of communicable diseases	all workers from the contractor's side to be tested for infectious diseases for monitoring purposes and to minimise the spread of HIV/AIDs and Covid 19.	The consultant explained that it will be inconsiderate to have that done since it might lead to social issues/unfairness, he then explained to the meeting the measures to be put in place to minimise the spread of infectious diseases. He added that a health and safety officer will be available during the project construction to ensure that the contractor is compliant.
6.	Land - acquisition and - employment	Displacement of people compensation of PAPs, if boda-boda men will be employed as water venders - if the borrow pits will be rehabilitated and responsible persons.	The consultant assured the meeting that land will be acquired and since it is a community land, compensation will be in kind, displacement of people is not anticipated. He encouraged the boda-boda riders seeking for jobs during construction to organise themselves in groups in order to increase their chances of being employed during construction period. The contractor is responsible for rehabilitation of any borrow pit dug by him. An environmental officer will be in the site to ensure that no borrow pits are abandoned.

5.7.3 summary FEEDBACK RECEIVED DURING focused group discussion

The Focus Group Discussions were held with Men, Women and the Youth as indicated in Table 5-5;

Table 5-5: FGD dates and attendance

Group	Date	Attendance	Venue
Men	18th January 2022	17	St James catholic church social hall
Women	18th January 2022	22	St James catholic church social hall
Youth	18th January 2022	14	St James catholic church social hall

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

Groups	Issues/comments discussed
Men	➲ The men confirmed that they were fully aware and well conversant with of the project. They added that the project will help improve education sector, lead to business growth and improve the security of Kaikor. ➲ They requested that they should be educated in electrical safety to minimize risks. ➲ Top three community needs according to Men FGD are Electricity, Water reticulation and improvement of Loitanit primary school classrooms. They requested for a project on education sector ie, rehabilitation of the classrooms.
Women	➲ The women reported they had heard about the project before and feel they knew what it was about. ➲ The project is worthwhile because it would benefit them. They emphasized that the project would lead to business growth in the area and create employment hence source of income. ➲ The women requested that the contractor to consider them for employment during construction period. ➲ Top three community needs according to Women FGD are Water project, Hospital improvement and electrification of the area. They requested for a project on water sector e.g., water reticulation to curb on their water challenges as their project of choice in compensation in kind.
Youth	➲ The youth reported that they were well conversant with the project and asked for project timelines

- They added that the project will help create jobs for them, boost their businesses e.g., welding, electrify schools and improve the security of the area.
- They asked to be considered for jobs during the project implementation and need for education on electrical safety.

5.8 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 REREC website. In addition, a copy of the ESIA should be availed by CREO to the chief's office for access by the local community and other stakeholders.

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

5.9 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

5.9.1 Objectives and Principles of Stakeholder Engagement post ESIA

Stakeholder engagement is the basis for building strong, constructive, and responsive relationships that are essential for the successful management of a project's environmental and social impacts.

In order to ensure effective engagement and consultation of all stakeholders, the contractor and the proponent will apply the following principles.

- Ensure the affected persons are provided opportunities to express their views on project risks, impacts and mitigation measures, and response provided.
- Begin consultations early even before construction begins because there is a lapse of time between ESIA consultations and implementation time. Identification of environmental and social risks and impacts should continue an ongoing basis as risks and impacts arise.
- Consultations should continue in a manner that is transparent, objective, meaningful and allow for ease in accessing information in a culturally

appropriate local language(s) and format that is understandable to affected and interested persons.

- Consultations with affected persons and interested parties should avoid manipulation, interference, coercion, or intimidation.
- Consultations should also pay attention to the needs of VMGs, vulnerable individuals and households.

The contractor shall identify the stakeholders early and consider appropriate methods for engaging them. The stakeholder engagements will be reported to REREC on monthly basis alongside the construction progress reports

6 IMPACT ASSESSMENT AND MITIGATION MEASURES

6.1 INTRODUCTION

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

6.2 IMPACT ASSESSMENT METHODOLOGY

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

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

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

6.3 DEFINING IMPACT

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

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

6.4 ASSESSMENT OF SIGNIFICANCE

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

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

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

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

Table 6-6-1: Categories of Significance

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

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

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

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

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

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

6.5 MAGNITUDE OF IMPACT

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

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

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

6.6 SENSITIVITY OF RESOURCES AND RECEPTORS

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

6.7 LIKELIHOOD

Terms used to define likelihood of occurrence of an impact are explained in Table 6-6-3 below.Table 6-6-3

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

An impact with a		
High probability	Refers to a very likely impact	Refers to very frequent impacts
Medium probability	Refers to a likely impact	Refers to occasional impacts

Low probability	Refers to rare impacts	Refers to rare impacts
	As far as one-time events (e.g., air emissions) or slowly developing effects are concerned (e.g., impacts on local life style)	As far as possibly recurring impacts are concerned, such as accident or unplanned events (e.g., traffic accident, fire)

6.8 DEFINITION OF MITIGATION MEASURES

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

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

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

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

6.9 ASSESSING RESIDUAL IMPACTS

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

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

6.10 PRE-CONSTRUCTION PHASE – NEGATIVE IMPACTS

6.10.1 Impacts related to Land Acquisition

The proposed project will entail the acquisition of a 1.267 ha land parcel for setting up the mini-grid. The land acquired may also be used to develop contractor facilities, worker's camps and other ancillary facilities e.g., storage and sanitary facilities. Loss of land used by the communities for livestock grazing and farming may trigger land disputes. New settlements may arise due to migration of people to the centres near the mini-grid disrupting the existing community settlement patterns.

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

6.10.1.1 Source of Impact and Overview of Baseline Conditions

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

6.10.1.2 Embedded/In-built Controls

Enabling the community to benefit from the project by supporting local projects e.g., construction of additional classrooms in Loitanit primary school or Water reticulation at the health centre.

6.10.1.2.1 Significance of Impact

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

6.10.1.3 Additional Mitigation Measures

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

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

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

1) Construction of two classes and provision of desks for Loitanit primary school whose classrooms are dilapidated.
2) Water reticulation to Kaikor dispensary.

6.10.2 Impacts related to Way leaves acquisition

The design of the distribution line will utilize the existing road reserves, however, any damage to structures, crops, community facilities and other assets will be compensated in line with the RPF provisions. If the affected persons voluntarily forego such compensation, the proponent will document such consents as voluntarily donated. Supply of electricity will involve passing of low voltage (LV) lines to connect the customers to power. It is estimated that a total of 19.7km of LV circuit will be constructed.

6.10.2.1 Embedded/In-built Controls

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

6.10.2.1.1 Significance of Impact

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

6.10.2.2 Mitigation measures

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

6.10.3 Impact Related to inadequate Stakeholder identification and consultations

These impacts are associated with these risks:

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

   Mitigation measures

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

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

   Mitigation Measures

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

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

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

   Mitigation measures

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

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

   Mitigation measures

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

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

   Mitigation measures

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

6.10.3.1 Embedded/In-built Controls

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

6.10.3.1.1 Significance of Impact

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

6.11 CONSTRUCTION PHASE- POSITIVE IMPACTS

6.11.1 Employment Opportunities

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

Thus, anticipated benefits of the Project include Direct employment opportunities mainly during construction of the mini-grids The local community is likely to benefit from the opportunities to be created from the following:

- Civil works during construction phase including, construction of solar PV module mounting area, transformer yard, inverter room, internal roads, laydown areas, labour camp, distribution line; and
- Skill transfer from the contractors to the locals that will be given opportunities during the implementation of the project.

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

6.11.1.1 Impact Significance

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

6.11.1.2 Enhancement Measures

- A significant segment of labour requirement during the construction phase will be sourced locally. While, the significance of the impact on employment opportunities during the construction phase is understood to be positive, the following measures should be put in place to ensure that the local community receives maximum benefit from the presence of the project;
- Preference should be provided to local labour; and

- Preference should be provided to the vulnerable population in the Study Area.

6.11.2 Impact on Local Trade

Where possible, construction materials will be sourced locally in order to promote local businesses.

Thus, anticipated benefits of the Project include indirect employment generated by the procurement of goods and services for the Project; induced employment related to jobs ensuing from the expenditure of incomes. The local community is likely to benefit from the economic opportunities to be created from the following:

- Self- employment options for individuals possessing vocational or technical training skills like electricians, welders, fitters etc;
- Contracting opportunities for local's residents including men, women and youths. During the public meeting the community insisted that all the unskilled labour force must be given to the locals.
- Creation of indirect employment for local community through establishing small shops like tea stalls, supply of intermediate raw materials, repair outlets, hardware stores etc. However, these are likely to be temporary.

6.11.2.1 Impact Significance

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

6.11.2.2 Enhancement Measures

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

6.12 CONSTRUCTION PHASE -NEGATIVE IMPACTS

6.12.1 Change in Land Use

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

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

- Land Acquisition for the mini-grid, wayleaves and construction camp site;
- Installation of PV modules;
- Establishment and operation of temporary structures such as temporary site office and store yard.

The land use receptor sensitivity criteria will be low. This is due to the fact that there will be visual change upon installation of the mini-grid. There is no major dependency

for grazing or agriculture on the land offered for the project. The magnitude criteria of this impact will be medium because there will be noticeable of change over the restricted site area. The change may be medium to long term and is reversible.

6.12.1.1 Embedded/In-built Control

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

6.12.1.2 Significance of Impact

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

6.12.1.3 Additional Mitigation Measures

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

6.12.2 Impact on Topography

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

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

6.12.2.1 Embedded/In built Control

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

6.12.2.2 Significance of Impact

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

6.12.2.3 Additional Mitigation Measures

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

6.12.3 Impact on Soil Environment

6.12.3.1 Project Phases and Associated Activities

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

Construction Phase

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

Operation and Maintenance Phase

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

Decommissioning Phase

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

6.12.3.2 Significance of Impacts

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

6.12.3.3 Additional Mitigations

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

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

6.12.4 Impact on Air Quality

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

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

6.12.4.1 Embedded/in-built control

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

6.12.4.2 Significance of Impact

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

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

6.12.4.3 Additional Mitigation Measures

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

6.12.5 Impact on Ambient Noise

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

The main receptors will be the Kaikor shopping centre, 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 Kaikor shopping centre.

6.12.5.1 Assessment Criteria for Impact on Ambient Noise

The assessment with respect to ambient noise quality of the study area has been done for the following project activities: construction activities including site preparation, piling work, construction of ancillary facilities, transportation of construction materials, machinery and personnel, and operation of generator sets.

6.12.5.2 Embedded/in-built control

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

6.12.5.3 Significance of Impact

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

6.12.5.4 Additional Mitigation Measures

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

6.12.6 Visual Intrusions and Changes in Landscape Impact

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

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

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

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

6.12.6.1 Embedded/In-built Control

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

6.12.6.2 Significance of Impact

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

6.12.6.3 Additional Mitigation Measures

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

- The extent of the labour camp and storage area should be limited in area to only that which is essential;
- Minimize presence of ancillary structures on the site and minimize roads disturbance;

- Upon completion of construction work, areas utilized for labour camp, storage area to be restored to original form.

6.12.7 Impacts on Waste Generation and Soil Contamination

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

The impact magnitude has been assessed as low since the proponent has managed other solar power projects as well and has effective management systems for waste and hazardous substances being generated or utilized during the project life as part of their Environmental and Social Management Framework.

6.12.7.1 Embedded/in-built control

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

6.12.7.2 Significance of Impact

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

6.12.7.3 Additional Mitigation Measures

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

6.12.8 Impacts on Water Resources and Water Quality

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

lead to potential contamination. The people in Kaikor area use water from boreholes as the main source of water and care must be exercised to avoid any pollution to the water source.

6.12.8.1 Embedded/In-build Control

- Appropriate remedial measures shall be implemented by the contractor in the event of erosion;
- Infrastructure shall be designed to ensure that contaminated run-off does not reach watercourses;
- In the event of an oil spill the procedures contained in the emergency response plan of the contractor will come into effect.

6.12.8.2 Significance of Impact

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

6.12.8.3 Additional Mitigation Measures

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

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

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6.13 CONSTRUCTION PHASE – SOCIAL IMPACTS

6.13.1 Impact on Occupational Safety and Health

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 Kaikor village.

6.13.1.1 Embedded/in-built control

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

6.13.1.2 Significance of Impacts

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

6.13.1.3 Additional mitigation measures

- All workers (regular and contracted) should be provided with training on Health and Safety management system of the contractor during construction stage and EHS policies and procedures during the operation stage;
- Obtain and check safety method statements from contractors;
- Monitor health and safety performance and have an operating audit system; and
- Permitting system should be implemented to ensure that lifting equipment are operated by trained and authorized persons only;
- Appropriate safety harnesses and lowering/raising tools should be used for working at heights;

- All equipment should be turned off and checked when not in use; and
- A safety or emergency management plan should be in place to account for natural disasters, accidents and any emergency situations.

6.13.2 Community Health and Safety

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

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

Fire hazards are also likely to occur especially when precaution measures are not taken to account. Smoking is one of causes of fires and this can happen if cigarette butts are left carelessly. Additionally, keeping of fuels onsite during construction can be a potential cause of fire. This impact is evaluated to be of moderate significance. All the construction activities will be confined at the project site hence high sensitivity and low magnitude

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

6.13.2.1 Embedded/in-built control

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

- The excavated areas will be properly fenced for safety and sign boards in local languages will be put up;
- No hazardous waste or any waste be stored within the site for long periods of time and be in contact with the soil in order to prevent against ground water contamination;
- The truck drivers carrying construction machinery and materials will be instructed to drive within speed limits with careful consideration for village traffic;
- Create awareness to the construction workers on potential fire hazards
- Provision of firefighting equipment (extinguishers) on site during construction;
- No smoking shall be done on construction site;
- 'No smoking' signs shall be posted at the construction site;

- A fire evacuation plan must be posted in various points of the construction site including procedures to take when a fire is reported;
- Construct /install pit latrines for both genders and clearly mark;
- Movement of heavy equipment and construction materials will be regulated during peak hours (0900hrs to 0500hrs).

6.13.2.2 Significance of Impact

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

6.13.2.3 Additional Mitigation Measures

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

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

6.13.3 Increase in Illicit behaviour and Crime

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

6.13.3.1 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.

6.13.3.2 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;

- The contractor should put in place mechanism to ensure no employee or job applicant is discriminated against on the basis of his or her gender, marital status, nationality, ethnicity, age, religion or sexual orientation;
- The Contractor will put in place a worker grievance redress mechanism accessible to all workers, whether permanent or casual, directly or indirectly employed. The Proponent worker grievance mechanism shall be open to the Contractor workforce in the event that their grievance is not adequately resolved by their direct employer. The Proponent will then have the authority to act to resolve this grievance;
- 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.

6.13.4 Increase in competition for scarce resources and strain on public utilities

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

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

6.13.4.1 Embedded/In-build Control

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

6.13.4.2 Significance of Impact

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

6.13.4.3 Additional Mitigation Measures

- Consultations with and involvement of local community in project planning and other phases of the project;
- Awareness-raising among local community and workers on the need to have a good /cordial working relation;
- Sensitization/awareness to workers regarding engagement with local community;
- Contactor shall make provision to provide resources needed by the workers if the need for such resources may result to competition e.g., water;
- Establishment and operationalization of an effective Grievance Redress Mechanism accessible to community members;

- The contractor and the project/community grievance redress committee to work closely address complains raised on time;
- Gender considerations in employment opportunities;
- Appropriate compensation for work done;
- Respect for community values/culture;
- Prompt payments as per the contractual agreements/terms.

6.13.5 Child labour and forced labour

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

During construction of the mini-grid the risk of forced labor is likely to occur and precaution is need to safe guard the community from being subjected to forced labor. The impact significance is rated minor, based on low sensitivity of the receptor and medium magnitude of the impact.

6.13.5.1 Significance of Impact

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

6.13.5.2 Mitigation measures

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

6.13.6 Impacts on Cultural Heritage

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

6.13.6.1 Significance of Impact

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

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

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

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

6.13.7 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 women, it was noted that intimate GBV and early marriages are the most common in the area. This is attributed to Turkana cultural practices. GBV might exacerbate be during the project implementation due to women are searching for jobs and those giving the jobs may ask for sexual favours.

6.13.7.1 Significance of Impact

During the FGD with women, it was noted that intimate GBV and early marriages are the most common in the area. This is attributed to Turkana cultural practices. Such cases are normally reported to the elders and the chiefs. This is expected to increase slightly during the project implementation. Thus, the significance of this impact is considered to be Major considering medium sensitivity of the receptor and high magnitude of the impact.

6.13.7.2 Mitigation measures

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

6.13.8 Exclusion of VMGs, Vulnerable Individuals and Households

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

exclusion of VMGS from the benefits and opportunities derived from the proposed mini-grid facilities.

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

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

- ✓ Poor female headed households;
- ✓ Child headed households;
- ✓ Persons Living with Disabilities;
- ✓ The Poor elderly;
- ✓ Persons living with HIV/AIDs.

6.13.8.1 Significance of Impact

Considering the high sensitivity of the VMGs identified in the project and high magnitude, the impact significance is considered to be major.

6.13.8.2 Mitigation measures

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
- Participation will be through meetings with the different groups of the vulnerable people identified primarily to ensure that;
    - The VMGs are aware of the project and its impacts
    - The VMGs are Aware of any restrictions and negative impacts
    - Provide support to VMG participation arrangements in the project
- Commit to open and transparent communication and engagement from the beginning and have a considered approach in place
- Ensure that all representatives of the contractor and Proponent staff carrying out the specific sub project investment including third party subcontractors and agents are well briefed on local customs, history and legal status, and

understand the need for cultural sensitivity
- Regularly monitor performance in engagement
- Enlist the services of reputable advisers with good local knowledge
- Implement the existing grievance redress mechanism

6.13.9 Risk of Communicable Diseases

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

6.13.9.1 Significance of Impact

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

6.13.9.2 Mitigation measures

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

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

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

6.13.10.1 Significance of Impact

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

6.13.10.2 Mitigation Measures

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

6.13.11 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 for domestic purposes.

6.13.11.1 Significance of Impact

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

6.13.11.2 Mitigation Measures

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

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

6.13.12 Energy Consumption

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

6.13.12.1 Significance of Impact

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

Mitigation Measures

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

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

6.14 OPERATION PHASE - POSITIVE IMPACTS

6.14.1 Impact on Local Economy and Employment

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

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

6.14.1.1 Significance of Impact

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

6.14.1.2 Enhancement Measures

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

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

6.14.2 Improvement of Local and National Economy

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

6.14.2.1 Impact Significance

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

6.14.2.2 Enhancement Measures

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

6.14.3 Education improvement

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

6.14.3.1 Significance of impact

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

6.14.3.2 Enhancement Measures

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

6.14.4 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 nearsightedness in children and adults.

6.14.4.1 Significance of impact

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

6.14.4.2 Enhancement Measures

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

6.14.5 Improved Standard of Living

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

6.14.5.1 Significance of impact

Impact significance will be high due to improved living standards.

6.14.5.2 Enhancement Measures

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

6.14.6 Security

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

6.14.6.1 Significance of impact

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

6.14.6.2 Enhancement Measures

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

6.14.7 Communications

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

6.14.7.1 Significance of impact

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

6.14.7.2 Enhancement Measures

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

6.15 OPERATION PHASE – NEGATIVE IMPACTS

6.15.1 Impact on Soil

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

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

6.15.1.1 Significance of Impacts

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

6.15.1.2 Additional Mitigations

- No unauthorized dumping of used oil and other hazardous waste should be undertaken at site;

- All waste should be stored in a shed that is protected from the elements (wind, rain, storms, etc.) and away from natural drainage channels;
- Proper storage of the oil is required to ensure no leakages/ spills to the ground;
- Frequent inspection and maintenance of the generator to minimize leakages;
- No vehicles should be serviced or maintained at the Mini-grid area;
- The waste oil or used oil must be disposed-off using NEMA approved waste handlers;
- Proper training for the handling and use of fuels for the operators of the Mini-grid;
- Solid waste should be Segregated in color coded waste receptacles;
- In case of accidental/unintended spillage on small area, the contaminated soil should be immediately collected and stored as hazardous waste;
- Any soil potentially contaminated by chemicals, oils, fuels to be collected and disposed of by a NEMA authorized waste handler.

6.15.2 Waste Generation and management

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

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

6.15.2.1 Significance of Impact

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

6.15.2.2 Embedded/in-built control

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

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

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

6.15.2.3 Additional Mitigation measures

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

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

6.15.3 Fire Outbreaks

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

6.15.3.1 Significance of Impact

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

6.15.3.2 Mitigation Measures

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

6.15.4 Impact on Water quality and demand

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

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

Discussions with the residents in Kaikor confirmed that water is a major concern in the area. As noted earlier, the local community rely on underground water/boreholes that are seasonal. Therefore, the receptor (water resource) sensitive is assessed as high.

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

6.15.4.1 Embedded/in-built control

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

6.15.4.2 Significance of Impact

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

6.15.4.3 Additional Mitigation Measures

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

6.15.5 Increased Oil Consumption

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

6.15.5.1 Significance of Impact

The impact will be of minor significance.

6.15.5.2 Mitigation Measures

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

6.15.6 Increased Storm Water Flow

The panels, building roofs and pavements of the proposed Mini-grid will lead to increased volume and velocity of storm water or run-off flowing across the area

covered by the solar panels during operation phase. This will lead to increased amounts of storm water entering the drainage systems.

6.15.6.1 Significance of the impact

The impact will be of minor significance.

6.15.6.2 Mitigation Measures

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

6.15.7 Noise, Vibration and EMF

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

6.15.7.1 Significance of Impacts

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

The exposure to would be little EMFs is highly negligible because the EMFs produced by the electrical installation are low. Consequently, the study does not anticipate impacts of EMFs.

6.15.7.2 Mitigation Measures

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

6.15.8 Landscape and Visual Impacts

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

6.15.8.1 Significance of Impacts

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

6.15.8.2 Suggested mitigation measures

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

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

6.15.9 Collision and Electrical hazards from Distribution Infrastructure

A number of birds' species were identified during the impact assessment. These include Hunter's Sunbird, common ostrich (stuthio Camelus), African Cuckoo (Cucus Gularis), lappet-faced vulture, isabelline wheatear among others.
The distribution lines and poles can potentially constitute an electrocution and collision hazard to birds. Some birds may also utilize the distribution towers for nesting.

6.15.9.1 Embedded/ in-built Control

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

6.15.9.2 Significance of Impacts

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

6.15.9.3 Additional Mitigation Measures

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

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

6.15.10 Dust emissions

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

6.15.10.1 Significance of Impacts

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

6.15.10.2 Mitigation Measures

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

6.15.11 Vehicle exhaust emissions

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

6.15.11.1 Impact significance

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

6.15.11.2 Mitigation Measures

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

6.16 OPERATIONS PHASE - KEY SOCIAL IMPACTS

6.16.1 Impact on Occupational Safety and Health

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

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

6.16.1.1 Embedded/in-built control

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

6.16.1.2 Significance of Impacts

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

6.16.1.3 Additional mitigation measures

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

- Permitting system should be implemented to ensure that the lifting equipment is operated by trained and authorized persons only;
- Appropriate safety harnesses and lowering/raising tools should be used for working at heights;
- All equipment should be turned off and checked when not in use; and
- A safety or emergency management plan should be in place to account for natural disasters, accidents and any emergency situations.

6.16.2 Impact on Community Safety and Health

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

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

6.16.2.1 Embedded/in-built control

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

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

6.16.2.2 Significance of Impact

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

6.16.2.3 Additional Mitigation Measures

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

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

6.16.3 Gender Based Violence, SEA & SH

Gender Based Violence (GBV), Sexual Exploitation and Abuse (SEA) may be committed against the communities by the staff during the operation and maintenance of the mini-grids. Incidences of Sexual Harassment (SH) may occur among the staff during operation and phase of the project. During the FGD with the women, it was noted that the most common form of GBV in Kaikor area is intimate partner violence that mainly affects married people, Early marriages and psychological violence among women.

6.16.3.1 Significance of Impact

Thus, the significance of this impact is considered to be Major but if the mitigation measures will be put in place, the magnitude of the impact will be moderate to low.

6.16.3.2 Mitigation measures

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

6.16.4 Exclusion of VMGs, Vulnerable Individuals and Households

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

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

6.16.4.1 Significance of Impact

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

6.16.4.2 Mitigation measures

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

6.16.5 Risk of Communicable Diseases

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

6.16.5.1 Significance of Impact

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

6.16.5.2 Mitigation measures

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

- The Contractor will make condoms available to employees;
- All project personnel should be inducted on a Code of Conduct that gives guidelines on worker-worker interactions, worker-community interactions and development of personal relationships with members of the local communities;
- If workers are found to be in contravention of the Code of Conduct, which they will be required to sign at the commencement of their contract, they will face disciplinary action including dismissal from duty;
- Sensitize all community segments and project workers on Covid 19 and precautionary measures that need to be observed;
- Restrict site access to only Authorised persons; and
- Continuously adhere to the MoH, WHO and World Bank guidelines on Covid-19 management.

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

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

6.16.6.1 Significance of Impact

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

6.16.6.2 Mitigation measures

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

6.17 DECOMMISSIONING PHASE- POSITIVE IMPACTS

6.17.1 Employment Opportunities

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

6.17.2 Site Rehabilitation

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

6.18 DECOMMISSIONING PHASE -NEGATIVE IMPACTS

Preparation for decommissioning

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

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

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

6.18.1 Impact on Soil

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

6.18.1.1 Significance of Impacts

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

6.18.1.2 Additional Mitigations

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

6.18.2 Impact on Air Quality

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

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

6.18.2.1 Embedded/in-built control

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

6.18.2.2 Significance of Impact

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

6.18.2.3 Additional Mitigation Measures

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

6.18.3 Impact on Ambient Noise

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

6.18.3.1 Assessment Criteria for Impact on Ambient Noise

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

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

6.18.3.2 Embedded/in-built control

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

6.18.3.3 Significance of Impact

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

6.18.3.4 Additional Mitigation Measures

- Only well-maintained equipment should be operated on-site;
- If it is noticed that any particular equipment is generating too much noise then lubricating moving parts, tightening loose parts and replacing worn out components should be carried out to bring down the noise and placing such machinery far away from the households as possible;

- Machinery and equipment that may be in intermittent use should be shut down or throttled down during non-work periods; and
- Minimal use of vehicle horns and heavy engine breaking in the area needs to be encouraged.
- The machineries should be maintained regularly to reduce noise resulting from friction;
- Normal working hours of the contractor to be defined (preferable 8 am to 5pm). If work needs to be undertaken outside these hours, it should be limited to activities which do not generate noise;
- Sensitize the truck drivers to switch off vehicle engines while loading materials.

6.18.4 Impacts on Waste Generation and Soil Contamination

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

6.18.4.1.1 Embedded/in-built control

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

6.18.4.1.2 Significance of Impact

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

6.18.4.1.3 Additional Mitigation Measures

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

6.19.1 Cumulative Impact Assessment

It was observed during the site survey that there are no other similar solar projects

within the projects site. Therefore, it is assumed that there will be no cumulative impacts from the above mentioned projects on the local soil, water, land, air and ambient noise environment.

6.9 DECOMMISSIONING PHASE - KEY SOCIAL IMPACTS

6.9.1 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 who will be affected.

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

6.9.1.1 Significance of Impact

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

6.9.1.2 Additional Mitigation Measures

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

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

6.9.2 Impact on Occupational Health and Safety

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

- Safety risks such as: tripping; falling due to working at heights; potential fire due to hot work, smoking, failure in electrical installations; electric shocks.

- Health risks: Injuries such as: lifting, lowering, pushing, pulling and carrying; temporary or hearing loss which usually comes from noise generated from machinery used for demolition; heat stress and working during high temperatures
- Occupational hazards due to dust and noise pollution from operating of heavy machinery and vehicular movement in the project sites;
- Risks of road accidents during the transportation of material and equipment to and from the project sites.

6.9.2.1 Embedded/in-built control

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

6.9.2.2 Significance of Impacts

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

6.9.2.3 Additional mitigation measures

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

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

6.9.3.1 Significance of Impact

The significance of this impact is considered to be Major but if the mitigation measures will be put in place, the magnitude of the impact will be moderate to low.

6.9.3.2 Mitigation measures

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

6.9.4 Exclusion of VMGs, Vulnerable Individuals and Households

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

6.9.4.1 Significance of Impact

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

6.9.4.2 Mitigation measures

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

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

6.9.5 Risk of Communicable Diseases

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

6.9.5.1 Significance of Impact

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

6.9.5.2 Mitigation measures

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

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

6.9.6 Child labour and forced labour

During decommissioning phase of the mini-grid the risk of forced labor and child labour is likely to occur and precaution is needed to safe guard the community from being subjected to forced labor.

6.9.6.1 Significance of Impact

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

6.9.6.2 Mitigation measures

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

6.9.7 Impacts related to labour influx

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

6.9.7.1 Significance of Impact

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

6.9.7.2 Additional Mitigation measures

- In contract documents for the Contractor, MOE/REREC should make explicit reference to the need to abide by Kenyan law, international best practice and the ratified ILO conventions and MOE's policies in relation to health and safety, labour and welfare standards;
- All project personnel should be inducted on a Code of Conduct that gives guidelines on worker-worker interactions, worker-community interactions and development of personal relationships with members of the local communities;
- If workers are found to be in contravention of the Code of Conduct, which they will be required to sign at the commencement of their contract, they will face disciplinary action including dismissal from duty;
- In selection of a Contractor, MOE/REREC should refer to past performance in similar assignments as an indicator of future performance with respect to worker management, worker rights, health and safety as outlined in Kenyan

law and international standards;

- Regular checks by MOE/REREC should be undertaken to ensure the relevant labour laws and occupational health and safety plans are adhered to at all times;

6.10 SOCIAL PROTECTION

There will adequate mechanisms in place to protect local vulnerable population especially women and minors from risks associated with influx of workers (harassment, underage sex). This system will ensure having security on site provided by the contractor as well as sensitization and enforcement by the contractor. There will also be a code of conduct established for contractor employees and contract workers acknowledging a zero-tolerance policy towards child labor and child sexual exploitation. Additionally, the contractor will employ their skilled staff and apply unskilled construction labor from the local population as far as possible to minimize on influx of foreigners into the community.

6.11 SOCIAL INCLUSION

Gender Mainstreaming

Projects usually affect women and men differently, and their roles are highly delineated. The project shall ensure that both men and women are equally consulted about the project and benefit from employment and other opportunities the project will present.

In addition, among communities, some groups are faced with barriers that prevent them from fully participating in political, economic, and social life. Disadvantage is often based on social identity, which may be derived from gender, age, economic status, ethnicity, disability, among other factors. These factors make some groups of people more vulnerable to project impacts than others alongside posing barriers to accessing project benefits. Thus, development projects affect people differently but vulnerable groups are more severely affected than those that are better off. In this project, some groups of the society that can be categorized as the vulnerable. These include the very poor, poor female headed households, poor children headed households, the poor elderly and the special needs persons (disabled). To ensure social inclusion and social sustainability, deliberate effort must be made to ensure the vulnerable take advantage of the project benefits as well as shielding them adverse impacts of the project.

7 ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN (ESMMP)

7.1 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.

7.2 MONITORING

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

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

During construction phase, the Implementing agency shall monitor the contractor's activities in order to verify that the management measures/procedures/specifications

are implemented as contained in the ESMMP. Compliance will mean that the contractor is fulfilling their contractual obligation.
During operation phase, REREC will monitor facility's operations to ensure compliance with management measures in the ESMMP and operation procedures. As part of this monitoring, the REREC will undertake or statutory initial environmental audit as required by the ESIA/EA Regulations, 2003 and subsequent annual environmental audits.

7.3 PLAN MONITORING

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

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

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

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

The Environmental and Social Management and Monitoring Plan (*ESMMP*) will provide the basis for monitoring of potential Environmental, social and health Impacts associated with the project. The ESMMP provides effective observation and documentation of monitorable parameters that will help in analyzing the effectiveness of the proposed mitigation measures with the advantages of improving operational efficiency, promoting competitive advantage, improving risk management, reducing liabilities and improving business performance. The ESMMP has been provide in **Error! Reference source not found.** below.

7.4 ENVIRONMENTAL AND SOCIAL MONITORING BY CONTRACTORS

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. *PAPSe.g., community grievances*: grievance and date submitted, action(s) taken and date(s), resolution (if any) and date, and follow-up yet to be taken—grievances listed should include those received since the preceding report and those that were unresolved at the time of that report. Grievance data should be age and gender-disaggregated.

13. Major changes to contractor's environmental and social practices.

14. *Deficiency and performance management*: actions taken in response to previous notices of deficiency or observations regarding E&S performance and/or plans for actions to be taken. These should continue to be reported until REREC determines the issue is resolved satisfactorily.

A detailed Environmental and social management plan for pre-construction, construction and decommissioning phase is well illustrated in the table 7-1,7-2,7-3 and

Table 7-1 ESMMP-ENVIRONMENTAL IMPACTS

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST (Ksh)
ENVIRONMENTAL IMPACTS						
<u>Land use changes</u> **-Permanent and temporary changes in land use**.	• Construction activities should be restricted to designated project area. • The land use in and around permanent project facilities should not be disturbed. • On completion of construction activities, land used for temporary facilities such as store yard should be restored to the extent possible. • The existing earth roads at the project area will be used for access to the project site.	Pre-construction	Contractor	Daily inspection	Construction activities restricted to designated project area.	No additional costs
<u>Topography</u> **-Change in Local topography and vegetation clearance**	• 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. • The contractor to ensure no noticeable changes in topography done. • Clear only the necessary areas • Ensure proper demarcation and delineation of the project area to be affected by construction works. • Specify locations for vehicles and equipment, and areas of the site which	Pre-construction Operation Decommissioning	Contractor	Weekly inspection	Monitoring Topography Records of number of trees replanted Parking areas designated	No additional cost

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST (Ksh)
ENVIRONMENTAL IMPACTS						
	should be kept free of traffic, equipment, and storage. • Designate access routes and parking areas • Re-vegetation including planting of trees around the plant/facility					
<u>Impact on soil</u> -Soil contamination, effect on soil composition and soil erosion	• 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.	- Preconstruction - Construction - Operation - Decommissioning	Contractor, proponent	Daily site inspections	Provisions for waste separation; site clear of contamination Assess size of rills or Gulleys forming from accelerated run off from compacted areas Records of any leakages from construction equipment/ vehicles.	150000

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST (Ksh)
ENVIRONMENTAL IMPACTS						
	• All dug up soil that is not needed on-site to be removed promptly and disposed of to appropriate areas. • Re-use the dug-up soil in backfilling and landscaping. • Any soil potentially contaminated by chemicals, oils, fuels to be collected and disposed of by a NEMA authorized waste handler. • Maintain all the waste tracking documents on site (waste transportation, waste treatment and disposal). • Re-use construction waste to the maximum extent possible; • Good management of the runoff/storm water to reduce its impact on loose soil; • Control construction activities especially during rainy / wet conditions. • Periodically sample soil for analysis and use the results to monitor the contamination in comparison with the initial monitoring results. • Construction related impacts like erosion and cut slope destabilizing should be addressed through landscaping and grassing, carting away and proper disposal of construction materials					

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST (Ksh)
ENVIRONMENTAL IMPACTS						
<u>Air Quality</u> **-Point source emissions** **-Dust emissions**	• Prevent Idling of vehicles and equipment's; • The speed of vehicles to the site should be limited to 10-15km/h; • The site should be sprinkled with water regularly to reduce amount of dust generated by the loading trucks; • Carry out regular maintenance to the construction machinery and equipment. This will minimize generation of hazardous gases and other suspended particulate matter. • Properly plan transportation of waste materials to ensure that vehicle fills are increased in order to reduce the number of trips done or the number of vehicles on the road; • Diesel Generator should be enclosed at an adequate stack height. • Visual inspection of dust pollution from roads and the demolition site and appropriate intervention if dust levels are high. • Suppress dust during dry periods by use of water sprays; • Stockpiles of excavated soil should be enclosed/covered/watered during dry or windy conditions to reduce dust emissions.	Construction Operation Decommissioning	Contractor and proponent	Daily site inspection	-Visual Observation of dust -Provision of PPEs especially masks -Engine maintenance records - inspection of stacks	150,000

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST (Ksh)
ENVIRONMENTAL IMPACTS						
	• 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.					
<u>Ambient Noise Levels</u> **-Increase in Noise Level**	• 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 Operation Decommissioning	Contractor, monitored by supervising engineer.	Daily inspections of the vehicles and machinery during construction and decommissioning Quarterly inspections during operation	Noise levels - Records of noise measurements done by contractor within the project area and at distances of 30m from the Solar mini-grid GRM records	50,000

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST (Ksh)
ENVIRONMENTAL IMPACTS						
	• 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	• The extent of the site office and storage area should be limited in area to only that which is essential; • Minimize presence of ancillary structures on the site and minimize roads disturbance; and • Upon completion of construction work, areas utilized for labor camp, storage area to be restored to original form.	Construction	Contractor and proponent.	Weekly site inspection	Inspection report	No additional cost
<u>Impact on water</u> - **Depletion of Water Resources/ water demand**	• 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	• Pre-construction • Construction • Operation	Contractor and proponent.	Daily site inspection.	Water usage records	200,000

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST (Ksh)
ENVIRONMENTAL IMPACTS						
- **Water Contamination**	and random disposal of sewage shall be strictly restricted; • Construction workers to be sensitized about water conservation and encouraged use of water optimally; • Ensure prudent use of water. • Install water-conserving automatic taps. • Any water leaks through damaged pipes and faulty taps should be fixed promptly • 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	• Decommissioning				
Increased energy consumption	• 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. • Proper planning of transportation of materials will ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts. • Complementary to these measures, they monitor energy use during construction	• construction	Contractor	quarterly	Energy consumption records	No additional cost

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST (Ksh)
ENVIRONMENTAL IMPACTS						
	and set targets for reduction of energy use.					
<u>Waste generation and management</u> **-Liquid waste** **-Solid waste** **-Hazardous waste** **-Sanitary waste**	• 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 color 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	• Construction • Operation • Decommissioning	Proponent, Contractor	Weekly Records of Audits and Visual Inspection	-Engine maintenance records -Oil spill containment plan -Well-disposed hazardous materials -Presence of separate and clean washrooms for both the gents and ladies	700,000

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST (Ksh)
ENVIRONMENTAL IMPACTS						
	management plan. This will be done by a Licensed 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 of. • 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 • Any solar panels or batteries removed from the array for disposal will first be collected and stored in the covered 10ft container provided by the Contractor. • For final disposal, the Contractor will ensure hazardous items are shipped offshore to a facility licensed to handle hazardous waste. This waste can also be managed locally by NEMA licensed waste battery handlers • Construct/ install pit latrines for both genders clearly labelled					

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST (Ksh)
ENVIRONMENTAL IMPACTS						
Public Health Impacts	• 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.* • Awareness creation and consultations with local communities prior and during construction on the dangers of these diseases. • Informing workers on local cultural values and health matters. • Provision of condoms to workers. • Allowing migrant workers time to be with their families • The contractor is impressed upon not to set a construction camp on site. • The contractor will provide public education/information about HIV/AIDS transmission and prevention measures. • Ensure equal treatment of workers. • Provide all appropriate COVID-19 preventive measures including campaign to maintain individual measures at the workplace.	• Construction	Contractor	Quarterly inspections	Number of awareness creation sessions conducted. -Availability of and distribution of condoms	20,000
Fire Hazards and fire outbreaks	• Create awareness to the construction workers on potential fire hazards • Provision of firefighting equipment on site during construction and operation phase of the project	Construction and operation	Contractor	Quarterly inspections	-Records of any Fire incidences -Provision of serviced fire	100,000

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST (Ksh)
ENVIRONMENTAL IMPACTS						
	• No smoking shall be done on construction site • 'No smoking' signs shall be posted at the construction site and the project area during operation phase. • A fire risk assessment and evacuation plan should be prepared and must be posted in various points of the construction site and facility including procedures to take when a fire is reported. • Detection/alarm systems that can detect fire should be and installed • Workers especially operators of the plant must be trained on fire management. • A fire Assembly point should be identified and marked				equipment, evacuation plan and safety signages -Records of fire safety training	
Impacts of construction material sourcing (e.g., quarrying)	• 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.	construction	Contractor	Quarterly inspections	Sources of raw materials (from local community)	Part of contractor's cost
Occupational Health and	• Use skilled personnel for activities which demand skills/technical tasks	construction	Contractor and proponent	Quarterly inspections	Records of any near misses,	1,200,000

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST (Ksh)
ENVIRONMENTAL IMPACTS						
safety Impacts	• Awareness creation/Tool box talks on safety to workers while at construction site • Workers coming to the site should be knowledgeable on safety precautions to take • Appropriate PPE (helmet, safety harness, boots, masks, climbing irons) • Proper general house keeping • Close supervision of workers • Risk assessment by contractor of the construction activities and implement mitigation measures appropriately • Adherence to occupational Safety and Health Act 2007 • Availability of equipped first aid box on site • Provide safe drinking water for workers • Engagement of trained first aider on site • Ensure the WIBA cover is taken for the staff • Establish safety committees				incident, and accidents. Records of corrective actions implemented if there was an accident.	
Public/community health	• Sensitize workers and the community on prevention and mitigation of HIV/AIDS and other sexually transmitted diseases, through staff training, awareness campaigns and community *Barazas.*	Construction and operation	contractor	Quarterly inspections	-Number of awareness creation sessions conducted.	20,000

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST (Ksh)
ENVIRONMENTAL IMPACTS						
	• Awareness creation and consultations with local communities prior and during construction on the dangers of these diseases. • Informing workers on local cultural values and health matters. • Provision of condoms to workers. • Allowing migrant workers time to be with their families. • The contractor is impressed upon not to set a construction camp on site. • The contractor will provide public education/information about HIV/AIDS transmission and prevention measures. • Ensure equal treatment of workers. • Provide all appropriate COVID-19 preventive measures including campaign to maintain individual measures at the workplace. • Proper barricading. • Hazard communication. • Controlled access to the site by designated personnel.				-Availability of and distribution of condoms -Presence of a controlled access and records of every person accessing the site.	
Community Safety- Access to site by general public	• Fencing off the facility to keep of community members, children and livestock from entering into the facility • Controlled access to the site only with prior approval	Operation	Contractor	Daily inspections	-Presence of a controlled access and records of every person accessing the site	Part of contractor's cost

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST (Ksh)
ENVIRONMENTAL IMPACTS						
	• Maintain records of any person who comes to site.					
Flooding and storm water flow	• 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 from concrete base. • Create flooding diversions and or spill ways to divert water from getting into the solar power facility. • Concrete only the required area and leave the rest of the land with vegetation like grass. • Construct rain water harvesting system on the control buildings/office and harness into storage tanks for use.	Operation	contractor	Quarterly	Provision of drainage system and water harvesting system -Raised foundations for the structures	100,000
Shocks 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.	Operation	Contractor	Quarterly inspection	-Records of awareness sessions conducted -Incidences report	No additional cost

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST (Ksh)
ENVIRONMENTAL IMPACTS						
	○ 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					

Table 7-2 – ESMMP SOCIAL IMPACTS

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST
SOCIAL IMPACTS						
POSITIVE IMPACTS						
Local Employment	• Prioritize hire of locals for all unskilled labour. • Implement a local recruitment plan that is fair and	Construction Operations Decommissioning	Contractor Proponent	quarterly	-Fair and transparent local recruitment plan in place. -Recruitment processes (job	Contractor's cost

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST
SOCIAL IMPACTS						
	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.				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.	
Impact on local trade/local sourcing	• Preference should be provided to the vulnerable population in the	Construction Operations Decommissioning	Contractor Proponent	Quarterly	records on Suppliers records	No additional cost

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST
SOCIAL IMPACTS						
	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.					
Improved Education	• The proponent should consider having the transmission lines are closer to schools for them to benefit from the power supply; • The proponent should consider partnering with the county government in providing street lighting to improve security for children and teachers leaving	Operation	Contractor and proponent	Annually	Electricity connections in institutions	No additional cost

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST
SOCIAL IMPACTS						
	for school early or leaving late for home.					
Improved health and standards of living	• The proponent should ensure that electricity is always available, reliable and affordable to PAPs.	Operation	Contractor and proponent	Annually	Reliable electricity in the project area	No additional cost
NEGATIVE IMPACTS						
Land acquisition and compensation for land and assets on land	In line with the RPF provisions; • The proponent has prepared an **Abbreviated Resettlement Action Plan (A-RAP)** to guide land acquisition for the mini-grid, and wayleaves for power distribution. • The contractor will implement and adhere to agreements for temporal use of land	Pre-Construction	Contractor- *(contractors' facilities, workers camps)* Proponent- *(project land for generation assets)*	Compensation in kind completed prior to the start of the Project	Land Acquisition and consultation report (consultation (minutes and lists of participants). -Type and amount of compensation paid to affected persons. - Priority community project implemented and handed over to affected communities. -Signed agreements with	Value of compensation in kind project will be equivalent to the value of land acquired as per NLC

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST
SOCIAL IMPACTS						
	and restoration of land after use. • Compensate affected communities in-kind (priority project) for the loss of land. • The construction activities will be restricted to within the allocated land and the immediate surroundings only. • After construction work, any land taken for a will be restored to their original form. • Consultations with the community on the low voltage lines. • The design of the distribution line will utilize the existing road reserves. However, any damage to structures, crops, trees, community facilities and other assets will be compensated in line				communities on the use and restoration of their land	

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST
SOCIAL IMPACTS						
	with the RPF provisions.					
Labour 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. • In contract documents for the Contractor, the proponent 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, labor and welfare standards. • In selection of a Contractor, the proponent should refer to past performance in similar assignments as	- Construction - Decommissioning	Proponent and Contractor	Monthly inspection of employment records	-Records of employees/updated employee register. -Number of local community employees and external employees/ updated employee register.	50,000

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST
SOCIAL IMPACTS						
	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 the proponent should be undertaken to ensure the relevant labor 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 will put in place a worker grievance redress mechanism accessible to all workers, whether permanent or casual, directly or indirectly					

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST
SOCIAL IMPACTS						
	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. • The contractor should include gender considerations in employment opportunities and provide appropriate compensation for work done. • Respect for community values/culture.					

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST
SOCIAL IMPACTS						
	• The contractor to pay workers as per the contractual agreements/terms.					
Child labour and Forced labour -Underage employment, sexual exploitation	• 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. • Implement and monitor the employment register regularly. Compliance with the national	• Construction • Decommissioning	Contractor and Proponent	Quarterly	-Updated employment register indicating locals employed, their ages, national identification numbers etc. -Grievances raised, aggrieved persons and status on resolution etc. Number of reported cases of forced labour.	70000

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST
SOCIAL IMPACTS						
	labour laws and labour management practices. • Put visible signage on site "**No Jobs for children**" • -Do not allow children at the project site.					
<u>GBV and Sexual Exploitation and Abuse (SEA)</u> **-Stigma and Rejection from the community.** **-Self-harm and suicidal behavior**.	• The contractor to prepare an Awareness Raising Strategy, which describes how workers and local communities will be sensitized to GBV risks, and the worker's responsibilities; • Develop and implement a SEA action plan that will follow guidance on the World Bank's Good Practice Note for Addressing GBV in Investment Project Financing involving Major Civil Works (Sept 2018). • Identify GBV Services Providers to which GBV	• Construction • Operation • Decommissioning	Proponent and Contractor GBV Expert Local CBO Local NGO	Quarterly	-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	250,000

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST
SOCIAL IMPACTS						
	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,				persons and status on resolution etc	

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST
SOCIAL IMPACTS						
	• Have a Response Framework which has Mechanisms to hold accountable alleged perpetrators associated to the project; • A referral pathway to refer survivors to appropriate support services.					
Exclusion Of VMGS, 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.	• Pre-construction • Construction • Operation • Decommissioning	Contractor and proponent	Weekly Inspection of the GRM Records	Minutes of consultative meetings with all community segments including VMGs and vulnerable individuals and households, grievances raised and status on resolution etc.	No additional Cost

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST
SOCIAL IMPACTS						
	• 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.					
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	Construction Operations Decommissioning	Contractor	Quarterly	-Availability of and implementation of the Stakeholder Engagement Plan. -Records of stakeholder consultations held -Record of stakeholder consultations held (minutes of meetings and list of participants).	50,000

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST
SOCIAL IMPACTS						
	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				-Information disclosed, to whom it was disclosed (men women, PWD, youth, vulnerable individuals and households etc., methods and languages used in the disclosure (culturally appropriate and accessible), grievances raised and status on resolution etc. -Concerns raised andactons raised.	

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST
SOCIAL IMPACTS						
	stakeholders on SEP and GRM.					
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	Quarterly	-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	No additional cost
Inadequacies in the GRM	• Ensure the subproject GRM incorporates existing local dispute resolution mechanisms at the lowest tier and allows access to administrative and judicial processes as well as to other redress	• Pre-construction • Construction • Operation • Decommissioning	Contractor and proponent	Monthly	-Local Grievances Committee in place, composition of committee, awareness of community and workers on project and	100,000

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST
SOCIAL IMPACTS						
	mechanisms such as meditation/arbitration and the World Banks grievance redress service (GRS) and the Inspection Panel. • Have a subproject level GRM Focal Point to be responsible for receiving, logging/registering, submitting to the responsible tier for resolution and responding to and updating complainants on resolution status. • Sensitize all stakeholder categories on the GRM and encourage them to make use of it. • Ensure the GRM is functional, culturally appropriate, and accessible to all stakeholders without any cost to them and				worker GRMs, updated GRM logs, types of grievances. -Availability of grievance redress process -Number of grievances reported -Number of grievances resolved in a timely manner -Number of grievances escalated to national courts and the World Bank Grievances Redress Service and Inspection Panel.	

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST
SOCIAL IMPACTS						
	without fear of retribution or reprisal. • Ensure adequate and proportionate representation of VMGs and vulnerable individuals in the local grievances handling committee. • Prepare a timebound Contractor's GRM and sensitize community members and subproject workers its processes. • Ensure all reported grievances are logged, dated, processed, resolved and closed out in a timely manner, or escalated to other levels. • Ensure the GRM provides for confidential reporting of particularly sensitive social aspects such as GBV, as well as					

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST
SOCIAL IMPACTS						
	anonymity for those who wish to report anonymously. • Allocate sufficient resources for training and sensitization of the GRM committee members on their roles and responsibilities.					
Change in Culture and heritage	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	Pre-construction	Contractor	Assessment of the Chance find programmed	Grievance records Chance finding report	200000

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST
SOCIAL IMPACTS						
	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					

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST
SOCIAL IMPACTS						
	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					

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST
SOCIAL IMPACTS						
	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					

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST
SOCIAL IMPACTS						
	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.					

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST
SOCIAL IMPACTS						
	• 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					

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST
SOCIAL IMPACTS						
	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.					
Inadequate Grievance Management	• Ensure the subproject GRM incorporates existing local dispute resolution mechanisms at the lowest tier and allows access to	- Construction - Operation - Decommissioning	Proponent	Monthly	• Grievance records	500,000

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST
SOCIAL IMPACTS						
	administrative and judicial processes as well as to other redress mechanisms such as meditation/arbitration and the World Banks grievance redress service (GRS) and the Inspection Panel • Have a subproject level GRM Focal Point to be responsible for receiving, logging/registering, submitting to the responsible tier for resolution and responding to and updating complainants on resolution status • Sensitize all stakeholder categories on the GRM and encourage them to make use of it • Ensure the GRM is					

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST
SOCIAL IMPACTS						
	functional, culturally appropriate, and accessible to all stakeholders without any cost to them and without fear of retribution or reprisal • Ensure adequate and proportionate representation of VMGs and vulnerable individuals in the local grievances handling committee. • Prepare a timebound Contractor's GRM and sensitize community members and subproject workers its processes • Ensure all reported grievances are logged, dated, processed, resolved and closed out in a timely manner, or escalated to other levels.					

POTENTIAL IMPACT	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	RESPONSIBILITY	MONITORING FREQUENCY	MONITORING INDICATOR	ESTIMATED COST
SOCIAL IMPACTS						
	• Ensure the GRM provides for confidential reporting of particularly sensitive social aspects such as GBV, as well as anonymity for those who wish to report anonymously. • Allocate sufficient resources for training and sensitization of the GRM committee members on their roles and responsibilities					

7.5 APPROACH TO IMPLEMENTATION OF ESMMP

7.6 Management Plan During Construction Phase

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

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

7.6.1 Construction Management Plan

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

a) Management of Fuels and other Hazardous Materials

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

b) Management of the Construction Site

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

c) Fire Prevention and Management

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

d) Management of Air Quality

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

e) Neighbouring Land Owner and Occupier Relations

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

f) Complaints Register

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

g) Construction Control

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

H) Control of Access

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

Control of material supply and burrow areas

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

7.6.2 Rehabilitation and Site Closure Plan

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

7.6.3 Local Recruitment Plan

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

In designing the local recruitment plan contractor shall:

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

The mitigation measure is:

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

7.6.4 Workplace Health and Safety Plan

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

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

7.6.5 Community Health and Safety Plan

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

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

7.6.6 Emergency Preparedness Plan

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

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

7.6.7 SEA/SH Prevention and Response Action Plan

The contractor will prepare a SEA/SH Prevention and Response Action Plan that will include a grievance management that ensures confidentiality. The plan should have an Accountability and Response Framework. The plan will include the necessary

measures for prevention and response of GBV impacts.
The mitigation measures shall include:

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

7.6.8 Stakeholder Engagement Plan

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

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

The plan shall put this measure in to consideration:

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

7.6.9 Grievance Redress 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.

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

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

7.6.9.1 Grievance Redress Principles

The principles of grievance mechanism management that need to be observed include;

- All complaints and grievances are resolved as quickly as possible.
- That the resolution of complaints and grievances should be at the lowest possible level for resolution.
- All complaints that can be resolved, should be resolved immediately on the site. The focus of the GRM is to resolve issues in a customarily appropriate fashion at community level and record details of the complaint, the complainant and the resolution.

7.6.9.2 Grievance Redress Committee Capacity Building

A grievance redress mechanism and a committee were established in a culturally appropriate manner in consultation with the community during the consultations for ESIA and will be utilized post ESIA. The GRM committee will have the following roles; log the grievances, maintain records of the GRC meetings and grievances, resolve the grievances to the extent possible.

7.6.9.3 Grievance Procedures

a) *Registration* - Community members can inform the contractor about concerns directly and if necessary, through third parties. Once a complaint has been received, it will be recorded in a complaints log or data system. The log will be kept in hardcopy or electronic form. All reported grievances will be categorized, assigned priority, and routed as appropriate.

7.6.9.4 Grievance Log

The grievance logbook will ensure that each complaint has an individual reference number, and is appropriately tracked and recorded actions are completed. The information to be recorded will include:

- Name, age, gender of complainant;
- Date the complaint was reported;
- Date the grievance logged;
- Action taken;
- Date information on proposed corrective action sent to complainant (if appropriate);
- The date the complaint was closed; and
- Date response was sent to complainant.

b) *Sorting and Processing* - This step determines whether a complaint is eligible for the grievance mechanism and its seriousness and complexity. The complaint will be screened however this will not involve judging the substantive merit of the complaint. The following guide will be used to determine whether a complaint is eligible or not:
Eligible complaints may include those where:

- The complaint pertains to the mini-grid project.
- The issues raised in the complaint fall within the scope of issues the grievance mechanism is authorized to address.

Ineligible complaints may include those where:

- The complaint is clearly not mini-grid project -related.
- The nature of the issue is outside the mandate of the grievance mechanism.
- The complainant has no standing to file.
- Other project or organizational procedures are more appropriate to address the issue.
- Closing Out and Escalation: Project-related grievances will be addressed and closed out as appropriate. The GRM will provide a channel for escalation e.g., through legal redress.

The proponent REREC will monitor the activities of the stakeholder engagement and grievance management activities.
The three tiers if the GRM are as described below:

7.6.9.5 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

7.6.9.6 Functions of the National Grievances Redress Committee

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

7.6.9.7 County Grievance Redress Committees (CGRC)

CGRC has been established at the county level to ensure participatory and transparent implementation of the project. The CGRC will help the project carry out its mandate efficiently- particularly ensuring effective communication with the communities.
Members to CGRC will include representation from the following agencies and entities
Representative of NLC, to grant legitimacy to the acquisition process and ensure that legal procedures as outlined in Land Act 2012

1. Representative of the implementing agency
2. Representative of NEMA to handle environmental issues
3. The County Administration representative, which will provide the much-needed community mobilization, and support to the sub-project.
4. County Land Survey Officer will survey all affected land and produce maps.
5. The County Gender and Social Development Officer who will be responsible for ensuring gender programs are adhered to.
6. The County Lands Registrar will verify all affected land and validate the same.

7. Two PAP representatives from Location Grievance Resettlement Committee – act as voice for the PAPs
8. NGOs and CBOs locally active in relevant fields

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

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

7.6.9.8 Locational Grievance Redress Committee (LGRC)

Since counties are large, further decentralized Grievance Redress Committee will be formed at the location of the sub-project. Subsequently, Locational Grievance Redress Committees (LGRC's), based at each location of a sub-projects, will be established. The LGRC's will be constituted by implementing agencies and representatives of CGRCs through consultation with the PAPs and will act as the voice of the PAPs.
The LGRCs will work under guidance and coordination of CGRC and the implementing agencies. Their membership will comprise of the following:

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

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

The roles of LRCCs will include among others the following:

a) Conducting extensive public awareness and consultations with the affected people.
b) Help ensure that local concerns raised by PAPs as regards to the project are promptly addressed by relevant authorities.
c) Resolve manageable disputes that may arise relating to the project. If it is unable

to resolve/help refer such grievances to the CGRCs instituted.

d) Ensure that the concerns of vulnerable persons such as the disabled, widowed women, orphaned children affected by the sub project are addressed.
e) Assist the community in recording grievances, including helping those who cannot write or read.
f) Help the vulnerable groups access project benefits
g) Ensure that all the PAPs in their locality are informed about the project

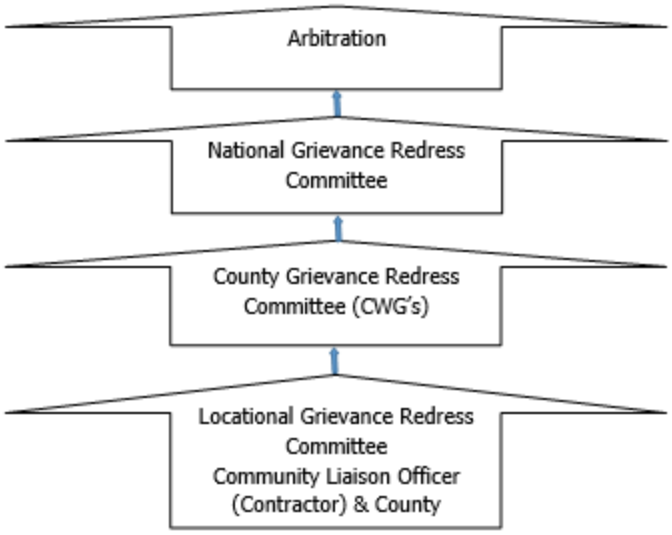

Figure 7-1: KOSAP Grievance Redress Mechanism

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

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

Responsibilities of the Community Liaison Officer include:

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

7.6.9.9 Existence of a Local Grievance Redress Mechanism in Kaikor.

A Local grievance redress committee was constituted in 2020. The LGRM was not active during the site visit. It is anticipated that the committee shall become active during the construction and operation phase of the project. The LGRM is composed of the following members of the project committee:

1. The area chief;
2. Youth representatives;
3. Female representatives;
4. Male representative; and
5. Vulnerable persons representative

Contractor will prepare an effective Grievance Redress Mechanisms (GRM) to address and respond to grievances from both the community, the workers and any other stakeholder.
A Grievance Redress Mechanism (GRM) provides access to remedy and identifies procedures to effectively address grievances arising from project implementation. GRM provides an avenue where people can formally lodge their complaints and grievances and have them properly considered and addressed.

The mitigation measures shall include:
- Prepare a project level timebound GRM in consultation with relevant stakeholders
- Ensure the project GRM incorporates existing local dispute resolution mechanisms at the lowest tier and allows access to administrative and judicial processes as well as to other redress mechanisms such as meditation/arbitration and the World Banks grievance redress service (GRS) and the Inspection Panel
- Have a subproject level GRM Focal Point to be responsible for receiving, logging/registering, submitting to the responsible tier for resolution and responding to and updating complainants on resolution status
- Sensitize all stakeholder categories on the GRM and encourage them to make use of it
- Ensure the GRM is functional, culturally appropriate, and accessible to all stakeholders without any cost to them and without fear of retribution or reprisal
- Ensure adequate and proportionate representation of VMGs and vulnerable individuals in the local grievances handling committee.
- Prepare a timebound Contractor's GRM and sensitize community members and project workers its processes
- Ensure all reported grievances are logged, dated, processed, resolved and closed out in a timely manner, or escalated to other levels.
- Ensure the GRM provides for confidential reporting of particularly sensitive social aspects such as GBV, as well as anonymity for those who wish to report anonymously.

7.6.9.10 World Bank Grievances Redress Mechanism
The World Bank has established 2 grievance redress mechanisms that provide avenues for individuals and communities to submit complaints directly if there is belief that they have been, or are likely to be, adversely affected by a World Bank-funded project. In this project PAPs and other stakeholders have the right to know and access at no cost these GRMs as described below.

7.6.9.11 World Bank Grievances Redress Service
The Grievance Redress Service (GRS) is an avenue for individuals and communities to submit complaints directly to the World Bank if they believe that a World Bank-supported project has or is likely to have adverse effects on them, their community, or their environment. The GRS enhances the World Bank's responsiveness and accountability to project-affected communities by ensuring that grievances are

promptly reviewed and addressed. Complaints must be in writing and addressed to the GRS and sent through the following methods namely:
Those aggrieved or their representatives can report their complaints through the following mediums;
Online by accessing the online form;
Sending an Email to grievance@worldbank.org; or
Submitting a letter to the World Bank Headquarters in Washington D.C., United States or World Bank Kenya County Office.

7.6.9.12 World Bank Inspection Panel

The Inspection Panel is an independent complaints mechanism for people and communities who believe that they have been, or are likely to be, adversely affected by a World Bank-funded project. The Panel is an impartial fact-finding body, independent from the World Bank management and staff, reporting directly to the Board. The Inspection Panel process aims to promote accountability at the World Bank, give affected people a greater voice in activities supported by the World Bank that affect their rights and interests, and foster redress when warranted. In September 2020, the Board updated the resolution that created the Panel and added to the Panel functions. At the same time, the Board approved a resolution establishing the World Bank Accountability Mechanism (AM). The new AM began operations in early 2021 and houses the Panel to carry out compliance reviews and a new Dispute Resolution Service (DRS), which will give complainants another way to have their concerns addressed. Contacts for registration of complaints to the IPare; (i) Tel: +12024585200: and (ii) Email: ipanel@worldbank.org.

7.6.9.13 Government Management of Land Acquisition Disputes

The Environment and Land Court, established under the Environment and Land Court Act 2011, is a superior court (with offices across the country) that hears and determines disputes relating to land and the environment. Likewise, the Land Acquisition Tribunal established under the Land Act 2012; (PART VIIIA 133A) has jurisdiction to hear and determine appeals from the decision of the NLC on the process of compulsory acquisition of land. Therefore, in the first instance, such appeals are referred to the Tribunal. However, a party dissatisfied with the decision of the Tribunal may appeal to the Environment and Land Court on a question of law only. The regulations to set the Land Acquisition Tribunal established under the Land Value (Amendment) Act of 2019 are underway. Besides, the Judicial Service Commission will chair the Land Acquisition Tribunal once operational.

7.6.10 Labor Influx Management Plan

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

The objectives of this plan are as follows:

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

The plan shall consider these measures:
Prepare and Implement a Labour Management Plan (LMP) with policies and measures for ensuring that:

- Subproject managers and workers are sensitised on:
  - ✓ County/National Labour laws
  - ✓ County/National Child Labour laws
  - ✓ National/International Forced Labour laws
- Enforce:
  - ✓ The Code of conduct
  - ✓ County/National Labour laws
  - ✓ County/National Child Labour laws
  - ✓ National/International Forced Labour laws

7.7 Rehabilitation and Decommissioning Management Plan

The rehabilitation and decommissioning management plan include the following:

7.7.1 Planning for Closure

a) The implementing agency shall investigate practical options for closure of the facility at least one year before decommissioning and submit a report to relevant authorities NEMA included.
b) The REREC shall develop rehabilitation and decommissioning plan in conjunction with relevant stakeholders at least one year before the end of facility's operations.
c) The REREC shall explore options of re-use and recycling of the facility's components/structures.

7.7.2 Decommissioning

a) The REREC shall take into consideration the health and safety of personnel, contractors, neighbors and the public during the planning and implementation of the demolition process.
b) The REREC shall undertake a further survey to identify any contaminated areas and remediate them accordingly.

7.7.3 Post Closure

The REREC shall ensure that the facility's site is free of impacts associated with the closure and demolition
The REREC shall develop, rollout and implement a monitoring plan that includes:
a) Monitoring of the rehabilitated site to confirm whether progress is satisfactory.
b) Outline of how land improvement and future land use will be affected by the past operations and decommissioning of the associated infrastructure.

7.8 INSTITUTIONAL IMPLEMENTATION ARRANGEMENTS FOR THE PROPOSED PROJECT

This section presents roles and responsibilities of proponent, implementing agency, supervision consultant and contractor. The project is jointly implemented by the Ministry of Energy and Kenya Power. Specific roles are presented below;

7.8.1 Proponent -Ministry of Energy and Petroleum (MoE)

The MoE will provide overall coordination and oversight of the project. MOE will be responsible for overall responsibility for safeguards due diligence, and compliance monitoring. The MOE will also provide funding for the project planning and implementation.

7.8.2 KOSAP Project Implementation Unit

The MOE has already put in place a Project Implementation Unit (PIU) to guide implementation of the project. The PIU is already implementing the project. In the PIU Environmental and Social issues are spearheaded by an Environmental and Social Safeguards Expert whose role is to coordinate and oversee implementation of safeguards. The PIU reports to the MOE.

7.8.3 The Implementing Agency (REREC)

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

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

Note: *The Solar Mini-grid will be installed operated and maintained by the contractor for the first ten (10) years and then handed over to REREC engineers and operators. So, for the seven years REREC will be monitoring the operations of the contractor.*

7.8.4 County Government of Turkana

The County government is a key stakeholder. The roles of the county government include giving relevant approvals needed, assisting is process of allocating land for Mini-grid, solving grievances that cannot be sorted at project level, monitoring progress of the project among others.

7.8.5 National Environmental Management Authority

This authority is responsible for approval of ESIA report and licensing and is free to check progress of implementation of ESMMP

7.8.6 Roles and Responsibilities of the Supervising Consultant

- The consultant must appoint an ESHS officer who will be reporting on the ESMMP implementation supervision
- The consultant ESHS officer be required to generate various reports including production of minutes of monthly site visits and quarterly supervision reports detailing environmental, health, social and safety compliance on quarterly basis amongst other technical aspects
- Reporting on the ESMMP implementation progress and recommendations

7.8.7 Roles and Responsibilities of the Contractor

- Implementation of the contractor related aspects of the ESMMP and regularly (monthly) reporting
- The contractor on his part will have to appoint an EHS officer and a Social Specialist to coordinate and report on the ESMMP implementation respectively.
- The contractor to engage a Community Liaison Officer to act as a link between the community and the contractor and support the Social Specialist.
- The contractor will also have the obligation of managing the E&S risks related to his/her operations.
- Maintaining the required level of stakeholder engagement and communication, including providing project schedule information to the public, accepting and resolving public grievances, advertising and hiring local workers.
- Maintain a working grievance redress mechanism.
- The contractor is to comply with all regulations and by-laws at the county level and other relevant regulations and laws
- The contractor shall refer to ESIA recommendations and the ESMMP when preparing the contractors- ESMMP and the specific plans
- The contractor shall provide water required for use in connection with the works including the work of subcontractors and shall provide temporary storage tanks, if required
- The contractor shall make his own arrangements for sanitary conveniences for his workers. Any arrangements so made shall be in conformity with the public health requirements for such facilities and the contractor shall be solely liable for any infringement of the requirements.
- The contractor shall be responsible for all the actions of any subcontractors whom he subcontracts.
- The contractor shall take all possible precautions to prevent nuisance, inconvenience or injury to the neighboring properties and to the public generally, and shall use proper precaution to ensure the safety of the community
- All work operations which may generate noise, dust, vibrations, or any other discomfort to the workers and/or visitors of the client and the local community must be undertaken with care, with all necessary safety precautions taken.
- The contractor shall take all effort to muffle the noises from his tools, equipment and workmen to not more than 70dBA
- The contractor shall upon completion of working, remove and clear away all plant, rubbish and unused materials and shall leave the whole site in a clean and tidy

state to the satisfaction of the Proponent. He shall also remove from the site all waste

- No shrubs, trees, bushes or underground thicket shall be removed except with the express approval of the proponent.
- No blasting shall be permitted without the prior approval of the KP and the local authorities.
- Borrow pits will only be allowed to be opened up on receipt of permission from the approving authorities.
- The standard of workmanship shall not be inferior to the Kenya Bureau of Standards where existing. No materials for use in the permanent incorporation into the works shall be used for any temporary works or purpose other than that for which it is provided. Similarly, no material for temporary support may be used for permanent incorporation into the works.
- Disposing of the waste generated during construction activities in accordance to the ESMMP.

- The contractor EHS officer will report on ESMMP implementation during construction period. The aspect to be reported by the contractor will include safety issues i.e. hours worked, recordable incidents and corresponding Root Cause Analysis (lost time incidents, medical treatment cases), first aid cases, incidents and accidents, potential near misses, and remedial and preventive activities required (for example, revised job safety analysis, new or different equipment, skills training etc.); Environmental incidents and near misses; noncompliance incidents with permits and national law; Training on E&S issues (dates, number of trainees, and topics); Details of any security risks; Worker & External stakeholder grievances and E&S inspections by contractor, including any authorities.

Environmental and Social concerns need to be part of the planning and development process and not an afterthought, it is therefore advisable that all the risks and impacts of the project be prevented and mitigated at the earliest opportunity possible to ensure smooth implementation of the project. Finally, a comprehensive Environmental and Social Management and Monitoring Plan (ESMMP) has been prepared and will guide in implementation of mitigation measures.

7.9 MANAGEMENT OF IMPACTS DURING OPERATION PHASE

The operation phase of the proposed project will be mainly power supply, line maintenance and clearing of wayleaves. A contractor (contracted to run the plant for a number of years before handing over to REREC) will be responsible for all the mitigation measures for negative impacts during the operation phase for the first seven years after which responsibility will be REREC. This will be done by implementation of the following steps:

- Inspections
- Corrective action
- Reporting

8 IMPACT SUMMARY AND CONCLUSION

8.1 INTRODUCTION

This chapter gives a summary of impacts conclusion and recommendations.

8.2 SUMMARY OF IMPACTS IDENTIFIED AND ASSESSED

8.2.1 Pre-construction Phase Impacts

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

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

8.2.2 Construction Phase Impacts

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

The significance of the identified negative impacts associated with the construction phase is Major, minor and moderate prior to the application of appropriate mitigation measures. Prior to the application of appropriate mitigation measures, Impact on Exclusion of VMGs, Vulnerable individuals and households will be of major significance during the construction phase due to the sensitivity of the identified impacts. Fourteen of the negative impacts identified are of minor significance and four are moderate significance before the application of appropriate mitigation measures. With the application of appropriate mitigation measures, the significance of all the identified negative impacts associated with the construction phase will be reduced to minor or negligible.

8.2.3 Operational Phase Impacts

A number of impacts have also been identified to be associated with the operational phase of the proposed Kaikor solar project. Of these, impacts on Economy, Employment, Education, Health benefits, Improved security, standards of living and communication will be positive impacts. Prior to the application of appropriate mitigation measures, Impact on Exclusion of VMGs, Vulnerable individuals and households will be of major significance during the operational phase due to the sensitivity of the identified VMGs. The presence of electrical infrastructure will pose this health threat to avifauna prior to the application of appropriate mitigation measures. Fifteen of the negative impacts are of minor significance and two are of Moderate significance before the application of appropriate mitigation measures.

With the application of appropriate mitigation measures, the significance of all the identified negative impacts associated with the operational phase will be reduced to MINOR or NEGLIGIBLE.

8.2.4 Decommissioning Phase Impacts

A number of impacts have been identified as a result of the decommissioning of the proposed Kaikor project. Employment creation and rehabilitation of the project site are considered to be positive impacts.

The significance of the identified negative impacts associated with the decommissioning phase is moderate to minor prior to the application of appropriate mitigation measures. With the application of appropriate mitigation measures, the significance of all the identified negative impacts associated with the decommissioning phase will be reduced to minor or negligible.

8.2.5 Conclusion and Recommendations

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

An Environmental and Social Management Plan (ESMMP) has been prepared to ensure that social and environmental impacts and risks identified during the ESIA process are effectively managed during the construction and operations of the Project. The ESMMP specifies the mitigation and management measures to which the Project Proponent and the Contractor will be committed and shows how the Project will mobilize organizational capacity and resources to implement these measures. The ESMMP also shows how mitigation and management measures will be scheduled and will ensure that the Project complies with the applicable laws and regulations within Kenya, as well as the requirements of WB OPs on environmental and social sustainability.

The Project Proponent and Contractor should accommodate the mitigation measures recommended during the ESIA process to the extent that is practically possible, without compromising the economic viability of the Project or having a lasting impact on the environment.

In summary, based on the 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.

9. REFERENCES

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

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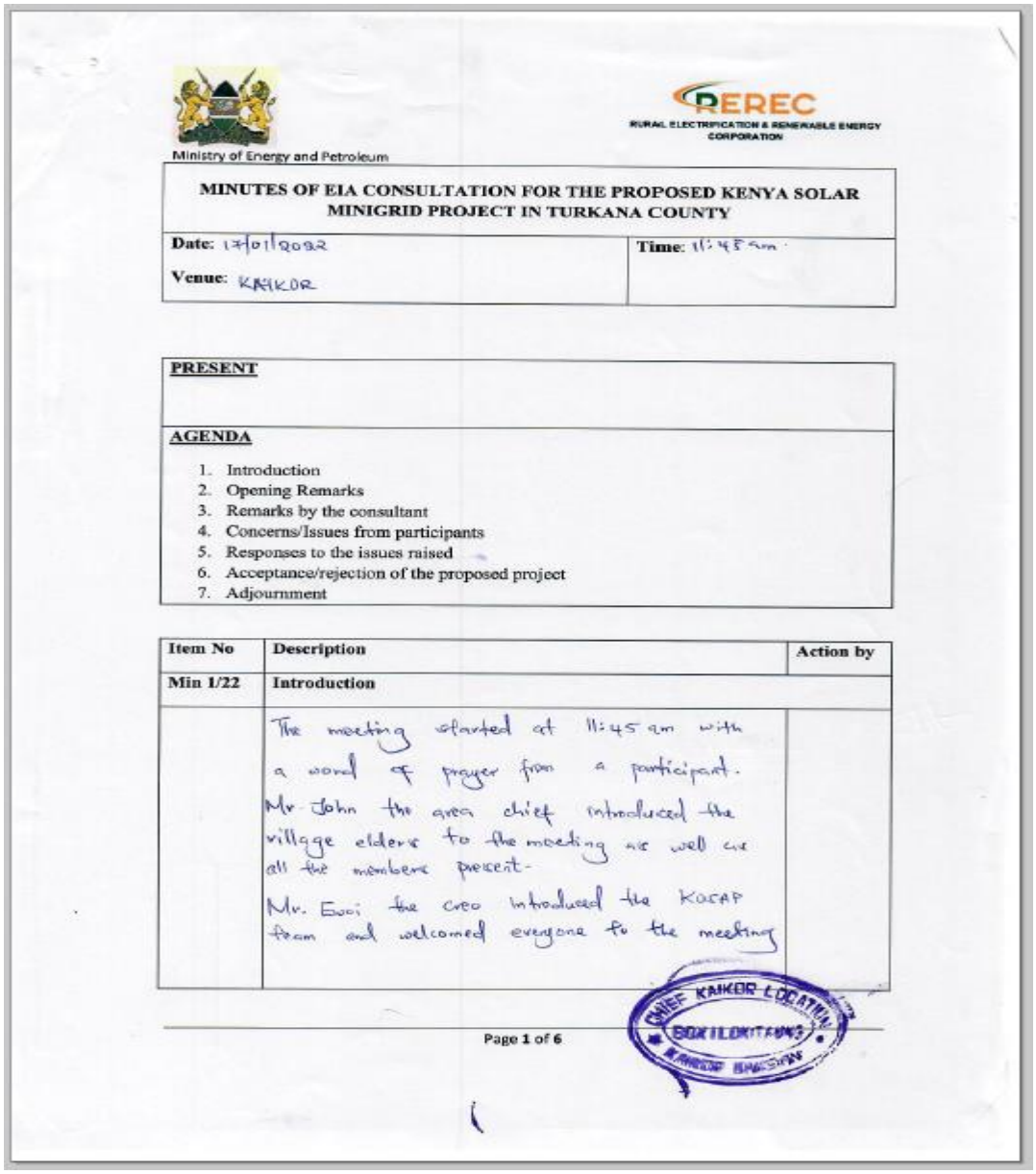
10. APPENDICES

No	Appendix	Item
1	Appendix 1	Minutes of EIA consultation meeting
2	Appendix 2	List of attendance
3	Appendix 3	Baseline Environmental measurements
4	Appendix 4	Minutes of Land acquisition meeting
5	Appendix 5	A-RAP Document
6	Appendix 6	Firm and Lead expert EIA practising licences

APPENDIX 1 – MINUTES OF EIA CONSULTATION MEETING



Ministry of Energy and Petroleum

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

Date: 17/01/2022	**Time:** 11:45 am
Venue: KAIKOR	

PRESENT

AGENDA

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

Item No	Description	Action by
Min 1/22	**Introduction**	
	The meeting started at 11:45 am with a word of prayer from a participant. Mr John the area chief introduced the village elders to the meeting as well as all the members present. Mr. Ewoi the CREO introduced the KOFAP team and welcomed everyone to the meeting	

CHIEF KAIKOR LOCATION BOX 1 LOKITAUNG KAIKOR ENGISHAE

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Min 2/22	**Opening Remarks**	
	Mr. Esoi explained to the community the main agenda and briefed everyone on KOSAP. It was said that KOSAP is funded by the World Bank and implemented by the Ministry of energy, REREC and Kenya Power. The community was informed on compensation in-kind; where they were told to name their prioritized project - either water, education or Health project.	
Min 3/22	**Remarks by the consultant**	
	Mr. Alan Owino explained some of the benefits that the community will accrue from the government's project (KOSAP) such as employment opportunities, Reliable electricity supply, Reduced indoor air pollution, Improved access to water and sanitation services e.t.c. The consultant also explained the ESIA processes such as identification of potential impacts and benefits, stakeholder engagement and public consultation, mitigation and optimization measures e.t.c. He also described the anticipated social issues/impacts of KOSAP e.g Labour influx, child labour, Elite Capture, Impacts on Cultural Heritage, GBV, SEA & SH, Risk of Insecurity incidence etc. Ms. Lydia described the anticipated Environmental issues/impacts such as environmental	

CHIEF KAIKOR LOCATION BOX 1 LOKITAUNG KAIKOR DIVISION

	exposure to hazardous & Toxic materials, operation of standby generator, occupational health and safety Risks, Impacts on local diversity and air quality etc Some of the mitigation measures discussed include ; the use of personal protective equipments, Implementation of specific intervention for the vulnerable to have equal access to project benefits & opportunities, vegetation re-planting to offset cleared vegetation	
Min 4/22	**Concerns / Issues/Recommendations from participants**	
	Teresa Simon enquired on the project timelines. She was also concerned on whether the community will pay for the wiring of their houses or not. Abdifatah Kapur a member of the Grievance Committee suggested that the contractor should conduct a public participation to discuss on employment and the payment. He also raised a concern that the contractor should aquire raw materials from the community / local business owners	

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	Mark Newoto the assistant Chief appreciated the project he recommended the contractor to improve infrastructure e.g the roads which are impassable especially during the rainy season. Alice recommended that the contractor should ensure all his/her employees (casual labourers) are paid appropriately and on time. She was also concerned on whether the committee has been formed. The members were concerned on the reliability of the solar power.
Min 5/22	**Responses to concerns/issues raised**
	The consultants responded that KOSAP is at its initial stages and that as soon as approval is issued then the project will commence. The members were also informed to choose a qualified electricians to do the household wiring, this would prevent anticipated accidents/impacts.

CHIEF KAIKOR LOCATION
KAIKOR KERIS

It was also discussed that the contractor will give the first priority to the local business owners regarding the purchase of the raw materials. Those with small-businesses were also encouraged to partner within themselves to facilitate the availability of these raw materials.

The members were informed that; the Ministry of Energy & Kenya Power will be responsible for the management of the project and they will ensure that the power supplied will be reliable.

Alice was also informed that KOCAP Grievance Redress Committee had been formed during the initial stages (site identification / Land Acquisition) and one of their main roles will be to ensure that the local concerns raised regarding the project are promptly actioned by the management.

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Min 6/22	**Acceptance/Rejection of the project**	
	All members unanimously accepted the project as they agreed on the equipping of the community water borehole as their prioritized project.	
Min 7/22	**Adjournment**	
	The meeting adjourned at 13:40 pm with a closing remarks from the area chief.	

Minutes Prepared By:
Name: Umul Khair Qabalo Adi Date: 17/01/2022
Position: ESIA expert Signature:

Minutes Confirmed By:
Name: John Ebei Nakwap Date:
Position: Chief Signature:

CHIEF KAIKOR LOCATION
BOX 1 LOKITAUNG
KAIKOR DIVISION

APPENDIX 2 – PUBLIC MEETING PARTICIPANTS' LISTS

KAIKOR ESIA

Ministry of Energy and Petroleum

REREC

Kenya Power

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

Venue: KAIKOR

Date: 17/9/2022

Time: 11:45 AM

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	ISAIAH ABELETO	MCA REP	M	0706470786	
2.	EGAAR EMMANUEL	OPINION LEADER	M	0701456614	
3.	EWOTON ERUS	FORMER COUNCILLOR	M	0790661684	
4.	EMMANUEL ACHUKA	WARD ADMINISTRATOR	M	0720317352	
5.	ABDIFATAH KAPUA	CHAIRMAN (KOSAP)	M	0711694385	
6.	PETER LOCHAMPA	ASS. CHIEF LOITANIT	M	0705661992	
7.	JOHN E. NAKUWAT	CHIEF KAIKOR	M	0728399172	
8.	CALPETER EKIDOR	MEMBER (KOSAP)	M	0708923652	
9.	EPUROT NAMUPA	ELDER	M	0799803404	
10.	PHILEMON ERUKUDI	OPINION LEADER	M	0791900230	
11.	CHRISTOPHER EKEYU	MEMBER	M	0706651334	
12.	KERIO L. PAUL	HEADTEACHER	M	0724021918	
13.	TITUS MUYEKA	PRINCIPAL	M	0726980377	
14.	LONGORAT EKAI	Opinion Leader	M	071342565	

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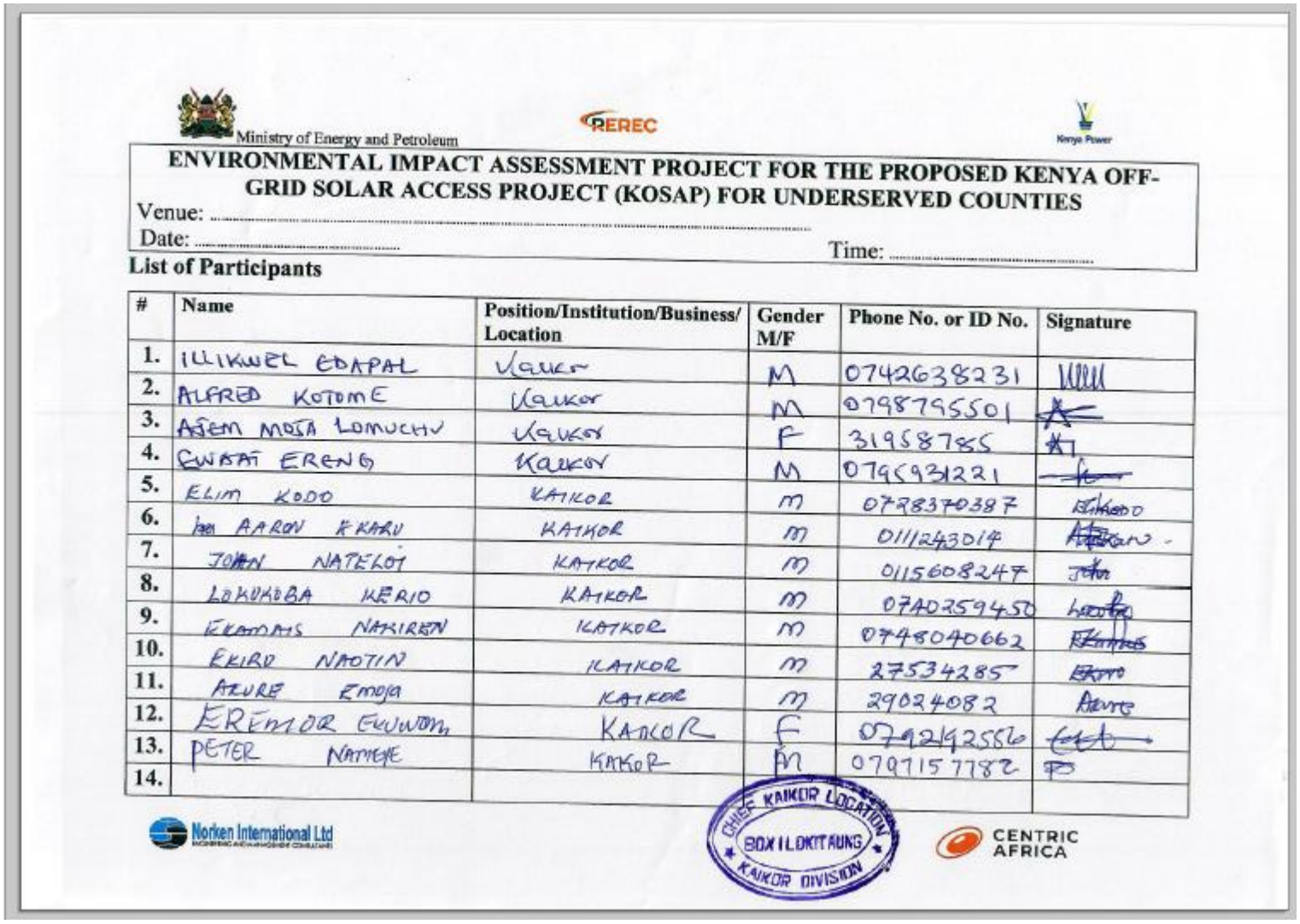

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Kenya Power

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

Venue: .....

Date: ..... Time: .....

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	ILLIKWEL EDAPAL	KAIKOR	M	0742638231	
2.	ALFRED KOTOME	KAIKOR	M	0798795501	
3.	AJEM MOJA LOMUCHU	KAIKOR	F	31958785	
4.	EWASAI ERENG	KAIKOR	M	0795931221	
5.	ELIM KODO	KAIKOR	m	0728370387	
6.	AARON EKARU	KAIKOR	m	0111243014	
7.	JOHN NATELOI	KAIKOR	m	0115608247	
8.	LOKUKOBA KERIO	KAIKOR	m	07A0259450	
9.	EKAMAIS NAKIREN	KAIKOR	m	0748040662	
10.	EKIRU NAOTIN	KAIKOR	m	27534285	
11.	AKURE EMOJA	KAIKOR	m	29024082	
12.	EREMOR EWUWON	KAIKOR	F	0792492556	
13.	PETER NATHEYE	KAIKOR	M	0797157782	
14.					

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

Venue: Kaikor

Date: 13/11/2021 Time: 10:00

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	DAMARIS ETOMO	KAIKOR	F	0757332250	
2.	NGAFUK EPETA	KAIKOR	F	0743341468	
3.	LOPETET MUSA AO	KAIKOR	M	0797151625	
4.	MARK PIRINGAN	KAIKOR	M	0741482052	
5.	EKIRU ATOOT EDINAH	KAIKOR	F	0727775671	
6.	AKUTAN NAPICHIA	KAIKOR	M	0797352217	
7.	CAROLINE EKIRU	KAIKOR	F	0700032426	
8.	ALFRED LOTELE	KAIKOR	M	0701410487	
9.	JACOB LOKWAYEN	KAIKOR	M	0705967074	
10.	EMMANUEL LOTUKO	KAIKOR	M	0743634574	
11.	LOKOL LOPUS NABUIN	KAIKOR	M	0798224383	
12.	NAYOK MORUKAPEL	KAIKOR	F	0748874388	
13.	PETER LOPETO	KAIKOR	M	0115729137	
14.	Longidi Amodoi	KAIKOR		07 19768084	

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

Venue: Kaikor

Date: 17/1/2024 Time: 10:00

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	NAKODO ITUKON	KAIKOR	F	0740178413	
2.	MARK EDAPAL	KAIKOR	M	0741482052	
3.	AKIRU EYOMO	KAIKOR	F	0790039880	
4.	NGATUK ECHOPOK	KAIKOR	F	0759649765	
5.	PEIKAN EBEI	KAIKOR	F	0703475218	
6.	LOKYAMAN MURTANI	KAIKOR	F	0115729137	
7.	EKKI MUSA	KAIKOR	M	0792917701	
8.	MARGRET LOKERRIS	KAIKOR	F	0708203225	
9.	EKOMWA EKOLONG	Kaikor	M	0714819065	
10.	NARAKA AKOLOM	Kaikor	M	0740833486	
11.	SHARON NAIBÉ	Kaikor	F	0769686968	
12.	MOLU KIMAT	Kaikor	M	0795330657	
13.	ABEI LOBUIN	Kaikor	F	0742742018	
14.	JECINTA KINYANG	Kaikor		0792081889	

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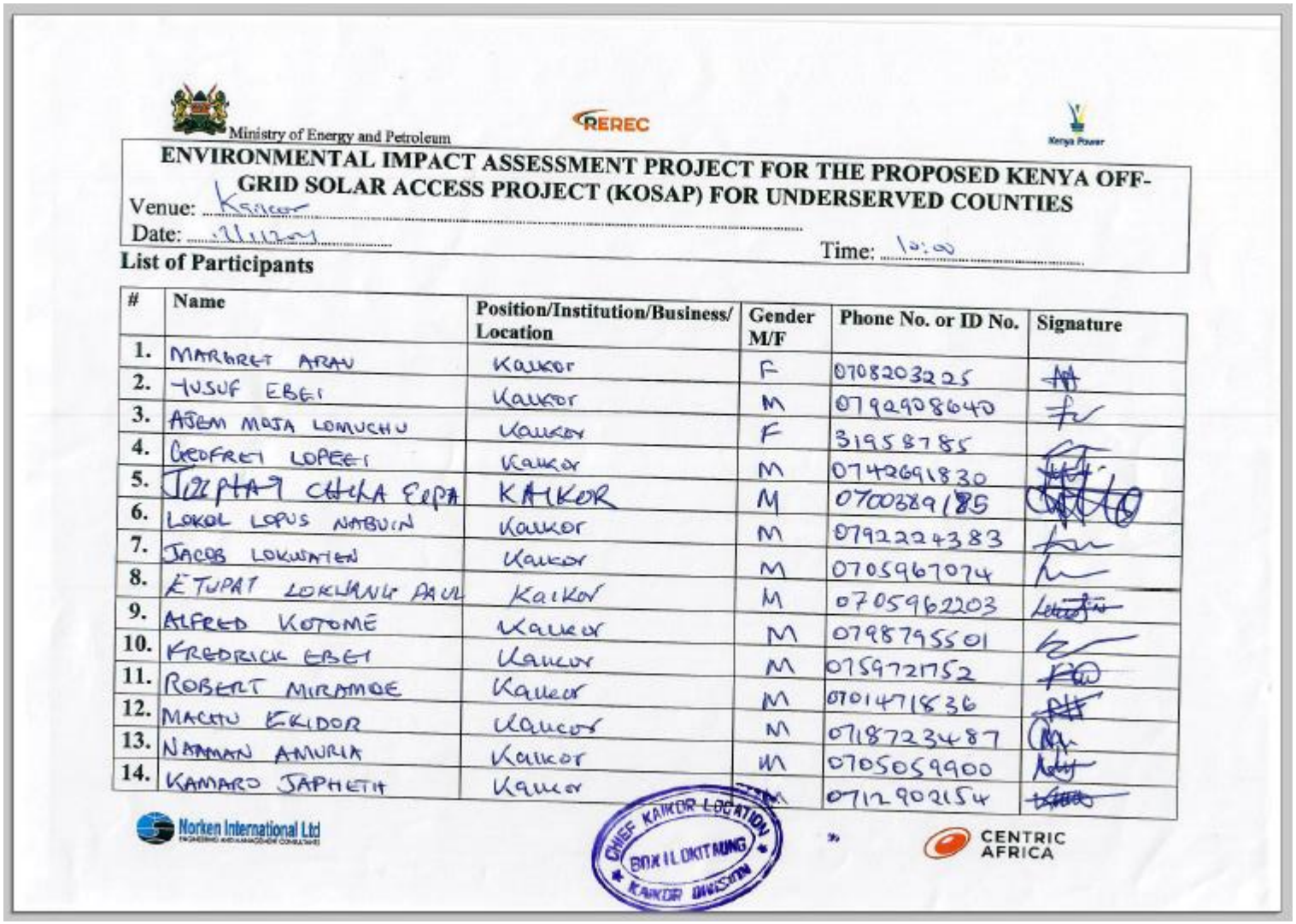

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ENVIRONMENTAL IMPACT ASSESSMENT PROJECT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES

Venue: Kaikor

Date: 31/12/21 Time: 10:00

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	MARGRET ARAU	KAIKOR	F	0708203225	
2.	YUSUF EBEI	KAIKOR	M	0792908640	
3.	AJEM MOJA LOMUCHU	KAIKOR	F	31958785	
4.	GEOFREY LOPEEI	KAIKOR	M	0742691830	
5.	JOSEPH CHEKA ELPA	KAIKOR	M	0700389185	
6.	LOKOL LOPUS NABUIN	KAIKOR	M	0792224383	
7.	JACOB LOKUNYEN	KAIKOR	M	0705967074	
8.	ETUPAT LOKUANG PAUL	KAIKOR	M	0705962203	
9.	ALFRED KOTOME	KAIKOR	M	0798795501	
10.	FREDRICK EBEI	KAIKOR	M	0759721752	
11.	ROBERT MIRAMOE	KAIKOR	M	0701471836	
12.	MACHU EKIDOR	KAIKOR	M	0718723487	
13.	NAMMAN ANURIA	KAIKOR	M	0705059900	
14.	KAMARO JAPHETH	KAIKOR	M	0712902154	

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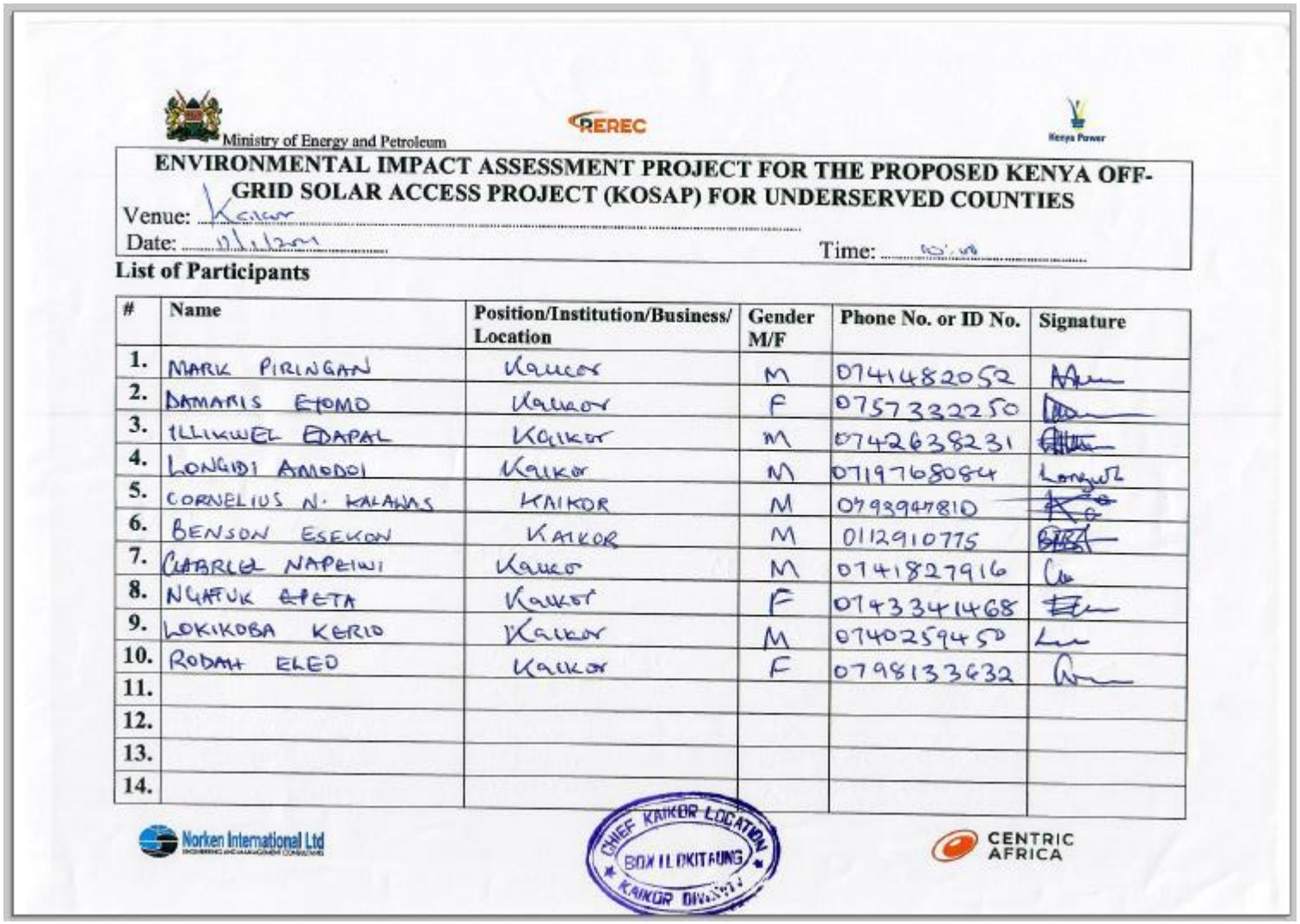

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ENVIRONMENTAL IMPACT ASSESSMENT PROJECT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES

Venue: Kaikor

Date: 11/12/2021 Time: 10:00

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	MARK PIRINGAN	Kaikor	M	0741482052	
2.	DAMARIS ETOMO	Kaikor	F	0757332250	
3.	ILLIKWEL EDAPAL	Kaikor	M	0742638231	
4.	LONGIDI AMODOI	Kaikor	M	0719768084	
5.	CORNELIUS N. KALAWAS	KAIKOR	M	0793947810	
6.	BENSON ESEKON	KAIKOR	M	0112910775	
7.	CHARLES NAPEIWI	Kaikor	M	0741827916	
8.	NGAFUK EPETA	Kaikor	F	0743341468	
9.	LOKIKOBA KERIO	Kaikor	M	0740259450	
10.	RODAH ELEO	Kaikor	F	0798133632	
11.					
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Venue: Kenen

Date: 17/1/2019

Time: 10:00

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	GABRIEL EKUWOM	BODA BODA VICE CHAIRPERSON	M	0796561238	[signature]
2.	Umulkheir Q. Abdi	CENTRIC AFRICA	F	0795023964	[signature]
3.	Lydia Komen	Nongon?? LTD	F	0717153253	[signature]
4.	Japheth Kiprany Bor	"	M	0725650810	[signature]
5.	ALLAN ODUNGA	CENTRIC AFRICA LTD	M	0727724873	[signature]
6.	Kennedy D.S. Mesoka	Min of Energy Eng	M	0722591628	[signature]
7.					
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13.					
14.					

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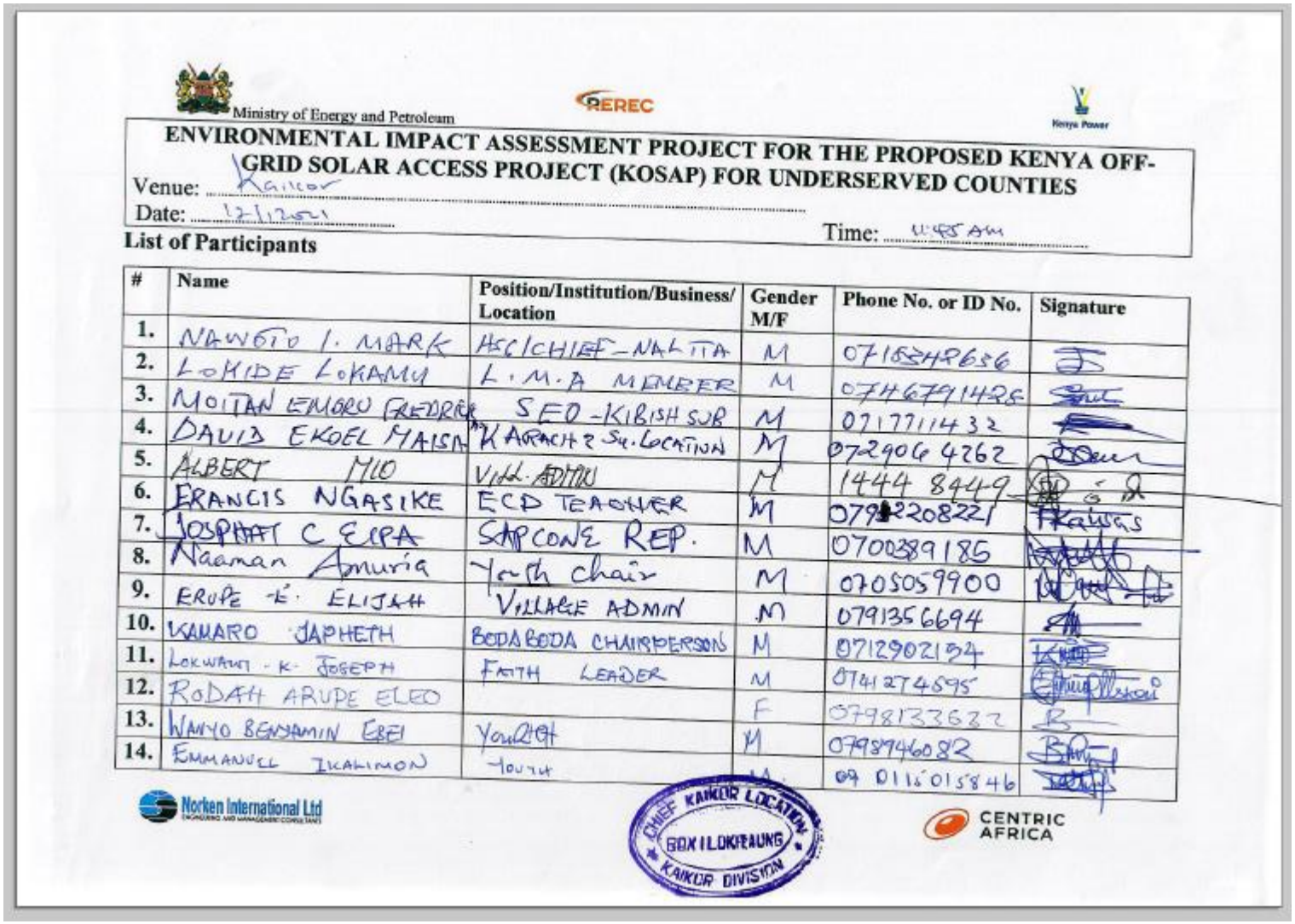

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ENVIRONMENTAL IMPACT ASSESSMENT PROJECT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES

Venue: Kaikor

Date: 12/12/2021 Time: 11:45 AM

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	NAWOTO I. MARK	HEC/CHIEF-NALITA	M	0715348656	
2.	LOKIDE LOKAMU	L.M.A MEMBER	M	0746791428	
3.	MOITAN EMORU FREDRICK	SEO-KIBISH SUB	M	0717711432	
4.	DAVID EKOEL MAISA	KARACHA SU. LOCATION	M	0729064262	
5.	ALBERT MIO	VILL. ADMIN	M	1444 8449	
6.	FRANCIS NGASIKE	ECD TEACHER	M	0792208221	
7.	JOSPHAT C ELIPA	SAPCONE REP.	M	0700389185	
8.	Naaman Amuria	Youth chair	M	0705059900	
9.	ERUPE E. ELIJAH	VILLAGE ADMIN	M	0791356694	
10.	KAMARO JAPHETH	BODABODA CHAIRPERSON	M	0712902134	
11.	LOKWAMI K. JOSEPH	FAITH LEADER	M	0741274595	
12.	RODAH ARUPE ELEO		F	0798133627	
13.	WANYO BENJAMIN EBEI	YOUTH	M	0798946082	
14.	EMMANUEL IKALIMON	YOUTH	M	09 0116 01 58 46	

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FOCUS GROUP DISCUSSION PARTICIPANTS LISTS

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

Venue: KAIKOR FEMALE FGD

Date: 31/01/2023 Time: 11:45AM

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	AKAI EYANAE EMOIT	KAIKOR	F	0714389536	
2.	LOSEGE LOBUR	KAIKOR	F		
3.	TERESA NAIZA SIMON	KAIKOR	F	0706657721	
4.	NATEAM AGNES	KAIKOR	F		
5.	CHRISTINE MERILEM	KAIKOR	F	0706372041	
6.	LOTORE ARIONG AMUAH	KAIKOR	F	0792915847	
7.	ARENG EKAALE	KAIKOR	F	0701516632	
8.	EKIRU EKULAM	KAIKOR	F		
9.	LOITAMOI ARII	KAIKOR	F	0743822147	
10.	REBECCA ERUPE ENAAI	KAIKOR	F	0791890592	
11.	NAKAROT LOMUNGO	KAIKOR	F		
12.	LORE ELIM	KAIKOR	F	0705638577	
13.	ALICE KOLOI	KAIKOR	F	0706250976	
14.	RATIO MUYA	KAIKOR	F	0707981530	

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Venue: KAIKOR FEMALE FGD

Date: 17/11/2021 Time: 11:45 am

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	EKAI NAHOTIN	KAIKOR	F	0717739647	
2.	NAMAHABU NAHOTIN	KAIKOR	F	0718854029	
3.	LOPEAT MUYA	KAIKOR	F	0740186792	
4.	LOMEKUI EKENO	KAIKOR	F	0704525898	
5.	NATOYE EKIRU	KAIKOR	F	0743634574	
6.	ADAPAL APORON	KAIKOR	F	0723614874	
7.	CATHERINE ABENYO	KAIKOR	F	0713101351	
8.	AKIBOR LOMILIO	KAIKOR	F		
9.					
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Kaikor Youths FGD

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

Venue: Kaikor St. James catholic church Hall

Date: 17/6/2022 Time: 10:45 AM

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	LOMUCHU LOBE	Kaikor	M	24241781	
2.	ELIM KODO	Kaikor	M		
3.	AARON EKARU	Kaikor	M		
4.	LOPETET MUSA AD	Kaikor	M	0797151625	
5.	CECILIA EKENO	Kaikor	F	0714789340	
6.	EMMANUEL LOTUKO LOCHUCH	Kaikor	M	0743634574	
7.	GABRIEL EKUWOM	Kaikor	M	0796561238	
8.	MARAKA AKOLOM	Kaikor	M	0740833486	
9.	LOKWAWI - K - JOSEPH	KAIKOR	M	0741274595	
10.	JECINTA KINYANG	Kaikor	F	0792081889	
11.	IKAI MESHACK EREGAE	KAIKOR	M	0725941462	
12.	EJEM LOMODO EKITELA	Kaikor	M		
13.	EKIRU NAOTIN NAMEYAN	Kaikor	M	27534285	
14.	OME JACKSON	KAIKOR	M	0716309021	

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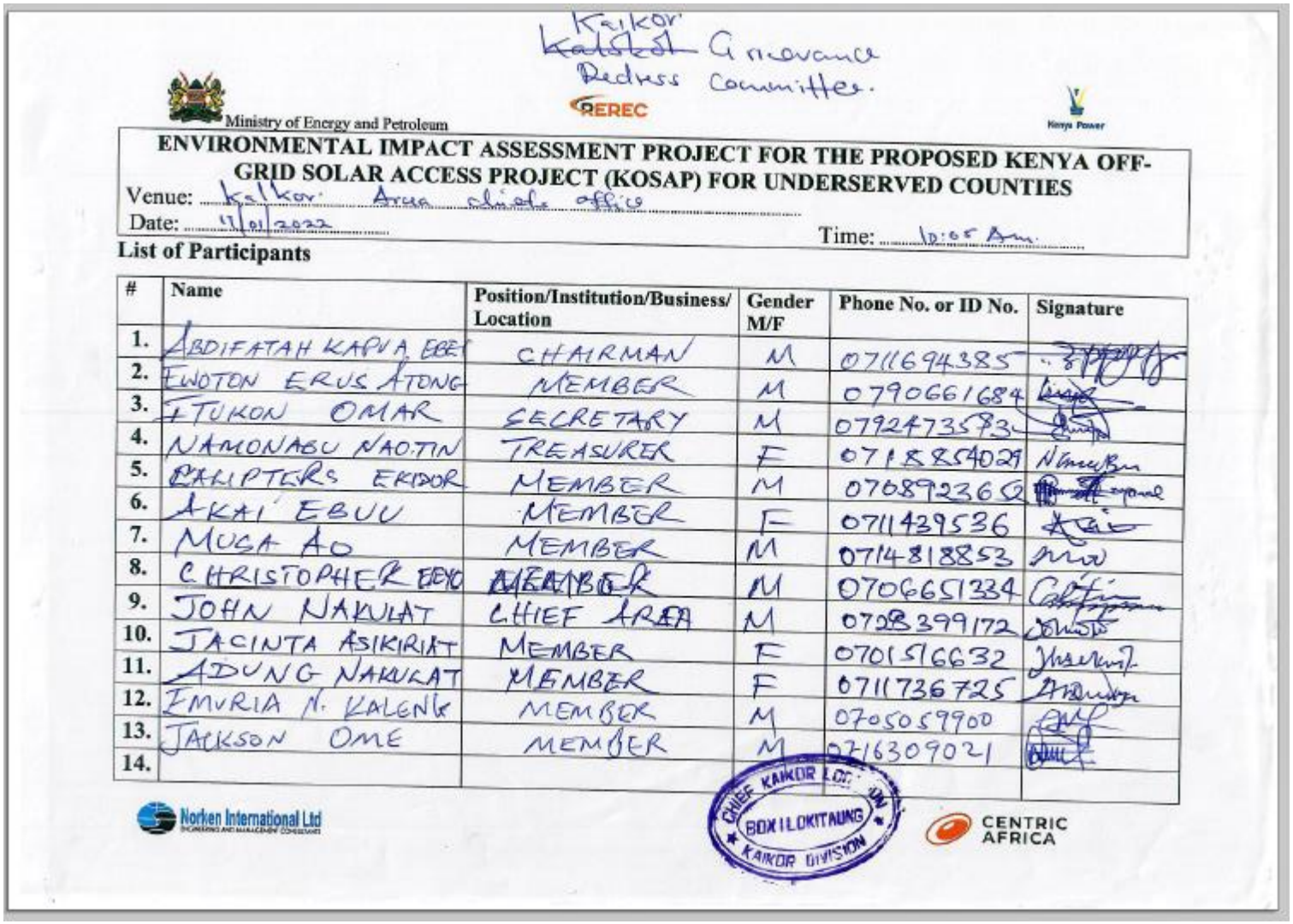

Kaikor Kaikor Grievance Redress Committee.

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

Venue: Kaikor Area chiefs office

Date: 17/01/2022 Time: 10:05 Am

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	ABDIFATAH KAPUA EBEI	CHAIRMAN	M	0711694385	
2.	EWOTON ERUS ATONG	MEMBER	M	0790661684	
3.	ETUKON OMAR	SECRETARY	M	0792473583	
4.	NAMONABU NAOTIN	TREASURER	F	0718854029	
5.	EMPTERS ERIDOR	MEMBER	M	0708923659	
6.	AKAI EBUU	MEMBER	F	0711439536	
7.	MUSA AO	MEMBER	M	0714818853	
8.	CHRISTOPHER EEKO	MEMBER	M	0706651334	
9.	JOHN NAKULAT	CHIEF AREA	M	0728399172	
10.	JACINTA ASIKIRIAT	MEMBER	F	0701566632	
11.	ADUNG NAKULAT	MEMBER	F	0711736725	
12.	EMURIA N. KALENK	MEMBER	M	0705059900	
13.	JACKSON OME	MEMBER	M	0716309021	
14.					

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

Venue: Kaikor C.

Date: 17/01/2022

Time: 10:12 – 10:42

List of Participants

FGD MEN KAIKOR.

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	Abdifatah Kapia	Chairman GRC	M	0711694385	
2.	LONGOROT EKAI	OPNION LEADER	M	0713426865	
3.	EWOTON SRUS	FORMER COUNCILOR	M	0790661684	
4.	ISAAH ABELETO	OPNION LEADER (TEACHER)	M	0706470786	
5.	ALBERT MIO	VILL. ADMIN (PLWD)	M	1444-8449	
6.	NAWOTO I. MARK	ASS/CHIEF-NALITA	M	0715542636	
7.	EMMANUEL ACHUKA	WARD ADMINISTRATOR	M	0720317352	
8.	CARPETERS EKIDOR	MEMBER GRC	M	0708923652	
9.	CHRISTOPHER EREYO	MEMBER GRC	M	0706651334	
10.	LOKIDE LOKAMU	DISABLE	M	0746791428	
11.	PHILEMON ERUKUDI AZIYAH	OPNION LEADER	M	0791900230	
12.	PETER LOCHAMPA	CHIEF LOITANIT	M	0705601992	
13.	ELAAR LOKAALE	OPNION LEADER	M	0701455684	
14.	YEYA KORINMANG	ELDER	M	N/A	

CHIEF KAIKOR LOCATION
BOX ILOKITAUNG
KAIKOR DIVISION

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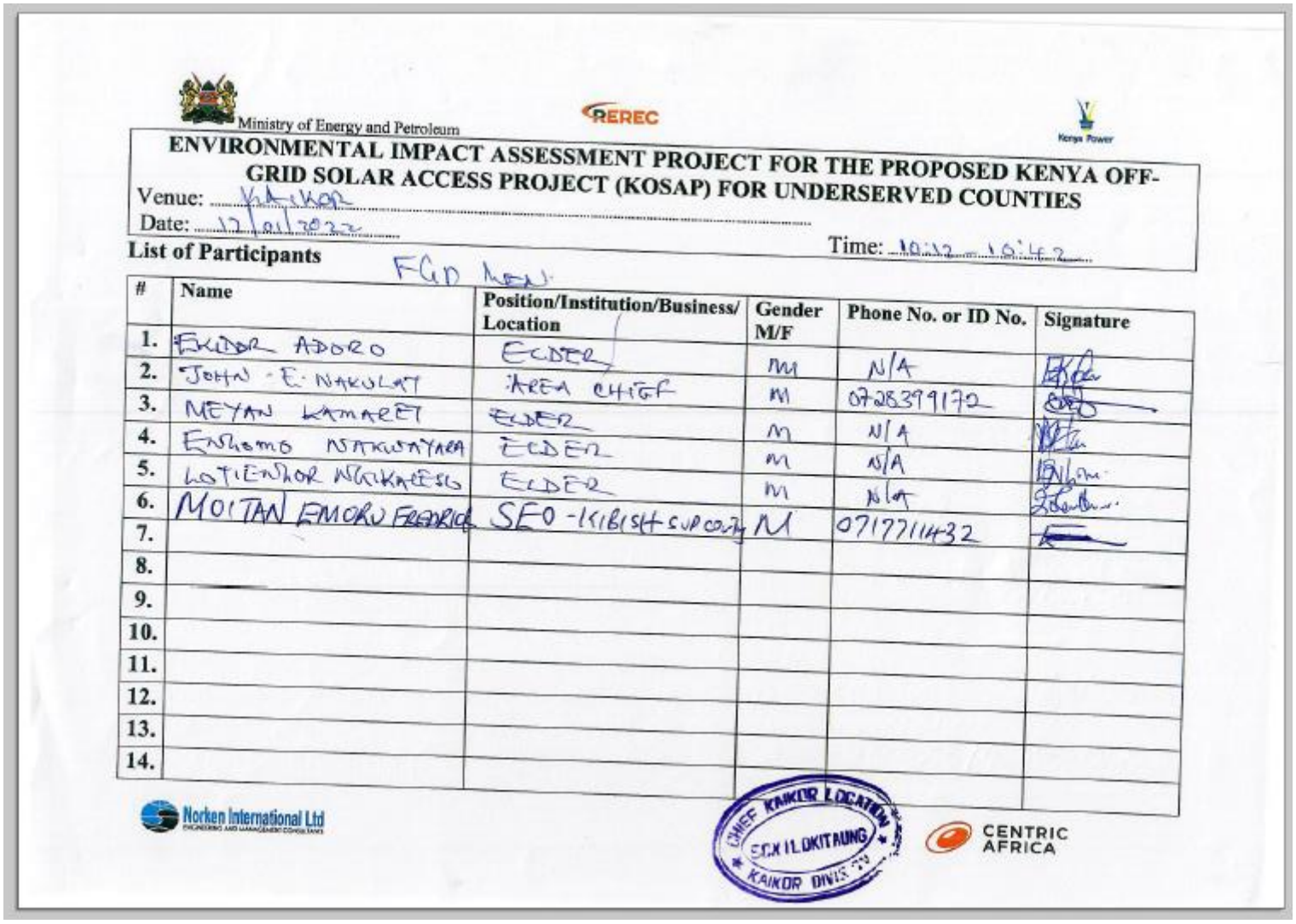

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ENVIRONMENTAL IMPACT ASSESSMENT PROJECT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES

Venue: KAIKOR

Date: 12/01/2022 Time: 10:12 - 10:42

List of Participants FGD MEN

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	ELDER ADORO	ELDER	M	N/A	
2.	JOHN E. NAKULAT	AREA CHIEF	M	0728399172	
3.	MEYAN LAMARET	ELDER	M	N/A	
4.	ENSHOMO NTAKUYAREA	ELDER	M	N/A	
5.	LOTIENYOR NGIKAKESG	ELDER	M	N/A	
6.	MOITAN EMORU FREDRICK	SEO - KIBISH SUB COUNTY	M	0717711432	
7.					
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SCX I LOKITAUNG
KAIKOR DIVISION

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APPENDIX 3– BASELINE ENVIRONMENTAL RESULTS

Polucon
At your service

NORKEN INTERNATIONAL LIMITED
P.O BOX 9882-00100
NAIROBI, KENYA

TEST REPORT NO: 202216010309B	
SAMPLE	SOIL
DATE & PLACE SUBMITTED	08th February 2022 at Polucon Laboratory, Nyali
DATE ANALYSIS STARTED	09th February 2022
SAMPLING METHOD	N/A
MARKS	Turkana 2

TEST	METHOD	RESULTS	UNITS	CLIENT SPECIFICATIONS
BTEX				
Benzene	PQA/LIM/002	<0.01	mg/kg	-
Toluene	PQA/LIM/002	<0.01	mg/kg	-
Ethyl benzene	PQA/LIM/002	<0.01	mg/kg	-
Xylene	PQA/LIM/002	<0.01	mg/kg	-
PAH				
Naphthalene	PQA/LIM/004	<0.01	mg/kg	-
Acenaphthylene	PQA/LIM/004	<0.01	mg/kg	-
Acenaphthene	PQA/LIM/004	<0.01	mg/kg	-
Fluorene	PQA/LIM/004	<0.01	mg/kg	-
Phenanthrene	PQA/LIM/004	<0.01	mg/kg	-
Anthracene	PQA/LIM/004	<0.01	mg/kg	-
Fluoranthene	PQA/LIM/004	<0.01	mg/kg	-
Pyrene	PQA/LIM/004	<0.01	mg/kg	-
Benzo(a)anthracene	PQA/LIM/004	<0.01	mg/kg	-
Chrysene	PQA/LIM/004	<0.01	mg/kg	-
Benzo(b)fluoranthene	PQA/LIM/004	<0.01	mg/kg	-
Benzo(k)fluoranthene	PQA/LIM/004	<0.01	mg/kg	-
Benzo(a)pyrene	PQA/LIM/004	<0.01	mg/kg	-

**********End of test results**********

Limit of Quantification (LOQ) = 0.01 mg/kg

Mombasa Lab
15th February 2022

Analyst

M. Bahati – Chemist

Technical signatory

J. Onsiyo – Lab manager

Where a statement of conformity is made, the following decision rules are applied not considering uncertainties: 'conform/comply' – Results are within limits while 'does not conform/comply' – Results exceed limits
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"Unless otherwise stated the results shown in this test report refer only to sample(s) tested and such sample(s) are retained for 90 days only (if non-perishable)."
NB: This report relates to submitted sample(s) only. The source and/or markings are as provided by the customer

GL8856
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www.polucon.com
Member of POLUCON Group

ISO 9001:2015 Certified
Designated Laboratory
ISPM15 CERTIFIED
Heat Treatment provid IPPC KE - 016

1 of 1

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P.O BOX 9882-00100
NAIROBI, KENYA

TEST REPORT NO: 202216010310A	
SAMPLE	WATER
DATE & PLACE SUBMITTED	08th February 2022 at Polucon Laboratory, Nyali.
DATE ANALYSIS STARTED	09th February 2022
SAMPLING METHOD	N/A
MARKINGS	Turkana 2

TESTS	TEST METHOD	RESULTS	UNITS	KS EAS 12: 2018: NATURAL POTABLE WATER SPECIFICATION
PHYSICAL-CHEMICAL TESTS				
Turbidity	APHA 2130 B	0.47	NTU	25 Max
*pH value	APHA 4500-H+	7.67	@ 25.0°C	5.5 Min – 9.5 Max
*Conductivity	APHA 2510 B	3200	µS/cm	2500 Max
Dissolved oxygen as DO	AOAC 973.45	6.50	mg/L	-
Temperature	APHA 2550	25.3	°C	-
INORGANIC CONTAMINANTS				
Nitrate as NO_3	APHA 4500-NO_3	27.00	mg/L	45 Max
Phosphates as PO_4	APHA 4500-P E	<0.01	mg/L	2.2 Max
*Manganese as Mn	APHA 3111B	<0.01	mg/L	0.1 Max
Mercury as Hg	APHA 3112B	<0.003	mg/l	0.001 Max
*Calcium as Ca	APHA 3111B	3.55	mg/L	150 Max
*Lead as Pb	APHA 3111B	<0.01	mg/L	0.01 Max
*Copper as Cu	APHA 3111B	<0.01	mg/L	1.0 Max
Arsenic as As	APHA 3114 B	<0.01	mg/L	0.01 Max
*Cadmium as Cd	APHA 3111B	<0.003	mg/L	0.003 Max

**********End of test results**********

Comment: Based on the above tests only, the water does not conform with the referenced specifications for natural potable water due to high conductivity.

Mombasa Lab
15th February 2022

Analyst

E. Wambugha – *Chemist*

Technical signatory

P. Onsinyo – *Lab manager*

"*"Indicates test(s) covered under the KENAS accreditation schedule while '+' indicates test(s) subcontracted to an approved Laboratory holding ISO/IEC 17025 accreditation.
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APPENDIX 4– MINUTES FOR LAND ACQUISITION MEETING

MINUTES OF COMMUNITY CONSULTATION MEETING

Minutes of the community consultation meeting held on 15/03/2021 at Kaikor market centre, from 13.45 pm.

AGENDA

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

In attendance (refer to annexed list of participants)

MIN 1.0 WELCOMING AND OPENING

The meting opened with a word of Prayers led by Albert Mio. Ass chief Laitan sub-location Peter lochampaa said Kaikor is occupied by the Kwatala Clan. He said the gathering was eager to hear more about the upcoming electricity project (Kaikol). Residents were very excited. Lokichal/ Kainuk/Lodwar have power but this side is darkness. What is common is torch, D-light and a few solar panels the rest (90%) live in darkness. Power will enable community do things like photocopy, business (cold drinks), charging and that's why we many people have turned up. The Ward Administrator Andrew Kalimapus said he was newly deployed in the region having reported 2 weeks ago. He said Kenyan law recognizes public participation on community projects Power has been a great challenge and requested those present to educate/inform those unable to come. In Kaikor one cannot even operate a photocopy machine or charge mobile phone at the town centre. He then invited the project team to take the floor.

The visiting team introduced themselves as follows;

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

MIN 2.0 KOSAP AND KAIKOR MINI GRID

Ms Myra Mukulu informed the participants that the proposed project is part the Kenya off Grid Solar Access Project (KOSAP) which is funded by the World Bank and is being implemented by the Ministry of Energy, the Kenya Power and Lighting Company (KPLC) and the Rural Electrification and Renewable Energy Corporation (REREC). MoE will provide overall coordination of the Project including responsibility for safeguards due diligence, and compliance monitoring. REREC will implement the mini grid and will be responsible for the implementation of Resettlement Framework Plan, Environmental Social Management Framework and Social Assessment. She said the Government is committed to providing electricity to communities that have not been served by the national grid such as Kaikor because it recognises energy as a key development enabler.

She said KOSAP entails the following components;

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

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

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

MIN 3.0 PROJECT LAND REQUIREMENTS: RIGHTS AND ENTITLEMENTS OPTIONS AND IMPLICATIONS

The Surveyor, Ms. Agnes Gachoki told the Baraza that the main purpose of the Baraza was to seek community consent for land donation for the project. Land required for the construction of the Mini grid is 1.267 hectares. In Kaikor, Land falls under the Community land category. It is yet to be registered, has no title but is jointly owned by the community. Its use and management is governed by the Community Land Act 2016.

She explained the various forms of acquiring in land including; allocation, land adjudication process, compulsory acquisition, settlement programs, transfers, donation and long-term leases.

The Surveyor informed the meeting that if they opted to consent to donation of the project land, following VLD criteria has to be met;

VLD criteria

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

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

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

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

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

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

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

MIN 4.0 PROJECT TECHNICAL DESCRIPTION, WIRING, CONNECTION AND PAYMENTS

Mr. Lawrence Lorika from KPLC told the meeting the proposed mini grid will comprise a solar system and a thermal unit (generator). The Mini-grid will have a capacity of 31KVA and PV 104kwp). He said all potential customers will be mapped for connection. Energy meters will be installed by KPLC staff and the locals living within the required 3 km radius would be connected to power. He said to be connected one will be required to pay a one-off connection fee of kshs.1000 as opposed to other places like Lodwar, Kitale and other big towns whereby they pay kshs.15000 or more.

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

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

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

MIN 5.0 SOCIAL AND ENVIRONMENTAL ISSUES

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

Potential positive impacts:

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

Potential negative impacts:

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

She affirmed that the project beneficiaries were the Yapakunur Clan, a major sub-tribe of the Turkana language group who are Indigenous people and are the only VMG residing near the sub-project area thus the sole project beneficiary. Construction of the mini grid could restrict the access of VMGs to grazing land thus affecting availability of pasture, and consequently their

main source of livelihoods, and forcing families to relocate grazing activities elsewhere. Consequently, a VMGP may not be required. The project can include specific interventions in the final ESMP to ensure the community has access to culturally appropriate benefits. The project will strive to minimize adverse impacts on the indigenous people and ensure that they fully and continuously participate in the consultation process and receive culturally appropriate benefits from construction of the mini grid. The ESIA study would be conducted before the onset of the project and an ESMP developed outlining viable mitigation measures.
Screening would be undertaken to ensure that the project is designed and implemented in an environmentally and socially sustainable manner, taking into account Kenya's relevant sector legislation as well as World Bank Safeguard Policies. This would be undertaken using screening checklists in reference to requirements of the Environmental Management and Coordination Act, 1999 (amended 2019) and KOSAP-Environmental and Social Management Framework (ESMF). The screening process would consider potential impacts of the project and propose viable mitigation measures. She assured the community that temporary or minor impacts which are foreseen during project implementation will be sufficiently mitigated.

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

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

Existing indigenous grievance redress mechanism
Conflicts occasionally arise within individuals and families. The Kaikor community like in all other parts of the Turkana society is endowed with elaborate and systematic traditional mechanisms of conflict management. When disputes occur, they are referred elders (*Ng'akasukou*). The elders then summon involved parties and witnesses to the meeting point (*Ekitoe Ng'akasukou*).The elders will listen to the conflicting parties/individuals, weigh adduced evidence and pronounce the verdict accordingly.
Any matter that is not resolved or when the parties are not satisfied they can report to the chief or seek discourse in a court of law.

The summary of the comments/remarks from the community in the meeting held at Kaikor QUESTION/COMMENTS ANSWER/REMARKS

QUESTION/COMMENTS	ANSWER/REMARKS
Abdifatah Kapua Land umesema ardhi ni ya community, sasa ile wakati tumewapea shamba kuna kitu mnarudisha kwa jamii kama land lease?	connection fee is reduced, 1000 instead of 15000.
Sahara Esilau (Woman) Stima iko na faida, nimekua kwa training kuhusu uzuri wa solarised water borehole.	Noted
Paul Kerio-Head teacher, local primary school. Kuna watu wenu wa REA wamekuja mara kama tatu, proposing about government plan to get land to install many power panels to light up the school and whole town. We even surveyed and put beacons on the land parcel. Is this the same programme?	Yes it is
Elizabeth Nakuon (Woman) Mimi ningependekeza hivi- wakati tunafanya site identification we must be careful especially if facility is being located in a school- it might injure children. Greatest challenge, any time projects are being brought in this area, most projects don't benefit us. Why in turkana isn't there a project that gives the community 10% as future earnings/loyalty? Even power will be purchased	Noted

MIN 6.0 Focus Group Discussions

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

FGD-MEN

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

Kioko them the FGD was a good avenue for the elders to express their opinions and freely ask any questions they might not have been unable to ask in front of the youth and women, He said that at the end of the FGD discussion the group should come into consensus on issues

discussed in the earlier meeting and select a representatives to the GRC. During the meeting the Men agreed to voluntary land donation and selected the following as their representatives in the GRC;

QUESTIONS AND ANSWERS FGD MEN

Albert Mio (Men) **Wakati hii mradi umefanywa na kumalizika na after time mkaza itokee, accident, etc- will there be compensation- natural or man made.**	**We don't anticipate any calamities. But in case it happens, the operator will advice**
Peter Lochampa (Men) Tumepewa stima hii stima wakati tumepewa tumeskia ni lazima tupate mtaalamu mwenye amesomea wiring ndio atengeneze kwa nyumba. Sasa sisi apa hatuna mtaalamu anayejua kazi ya stima. Kwa nini contractor wakati anajenga laini kwa nini kama nimelipa 1000 contractor awezi nifanyia wiring?	There are many qualified technicians. Premise wiring is individual responsibility
Nalipose Mamaret Kuna token kidogo ya wazee?	No

Members nominated by men to the GRC

Name	ID number	Telephone number
Abdifatah kapua	20223815	0711694385
Albert mio	14448449	0701148083

FGD WOMEN

A focus group discussion was held with women. The main objective of this discussion was to gauge whether the women had understood the project and its requirements and to provide them an opportunity to air their issues/give their opinions on the project. Myra explained to the women that it was important to hold a separate discussion with them so that they have opportunity to freely express themselves as this may have not been possible in the Baraza. The women were allowed time to ask questions, give suggestions and or seek clarifications.

From the questions in the group, it was clear that they had not understood the issue. Myra then explained that the meeting was to clarify any issues about the project on environmental and social issues as well as request land donation from the community. She explained further that the Ministry wanted land for was to construct a solar minigrid. She explained further that they should select women representatives for women to cater for their respective issues.

QUESTIONS AND ANSWERS FGD WOMEN

Name of Person making the contribution (e.g. comment or question)	**Question, Comment, Suggestion**	**Feedback/Responses by project team**	**Response by agency on how feedback will be used or acted upon**
Elizabeth Akai	When the electricity comes it will be very good because it can reduce the costs for posho mill (making maize flour)	Myra responded that this is true as it will be cheaper than diesel	
Sarah Esilan	We are happy with the electricity. There will be more security. We have done some basic training on diesel generators. We have also received some basic training on solar and would like more training	Myra responded that this is noted and we will take the feedback to our managers	Ministry should consider training of communities on maintenance of the minigrids for sustainability

Myra requested that they elect 2 women to the GRC.

The women elected were;

Name	ID number	Telephone number
Sarah Esilan		0706912873
Elizabeth Akai	8500698	0711439536

FGD YOUTH

The youth had no questions and went when asked to nominate members to the GRC they proposed the following:

Name	ID number	Telephone number
Emukuria n. kaleng	29759541	0705059900
Gladys l. ewon	35716026	0711161647

8.0 Review of feedback from FGDs by all community members.

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

The community nominated the following as members of the GRC:

No	Name	Design.	1D No.	Mobile No.
1	Abdifatah kapua	MEN	20223815	0711694385
2	Albert mio	MEN	14448449	0701148083
3	Sarah Esilan	WOMEN		0706912873
4	Elizabeth Akai	WOMEN	8500698	0711439536
5	Emukuria n. kaleng	YOUTH	29759541	0705059900
6	Gladys l. Ewon	YOUTH	35716026	0711161647

APPENDIX 5

ABBREVIATED RESETTLEMENT ACTION PLAN (A-RAP)

1. Kaikor Sub-project Site

The Kaikor sub-project site is on unregistered community land and held in trust by the County Government of Turkana on behalf of the community, in line with the Community Land Act 2016. The proposed site is uninhabited, has no structures, community facilities, or encumbrances. Consultations leading to the identification and selection of the sub-project site are captured in the Environmental and Social Screening report for *Kaikor Refer to Chapter 4 of the ESIA for the comprehensive socio-economic profile*.

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

The number of project-affected persons (PAPs) is 6633 (approximately 1026 households). The land acquisition-related impacts are loss of land and pasture. Mitigation measures include in-kind compensation for loss of land and pasture, and designing power distribution lines to avoid impacting trees, crops, structures, and community facilities. No physical displacement is anticipated; however, there is minimal loss of pasture occasioned by the acquisition of land utilized by the community for grazing. The 1.267 Hectares identified for the sub-project will be acquired compulsorily by the National Land Commission (NLC). The proposed site will be valued and compensated in line with the provisions of the Resettlement Policy Framework (RPF) prepared under KOSAP. *Refer to section 2.1 of the ESIA for* social-economic Environment.

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

The proponent requested the community identify three priority projects, whereby one out of the three would be provided as in-kind compensation for loss of land and pasture. The community proposed two areas of compensation namely: Construction of additional classrooms in Loitanit Primary school and Water reticulation to the dispensary at Kaikor. The value of the priority community project will be proportional to or higher than the value of land under acquisition. In addition, loss or damage to crops, trees, structures, and community facilities will be compensated in line with the provisions of the RPF, and as summarized in the entitlement matrix below.

3.1 Entitlement Matrix

Types of Impact	Person(s) Affected/Eligible for Compensation	Compensation/Entitlement/Benefits	Responsible organization
1. Loss of Land			
Loss of unregistered community land.	Community.	Compensation in-kind as prioritized by the community.	REREC
Loss of land in unregistered group ranches.	Group ranch members.	Compensation in-kind as prioritized by the community.	

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

		replacement cost,[1] in line with the provisions of the RPF.	

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

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

4.1 Engagement of Project -Affected Persons (PAPs)

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

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

4.2 Identification of Community Representatives

The Shantabak Locational Grievance Redress Committee (LGRC), constituting a chairperson, secretary, and three members, was formed through community consensus. The committee's membership comprises men, women, youth, persons with disabilities, and ethnic minorities. The LGRC is responsible for engaging PAPs and resolving complaints. Refer to Chapter 6 of the ESIA on the Grievance Redress Committees. Further, the community will constitute the A-RAP Implementation Committee responsible for coordinating community engagements on the A-RAP and monitoring the implementation and closure of the A-RAP. The representation of the committee will consider gender, vulnerability, and intergenerational sensitivities.

Figure 1:

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

4.3 Summary of Consultations on Land Acquisition and Compensation Options

Date	Objective	Implementing Entities	Land Acquisition and Compensation Aspects Discussed	Key Issues Raised	Responses Given
March 15th 2021	Environmental and Social Screening. Voluntary land donation (VLD). Constitution of the Locational Grievance Redress Committee (GRC).	Ministry of Energy (MoE) Kenya Power (KPLC) Rural Electrification and Renewable Energy Corporation (REREC)	Site identification and land allocation for the sub-project. Criteria for VLD. Community entitlements (forms of compensation and implications for each).	1.Kuna watu wenu wa REA wamekuja mara kama tatu, proposing about government plan to get land to install many power panels to light up the school and whole town. We even surveyed and put beacons on the land parcel. Is this the same programme? 2.Land umesema ardhi ni ya community, sasa ile wakati tumewapea shamba kuna kitu mnarudisha kwa jamii kama land lease?	Yes, it's Connection fee is reduced, 1000 instead of 15000.
January 17th 2022	Environmental and Social Impact Assessment.	Consultants MoE KPLC REREC	Land acquisition through compulsory acquisition (not voluntary land donation). Selection of three priority community projects, whereby one is to be implemented as in-kind compensation for land.	Community requested for Construction of additional classrooms in Loitanit Primary school.and Water reticulation to the dispensary at kaikor	The proponent has set aside KES 1 million to implement the priority in-kind compensation project. The value of the project will be proportional to or greater than the value of land. NLC will determine the value of land.
May 2023	Compulsory Land Acquisition.	NLC	Site inspection and inquiries. Land valuation.		

			Award of compensation.		

5. Institutional Responsibility for Implementation of the ARAP

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

6. Procedures for Grievance Redress

The Project procedures for grievance redress were established through a public consultation process and informed by the existing conflict resolution structures in the community. The Grievance Redress Mechanism (GRM) comprises tiers at the project, county, and national levels. *Refer to Chapter 7.6.9 of the ESIA for a detailed GRM.*

7. Implementation Timetable and Budget for the ARAP Implementation

7.1 Timelines

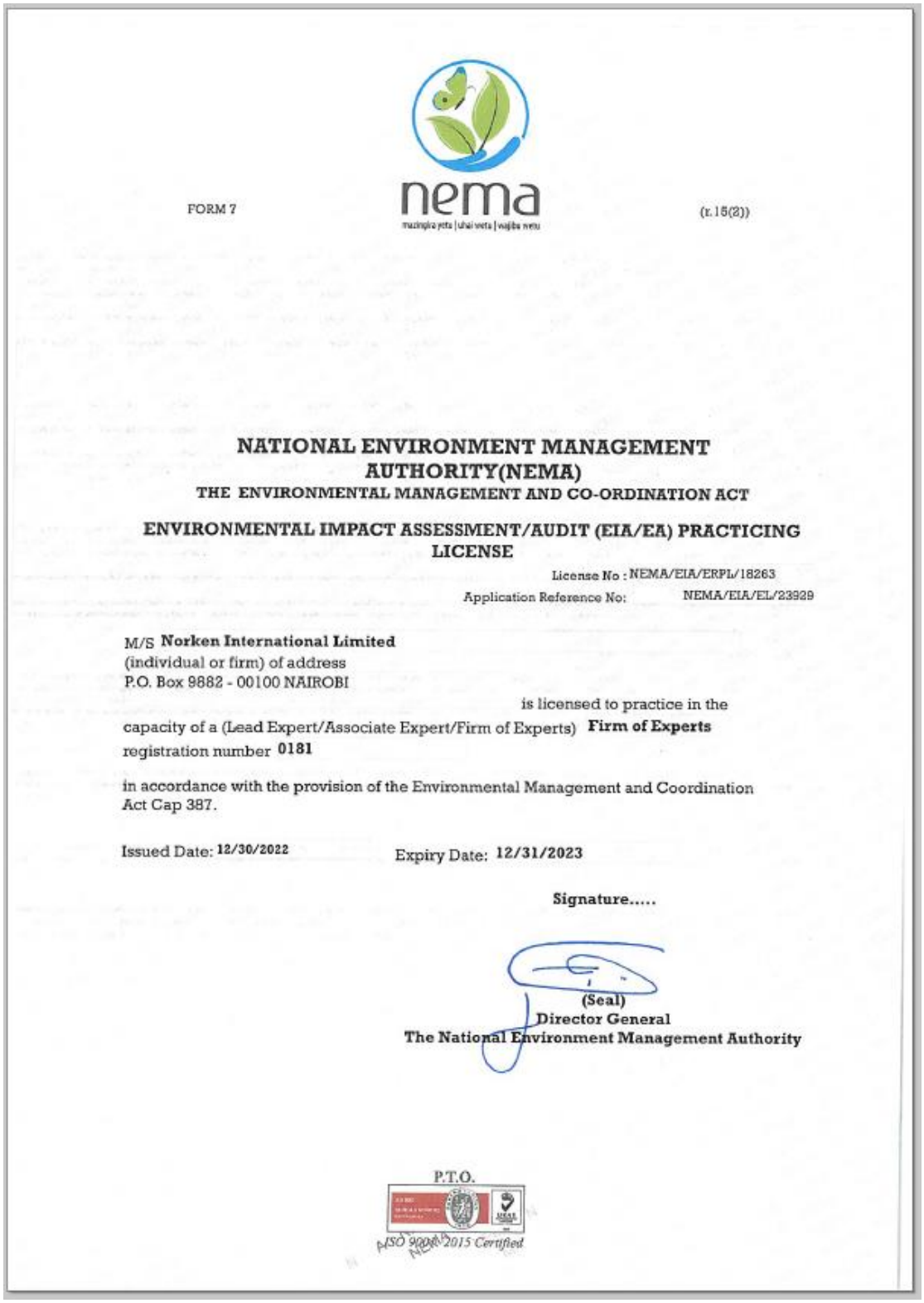
The proponent will commission the community project by May 25th, 2025, before operationalizing the mini-grid. The mini-grid contractor will implement the mini-grid and the community project simultaneously. The Supervision Consultant and IAs will implement a commitment register to ensure the mini-grid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

7.2 Budget

The proponent has set aside KES 1 million for the community project (budget captured in the ESMP). The compensation award from NLC and the Bill of Quantities will inform the final

cost of the community project. The costs for in-kind compensation, stakeholder engagement, grievance management (including the facilitation of the GRCs and the A-RAP Implementation Committee), and monitoring are covered under the project.

APPENDIX 6 – NEMA LICENCES



FORM 7 (r. 15(2))

nema
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NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY(NEMA)

THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT

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

License No : NEMA/EIA/ERPL/18263

Application Reference No: NEMA/EIA/EL/23929

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

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

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

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

Signature.....

(Seal)
Director General
The National Environment Management Authority

P.T.O.

ISO 9001:2015 Certified

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NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY(NEMA)

THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT

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

License No : NEMA/EIA/ERPL/18279

Application Reference No: NEMA/EIA/EL/23951

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

registration number **1893**

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

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

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