

Language: English
Original: English



AFRICAN DEVELOPMENT
BANK GROUP

PROJECT: KOPERE SOLAR PARK POWER PROJECT IN KISUMU DISTRICT, NANDI COUNTY KENYA

COUNTRY: REPUBLIC OF KENYA

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT SUMMARY

Date: September, 2018

Appraisal Team	Team Leaders: N. Kinoshita (chief Investment Officer) J. Jakoet (Senior Investment Officer RDGE1), F. Mohamed (Consultant) Team Members: F. Oku, Senior Environmental Specialist RDGE Divisional Manager: Aida Ngom Sector Director: Wale Shonibare Regional Director: Gabriel Negatu
----------------	---

**ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT [ESIA]
SUMMARY**

Project Title: KOPERE SOLAR POWE PROJECT	Project Number: P-KE-FF0-001
Country: KENYA	Department: PESR
Division: PESR2	Project Category: 2

1. INTRODUCTION

The Project to be supported by the Bank project involves the Design, construction and operation of a 50 MWp (40 MWac net capacity) solar PV power project, 5 km from the center of Kopere in Kisumu District, Nandi County, Kenya under a 20-year ‘take or pay’ PPA. The project falls under the Renewable Energy Feed-in-Tariff (FiT) policy in Kenya.

The project also involves the construction of a 33/132 kV substation and a 1.8 km transmission line with a way-leave of 40 m (20 m on either side of the line) connecting to the existing 132 kV Lessos-Muhoroni transmission line at Pylon 87 to evacuate the electricity to the national grid via an existing 132 kV high voltage network operated by Kenya Power and Lighting Company (KPLC). The transmission line cross Blocks 31 and 42 (Annex I), and an easement agreement for this line is in place (as of June 2018) with the private landowners. The project site was previously designated as agricultural land, but a change in land use application approved by the Director of Physical Planning: Nandi County, in August 2016, now recognizes this land as mixed use (light industrial Solar Park and agriculture).

The Project is to be built, owned and operated by Voltalia S.A, who hold 100% of the SPV (Kopere Solar Park Ltd) and will act as the EPC contractor. Voltalia is an experienced international integrated renewable energy developer based in Paris with a track-record of over 700 MW of projects developed. The Project will use a horizontal single-axis tracking system. The operations, management and supervision of the Project will be undertaken primarily by employees either recruited specifically for the Project or seconded from Voltalia.

This ESIA summary highlights the key environmental and social (E&S) assessment and management plans designed by Voltalia to ensure the proposed project component activities comply with both Kenyan and the African Development Bank’s E&S policy requirements.

2. POLICY LEGAL AND ADMINISTRATIVE FRAMEWORK

The ESIA has been carried out in accordance with applicable environmental, social and power sector policies, standards, regulations and legislation in Kenya, relevant international conventions and standards as well as E&S Operational Safeguards of the African Development Bank. These include but not limited to Policy Paper on Environment and Development (Sessional Paper No 6 of 1999), Vision 2030, National Policy on Water Resources Management and Development, 1999, The Constitution of Kenya, Energy Act, 2006, Environmental Management and Coordination Act, 1999, Environmental (Impact Assessment and Audit) Regulations, 2003, Environmental Management and Coordination (Water Quality)

Regulations, 2006, The Environmental Management and Coordination (Waste Management) Regulations, 2006, Environmental Management and Coordination Act (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009, Wildlife (Management and Conservation) Act 2013, Forestry Services Act, 2005, Land Act, 2012, National Land Commissions Act, 2012, Land and Environment Court Act, 2011, Land Registration Act, 2012, Water Act, 2002, Water Quality Regulations, 2006, Water Resources Management Rules (2007), Public Health Act (Cap 242), Public Health (Drainage and Latrines) Rules, Cap 130, 1958, Physical Planning Act, 1996, Occupational Safety and Health Act, 2007, Employment Act No 11 of 2007.

AfDB's Operational Safeguard Review

The project has been assigned a category 2 rating because the potential environmental and social impacts associated with the solar power generating source are not significant, site specific and can be managed by a robust Environmental and Social management Plan (ESMP). The clean and renewable power generating source supersedes the category 1 rating for 30MW generating threshold within the Integrated Safeguard System (ISS). Consequently Operational Safeguards (OS) 1 on Environmental Assessment have been triggered because the component activities have the potential to generate environmental and social impacts to identified receptors within the project's area of influence. Operational Safeguard (OS2) has also been triggered to help address the impacts to livelihood to 26 Project Affected Persons who undertake subsistence farming on the privately owned project land. The project activities do not however result in the involuntary acquisition and/or restriction of land, assets, or and/or local natural resources. OS 4 on Pollution Prevention and Hazardous Substances is triggered since construction will involve use of fuels and possibly some hazardous materials. OS 5 on Labor, Working Conditions, Occupational Health and Safety is applicable since the construction will involve a significant number of construction workers.

3. PROJECT DESCRIPTION AND JUSTIFICATION

Kopere Solar Park Ltd is an SPV set up to develop a Greenfield 40MW solar PV plant in Kopere, Nandi County in Western Kenya. The Project is proposed to be sited on 158 hectares of land leased through two private owners. The land reference is Songhor/ Songhor/ Blocks 20 and 26 (Nyaroche Farm) in the Nandi County of Kenya (See Annex I). Kopere Solar Park has entered into a long-term lease agreement with the land owners. The land to be developed was previously used for sugarcane farming, but is now largely fallow (save for some subsistence agriculture currently ongoing on the land).

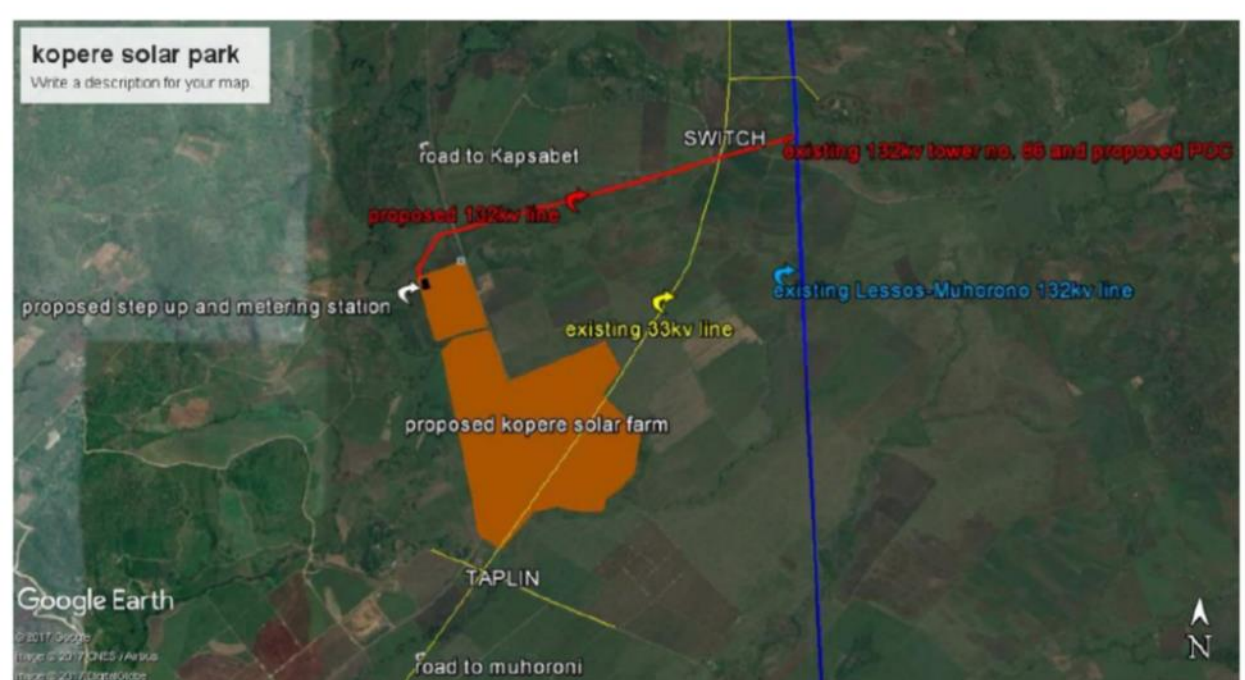
The Project comprises installation of 40MW (AC) of solar panels, a 50 kVa 33/132 kV step-up substation, and a 1.8km double circuit 132 kV transmission line, with a way-leave of 40 m (20 m on either side of the line) connecting to the existing 132 kV Lessos-Muhoroni transmission line at Pylon 87. The solar farm and substation will be fenced. The Project Area refers to the 100 hectares fenced area within which the solar park will be located, as well as the footprint of the substation and transmission line way leave.

The transmission line cross Blocks 31 and 42, and an easement agreement for this line is in place (as of June 2018) with the private landowners. The land was previously designated as agricultural land, but a change in application approved by the Director of Physical Planning: Nandi County, in August 2016, now recognizes this land as mixed use (light industrial (Solar Park) and agriculture). The existing Lessos-Muhoroni 33 kv distribution will also be relocated alongside the road as part of the Project. The general layout of project, as a whole is shown in Figure 3.1 overleaf and Annex I of this Report.

The Project is to be built, owned and operated by Voltalia S.A, who hold 100% of the SPV – Kopere Park Ltd (KSP) - and will act as the EPC contractor. The key planned activities associated with the Project will include, but are not limited to:

- Construction of the Project, commencing in early 2019, with the construction period expected to take approximately one year. Construction activities include:
 - ✓ Vegetation clearance and ground preparation.
 - ✓ Construction/ upgrading of on-site access roads.
 - ✓ Relocation of the Lessos-Muhoroni 33 kv distribution line to be positioned alongside the road.
 - ✓ Erection of the security fence around the solar farm site boundary.
 - ✓ Minor levelling and grading of the areas where the solar arrays are to be installed.
 - ✓ Levelling of temporary hard-standing areas.
 - ✓ Installation of solar trackers and mounting the solar panels using steel structures.
 - ✓ Construction of sub-station and 1.8 km transmission line within the Project area.
- Commissioning of the Project expected in early 2020.
- Operation of the Project is over 20 years.
- Decommissioning of the Project.

Figure 3.1: Technical Design Layout plan for the project



The project does not intend to construct temporary workforce accommodation for construction workers on site. KSP Project plans to employ workers from the local area and / or to transport employees in from nearby urban centers. It is estimated that up to 200 skilled and unskilled workers will be required over a 12 month period during construction, and approximately 20 will be required during operations development phase.

Justification of the Project:

Kenyan installed power generation capacity is actually 1,591 MW, dominated by hydroelectricity (49%), geothermal (29%) and diesel (21%), although increasing demand and the volatility of the hydroelectric generation are leading to a surge in the diesel based generation. Kenya's Climate Action Plan sets a low carbon development strategy that considers the renewable energy generation sector as one base option for the country. Although geothermal is the most promising renewable energy source, Kenya also has an excellent solar resource (about 2.160 kWh/m²/year of solar horizontal irradiation). Therefore the client proposes to venture into this untapped natural renewable resource. Returns from the proposed investment will be obtained from the sale of the generated solar energy to the national grid of 99,275 MWh/year. This is in line with the new "feed in tariff" policy which took effect in January 2013. As per the policy document, suppliers of solar power to the national grid will earn (\$0.12) per kilowatt hour (kWh).

The proponents considered not only its technical and financial feasibility, but also its own bet on bringing to the local Kenya people significant improvement in power supply, an opportunity for training in installation, operation and maintenance of utility scale PV plants. The project through the generation of electricity will stimulate other local economic activities. It will also assist the Government in its policy of employment creation, enhancing and promoting Green energy projects in line with Vision 2030 and providing satisfactory returns to the development partners and the Kenyan economy as a whole.

4. DESCRIPTION OF THE PROJECT ENVIRONMENT

There are two streams, including the Kipsiwa River that flows along the western boundary of blocks 20 and 26, and a tributary of the Anapi Ngetuny River, which dissects the south-western corner of block 20 (See Annex I for site layout). A national tarmac road, the Kimwani-Kopere road, bisects the site into two parts. A sugarcane weighbridge, belonging to the West Kenya Sugar Cane Company Ltd, is located to the north-east, adjacent to the proposed Project site. An artificial drainage channel runs from the road westwards and through the farm, draining into the Nyando River. Human settlements are also located within the site and surrounding areas, particularly to the south, but not in the specific proposed area for the Project. To the south and east of the proposed project are private sugar farms, which are largely not productive and now utilized by land occupiers who practice subsistence agriculture.

On site there is a high tension overhead powerline cutting through the Eastern portion of parcel 20. On the Eastern side of the highway reserve, there lies an underground fiber optic cable line laid by the Ministry of Information, Communication and Technology.

The main food crops produced in the region are maize, beans, cow peas, potatoes and cabbages which cover a total of 125, 756 Ha. The main cash crops are tea, coffee and sugar cane. The cash crop covers a total of 26290Ha. Illegal charcoal burning and firewood sale is also practiced within the project area.

The county's inter-censal growth rate stands at 3.1 percent which is slightly higher than the national growth rate of 3.0 percent. There is a disproportionately higher concentration of the population between the ages of 0-9 years (31.7 percent) which explains the high population growth rate. There will be need for massive investment in maternal, child health care services and early childhood education as well as intensive family planning initiatives to cater for this age group.

The hilly and undulating topographical features of Nandi County coincide with a spatial distribution of ecological zones that define the agricultural and overall economic development potential of the area. The Northern parts receive rainfall ranging from 1,300mm to 1,600mm per annum. The Southern half is affected by the lake basin atmospheric conditions receiving as high as 2,000mm per annum.

5. PROJECT ALTERNATIVES

The ESIA considered project alternate analyses including the No project alternative, site locations, different power generating sources and design of the solar modules. Overall, the introduction of 40MW in the Kenyan grid will aid towards alleviating power outages, especially during the dry seasons, and help to reduce the country heavy reliance on the power production from the oil and diesel power generators as well as contribute towards the envisioned additional 5000MW electricity generation by 2030. The current design of the KSP Project was deemed to be the most economically, technically and environmentally sustainable option under all the options considered.

6. POTENTIAL IMPACTS

The following potential positive and negative environmental and social impacts are anticipated throughout the different project development phases;

i. Positive Impacts

During construction, the key positive impacts will be creation of skilled and unskilled employment opportunities for an estimated 200 staff for a period of about 12 months; income generation activities to the local communities through sale of local construction materials and food by women; improvement in local economy from increased trade activities and potential diffusion and transfer of communication and knowledge from specialist construction staff to the local participants.

During operation phase, the most significant positive impact of the project will be the realization of its objective by injecting additional 40 MW of electric energy into the national grid. This will enhance the country's energy supply and security through a relatively more environmentally friendly energy generation process. Similarly, it is in line with enabling the energy sector make strides towards the policy directions envisaged in the Vision 2030.

Further, the operation phase is anticipated to create 20 direct permanent job opportunities in the plant management and maintenance and numerous other indirect opportunities.

ii. Negative Impacts

The proposed project will be associated with a number of negative impacts both during construction and operation phases. At the construction phase, major impacts will be common construction environmental health and safety issues including: limited vegetation clearance within the project plant area to be replaced by infrastructure; generation of construction dust, occupational and general public safety and health hazards emanating from construction road traffic. Other potential negative impacts include:

- Impact from materials quarry sites;
- Construction waste generation;
- Potential spread of HIV/AIDs and other Sexually Transmitted Infections;

- Impacts on Soils
 - ✓ Soil erosion and increased sedimentation
 - ✓ Soil pollution
 - ✓ Soil compaction;
- Visual and landscape impacts; and
- Pressure of existing water Resources

The project will be developed on a 157.666 ha greenfield site in Kopere, Nandi County in Western Kenya, on privately owned land (although approx. 100 ha will be under solar panels). The land leased by the company was previously classified as agricultural land but a change in land use application approved by the Director of Physical Planning: Nandi County, in August 2016, now recognizes this land as mixed use (light industrial Solar Park and agriculture).

No project related land uptake resulting in physical displacement requiring resettlement is envisaged. However there are 26 economically displaced Project Affected Peoples (PAPs) who have been identified as land users (subsistence farmers), farming in the Project area. Agreement has been reached with these PAPs not to commence anymore planting after harvesting their seasonal crops on the land this year. The Transmission line is also on privately owned land and is the subject of an easement agreement which has been secured. There are no permanent dwellings within the Project area; there is, however, part of the leased land that has occupied worker housing provided by the landowner. There are no current plans for the Project to use this specific piece of land, so the Project will not result in physical displacement.

Climate Change

Based on the vulnerability analysis conducted by the Bank's Climate Safeguard System, the project has been classified Category 2 which requires a review of its climate change risks and adaptation measures. Practical risk management and adaptation options shall be integrated into the project design and implementation plans.

7. ENVIRONMENTAL MANAGEMENT PLAN (ESMP)

The Project has undertaken various forms of Environmental and Social Impact Assessment (ESIA) for the proposed project and obtained approval from National Environmental Management Authority (NEMA License and Conditions of Approval of June 2016) as listed below;

- Environmental and Social Due Diligence Draft Report by ERM, September 2018.
- AWEMC ESIA Addendum of January 2018
- ESIA Report of March 2016 by AWEMC
- AECOM Environmental and Social Evaluation Report of September 2016 (including a summary Environmental and Social Action Plan (ESAP))
- AECOM Environmental and Social Management Plan (ESMP) of January 2017
- AWEMC Socio-Economic Survey of January 2018
- AWEMC Climate Risk Assessment Report of February 2018
- AWEMC Cumulative Impact Assessment of February 2018
- AWEMC Landscape and Visual Impact Assessment Report of February 2018

To manage the identified environmental and social impacts from the project's component activities, a framework management plan *The framework Environmental and Social Management Plan (AECOM, 2017)* has been developed which needs to be further updated into project specific level ESMPs for both the Construction and Operational phases of the project. Table 7.1 overleaf provides a summary of the framework ESMP;

Table 7.1: Environmental and Social Management Plan (ESMP)

Environmental and Social Aspects	Recommended mitigation and/ or management measure	Responsibility for Implementation	Cost (KES)
<i>Construction phase ESMP</i>			
Land Use & Cover Change During Construction of Right-of- Way	<ul style="list-style-type: none"> ○ Site transmission and distribution rights-of-way, access roads, lines, towers, and substations to avoid critical habitat through use of existing utility and transport corridors for transmission and distribution, and existing roads and tracks for access roads, whenever possible. ○ Installation of transmission lines above existing vegetation to avoid land clearing. ○ Avoiding use of machinery in the vicinity of watercourses. ○ Avoiding clearing vegetation in riparian areas. 	Contractor and resident Engineer	0,00
Avian and Bat Collisions and Electrocutions	<ul style="list-style-type: none"> ○ Considering the installation of underground transmission and distribution lines in sensitive areas (e.g. critical natural habitats). 	Proponent and Contractor	300,000
Insulating Oils and Fuels Contamination	<ul style="list-style-type: none"> ○ Replacing existing transformers and other electrical equipment containing PCB, and ensuring appropriate storage, decontamination, and disposal of contaminated units. ○ Prior to final disposal, retired transformers and equipment containing PCB should be stored on a concrete pad with curbs sufficient to contain the liquid. ○ Contents of these containers should they be spilled or leaked. The storage area should also have a roof to prevent precipitation from collecting in the storage area. Disposal should involve facilities capable of safely transporting and disposing of hazardous waste containing PCB. ○ Surrounding soil exposed to PCB leakage from equipment should be assessed, and appropriate removal and / or remediation measures should be implemented 	Proponent and Contractor Contractor and Resident Engineer	400,000
Soil Erosion	<ul style="list-style-type: none"> ○ Vegetate areas with loose soil 	Contractor	50,000
Water Quality	<ul style="list-style-type: none"> ○ Ensure proper management and conservation of the available water resources 	Proponent/Contractor	0,00
Live Power Lines	<ul style="list-style-type: none"> ○ Only allowing trained and certified workers to install, maintain, or repair electrical equipment. ○ Deactivating and properly grounding live power distribution lines before work is performed on, or in close proximity, to the lines. ○ Ensuring that live-wire work is conducted by trained workers with strict adherence to specific safety and insulation standards. Qualified or trained employees working on transmission or distribution systems should be able to achieve the following: <ul style="list-style-type: none"> ▪ Distinguish live parts from other parts of the electrical system ▪ Determine the voltage of live parts ▪ Understand the minimum approach distances outlined for specific live line voltages ▪ Ensure proper use of special safety equipment and procedures when working near or on exposed energized parts of an electrical system. ○ Workers should not approach an exposed energized or conductive part even if properly trained unless: <ul style="list-style-type: none"> ▪ The worker is properly insulated from the energized part with gloves or other approved insulation; or, ▪ The energized part is properly insulated from the worker and any other conductive object; or, ▪ The worker is properly isolated and insulated from any other conductive object (live-line work). ○ Where maintenance and operation is required within minimum setback distances, specific training, safety measures, personal safety devices, and other precautions should be defined in a health and safety plan. ○ Minimum hot stick distances may only be reduced provided that the distance remaining is greater than the distance between the energized part and a grounded surface. 	Contractor and Resident Engineer	0,00

Environmental and Social Aspects	Recommended mitigation and/ or management measure	Responsibility for Implementation	Cost (KES)
	<ul style="list-style-type: none"> ○ Workers not directly associated with power transmission and distribution activities who are operating around power lines or power substations should adhere to local legislation, standards, and guidelines relating to minimum approach distances for excavations, tools, vehicles, pruning, and other activities. ○ Safety belts should be of not less than 16 millimeters (mm) (5/8 inch) two-in-one nylon or material of equivalent strength. Rope safety belts should be replaced before signs of aging or fraying of fibres become evident. ○ When operating power tools at height, workers should use a second (backup) safety strap. ○ An approved tool bag should be used for raising or lowering tools or materials to workers on structures ○ Provision must be made for persons to be trained in first aid, with a certificate issued by a recognized body. 	Contractor and Resident Engineer	117,000,00
Visual Pollution	<ul style="list-style-type: none"> ○ Extensive public consultation during the planning of power line and power line right-of-way locations. ○ Siting power lines, and designing substations, with due consideration to landscape views and important environmental and community features ○ Location of high-voltage transmission and distribution lines in less populated areas, where possible. ○ Burying transmission or distribution lines when power must be transported through dense residential or commercial areas. 	Proponent, Contractor and Resident Engineer	370,000
Insecurity	<ul style="list-style-type: none"> ○ Ensure the general safety and security at all times by providing day and night security guards and adequate lighting within and around the construction site. ○ Body-search the workers on entry, to avoid getting weapons on site, and leaving site to ensure nothing is stolen. ○ Ensure only authorized personnel get to the site ○ Installation of security lights to improve security of workers accessing and leaving the site early in the morning and at night respectively. ○ Proposed project offices should be located near Mberere centre due to close proximity with the police station 	Proponent, Contractor and Resident Engineer	100,000
Spread of diseases	<ul style="list-style-type: none"> ○ Conduct HIV/AIDS campaigns and education ○ Provide Condoms to workers and community members 	Proponent	200,000
Socio-Economic and Cultural Changes	<ul style="list-style-type: none"> ○ Conduct CSR activities within the area such as provision of drinking water ○ Prioritize the employment of locals ○ Allow the locals to use the adjacent lands for grazing and farming 	Proponent	250,000
Community Conflict	<ul style="list-style-type: none"> ○ Ensure the local community members are involved in construction activities through provision of skilled and semi-skilled jobs. ○ Balance the jobs offered amongst the two predominant communities (Luo and Kalenjin) to avoid conflict of perceived favoritism. Where portfolio balance is not achieved due to an extra slot, the position should be granted to a member of a different community from the two. ○ Appoint preferably 2 liaison officers to handle community related issues and conflicts occasionally with the involvement of clergy. 	Proponent and Contractor	60,000
Operation phase ESMP			
Land Use & Cover Change During Right-of- Way Maintenance	<ul style="list-style-type: none"> ○ Implementation of an integrated vegetation management approach (IVM). The selective removal of tall-growing tree species and the encouragement of low growing grasses and shrubs is the common approach to vegetation management in transmission line rights-of way. Alternative vegetation management techniques should be selected based on environmental and site considerations including potential impacts to non-target, endangered and threatened species. ○ Removal of invasive plant species, whenever possible, cultivating native plant species. ○ Scheduling activities to avoid breeding and nesting seasons for any critically endangered or endangered wildlife species. ○ Observing manufacturer machinery and equipment guidelines, procedures with regard to noise, and oil spill. 	Proponent	20,000
Fire Risk	<ul style="list-style-type: none"> ○ Monitoring right-of-way vegetation according to fire risk. 	Proponent and	210,000

Environmental and Social Aspects	Recommended mitigation and/ or management measure	Responsibility for Implementation	Cost (KES)
	<ul style="list-style-type: none"> ○ Removing blowdown and other high-hazard fuel accumulations. ○ Time thinning, slashing, and other maintenance activities to avoid forest fire seasons ○ Disposal of maintenance slash by truck or controlled burning. Controlled burning should adhere to applicable burning regulations, fire suppression equipment requirements, and typically must be monitored by a fire watcher ○ Planting and managing fire resistant species (e.g. hardwoods) within, and adjacent to, rights-of-way. ○ Establishing a network of fuel breaks of less flammable materials or cleared land to slow progress of fires and allow firefighting access 	Contractor	
Avian and Bat Collisions and Electrocutions	<ul style="list-style-type: none"> ○ Maintaining 1.5 meter (60-inch) 11 spacing between energized components and grounded hardware or, where spacing is not feasible, covering energized parts and hardware. ○ Retrofitting existing transmission or distribution systems by installing elevated perches, insulating jumper loops, placing obstructive perch deterrents (e.g. insulated” V’s”), changing the location of conductors, and / or using raptor hoods. ○ Installing visibility enhancement objects such as marker balls, bird deterrents, or diverters 	Proponent and Contractor	140,000
Exposure to Electric and Magnetic Fields	<ul style="list-style-type: none"> ○ Evaluating potential exposure to the public against the reference levels developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). Average and peak exposure levels should remain below the ICNIRP recommendation for General Public Exposure. ○ Considering siting new facilities so as to avoid or minimize exposure to the public. Installation of transmission lines or other high voltage equipment above or adjacent to residential properties or other locations intended for highly frequent human occupancy, (e.g. schools or offices), should be avoided. ○ If EMF levels are confirmed or expected to be above the recommended exposure limits, application of engineering techniques should be considered to reduce the EMF produced by power lines, substations, or transformers. Examples of these techniques include: <ul style="list-style-type: none"> ▪ Shielding with specific metal alloys 20 ▪ Burying transmission lines²¹ ▪ Increasing height of transmission towers ▪ Modifications to size, spacing, and configuration of conductors 	Proponent and Contractor	310,000
Insulating Oils and Fuels Contamination	<ul style="list-style-type: none"> ○ Replacing existing transformers and other electrical equipment containing PCB, and ensuring appropriate storage, decontamination, and disposal of contaminated units. 	Proponent and Contractor	300,000
Pesticides Contamination	<ul style="list-style-type: none"> ○ Provide those responsible for deciding on pesticides application with training in pest identification, weed identification, and field scouting. ○ Use mechanical weed control and / or thermal weeding. ○ Support and use beneficial organisms, such as insects, birds, mites, and microbial agents, to perform biological control of pests. ○ Protect natural enemies of pests by providing a favorable habitat, such as bushes for nesting sites and other original vegetation that can house pest predators. ○ Use animals to graze areas and manage plant coverage ○ Use mechanical controls such as traps, barriers, light, and sound to kill, relocate, or repel pests. 	Proponent	160,000
Exposure to Live Power Lines	<ul style="list-style-type: none"> ○ Only allowing trained and certified workers to install, maintain, or repair electrical equipment. ○ Deactivating and properly grounding live power distribution lines before work is performed on, or in close proximity, to the lines; ○ Ensuring that live-wire work is conducted by trained workers with strict adherence to specific safety and insulation standards. Qualified or trained employees working on transmission or distribution systems should be able to achieve the following: 	Proponent	

Environmental and Social Aspects	Recommended mitigation and/ or management measure	Responsibility for Implementation	Cost (KES)
	<ul style="list-style-type: none"> ▪ Distinguish live parts from other parts of the electrical system ▪ Determine the voltage of live parts ▪ Understand the minimum approach distances outlined for specific live line voltages ▪ Ensure proper use of special safety equipment and procedures when working near or on exposed energized parts of an electrical system. ○ Workers should not approach an exposed energized or conductive part even if properly trained unless: <ul style="list-style-type: none"> ▪ The worker is properly insulated from the energized part with gloves or other approved insulation; or, ▪ The energized part is properly insulated from the worker and any other conductive object; or, ▪ The worker is properly isolated and insulated from any other conductive object (live-line work). ○ Where maintenance and operation is required within minimum setback distances, specific training, safety measures, personal safety devices, and other precautions should be defined in a health and safety plan. ○ Minimum hot stick distances may only be reduced provided that the distance remaining is greater than the distance between the energized part and a grounded surface. ○ Workers not directly associated with power transmission and distribution activities who are operating around power lines or power substations should adhere to local legislation, standards, and guidelines relating to minimum approach distances for excavations, tools, vehicles, pruning, and other activities. 		
Working at height on poles and structures.	<ul style="list-style-type: none"> ○ Testing structures for integrity prior to undertaking work. ○ Implementation of a fall protection program that includes training in climbing techniques and use of fall protection measures; inspection, maintenance, and replacement of fall protection equipment; and rescue of fall-arrested workers, among others ○ Establishment of criteria for use of 100 percent fall protection (typically when working over 2 meters above the working surface, but sometimes extended to 7 meters, depending on the activity). The fall protection system should be appropriate for the tower structure and necessary movements, including ascent, descent, and moving from point to point. ○ Installation of fixtures on tower components to facilitate the use of fall protection systems ○ Provision of an adequate work-positioning device system for workers. Connectors on positioning systems should be compatible with the tower components to which they are attached. ○ Hoisting equipment should be properly rated and maintained and hoist operators properly trained. ○ Safety belts should be of not less than 16 millimetres (mm) (5/8 inch) two-in-one nylon or material of equivalent strength. Rope safety belts should be replaced before signs of aging or fraying of fibers become evident. ○ When operating power tools at height, workers should use a second (backup) safety strap ○ Signs and other obstructions should be removed from poles or structures prior to undertaking work. ○ An approved tool bag should be used for raising or lowering tools or materials to workers on structures 	Proponent	217,000
Exposure to Electric and magnetic fields	<ul style="list-style-type: none"> ○ Training of workers in the identification of occupational EMF levels and hazards; exposure, limiting access to properly trained workers. ○ Identification of potential exposure levels in the workplace, including surveys of exposure levels in new projects and the use of personal monitors during working activities ○ Establishment and identification of safety zones to differentiate between work areas with expected elevated EMF levels compared to those acceptable for public use. ○ Implementation of action plans to address potential or confirmed exposure levels that exceed reference occupational exposure levels developed by international organizations such as the International Commission on Non-Ionizing Radiation Protection (ICNIRP), and the Institute of Electrical and Electronics Engineers (IEEE). Personal exposure monitoring equipment should 	Proponent and Resident Engineer	40,000

Environmental and Social Aspects	Recommended mitigation and/ or management measure	Responsibility for Implementation	Cost (KES)
	be set to warn of exposure levels that are below occupational exposure reference levels (e.g. 50 percent). Action plans to address occupational exposure may include limiting exposure time through work rotation, increasing the distance between the source and the worker, when feasible, or the use of shielding materials.		
Pesticides Contamination	<ul style="list-style-type: none"> ○ Train personnel to apply pesticides and ensure that personnel have received the necessary certifications, or equivalent training where such certifications are not required. ○ Respect post-treatment intervals to avoid operator exposure during re-entry to crops with residues of pesticides. ○ Ensure hygiene practices are followed (in accordance to FAO and PMP) to avoid exposure of family members to pesticides residues. 	Proponent	100,000
Electrocution	<ul style="list-style-type: none"> ○ Use of signs, barriers (e.g. locks on doors, use of gates, use of steel posts surrounding transmission towers, particularly in urban areas), and education / public outreach to prevent public contact with potentially dangerous equipment. ○ Grounding conducting objects (e.g. fences or other metallic structures) installed near power lines, to prevent shock. 	Proponent and Resident Engineer	340,000
Electromagnetic Interference	<ul style="list-style-type: none"> ○ Create transmission line rights-of-way and conductor bundles to ensure radio reception at the outside limits remains normal. 	Proponent	
Visual Pollution	<ul style="list-style-type: none"> ○ Accurate assessment of changes in property values due to power line proximity. 	Proponent and Valuer	50,000
Noise pollution	<ul style="list-style-type: none"> ○ Measures to mitigate this impact may be addressed during project planning stages to locate rights-of-way away from human receptors, to the extent possible. ○ Use of noise barriers or noise cancelling acoustic devices should be considered as necessary 	Proponent	50,000
Aircraft Navigation Safety	<ul style="list-style-type: none"> ○ Adherence to regional or national air traffic safety regulations. 	Proponent	
Community Conflicts	<ul style="list-style-type: none"> ○ Ensure the local community members are involved in construction activities through provision of skilled and semi-skilled jobs. ○ Balance the jobs offered amongst the two predominant communities (Luo and Kalenjin) to avoid conflict of perceived favoritism. Where portfolio balance is not achieved due to an extra slot, the position should be granted to a member of a different community from the two. 	Proponent and Contractor	60,000
Insecurity	<ul style="list-style-type: none"> ○ Proposed project offices should be located near Mberere centre due to close proximity with the police station. 	Proponent and Contractor	0,00
<i>Decommissioning Phase ESMP</i>			
Insulating Oils and Fuels Contamination	<ul style="list-style-type: none"> ○ Prior to final disposal, retired transformers and equipment containing PCB should be stored on a concrete pad with curbs sufficient to contain the liquid contents of these containers should they be spilled or leaked. The storage area should also have a roof to prevent precipitation from collecting in the storage area. Disposal should involve facilities capable of safely transporting and disposing of hazardous waste containing PCB. ○ Surrounding soil exposed to PCB leakage from equipment should be assessed, and appropriate removal and / or remediation measures should be implemented. 	Resident Engineer & Contractor	100,000
Wood Preservatives Contamination	<ul style="list-style-type: none"> ○ Undertake appropriate disposal of used poles. Landfill facilities should be capable of handling wastes that may have chemical leaching properties. Disposal through incineration or through recycling should consider associated air emissions and secondary product residues of preservative chemicals. 	Resident Engineer & Contractor	100,000

8. ENVIRONMENTAL AND SOCIAL MONITORING PROGRAM

The Environmental and Social Management Plan will be subject to monitoring. The monitoring plan is complementary to the audits, inspections and reporting activities defined in the framework for implementation of the ESMP as summarized in Table 7.1. Furthermore a detailed project specific Environmental and Social Action Plan (ESAP) shall be developed as part of an Environmental and Social Due Diligence (ESDD) to ensure effective monitoring of the ESMP throughout the project development phases.

The National Environment Management Authority (NEMA) Kenya is also mandated to conduct independent monitoring of all projects based on the approval conditions for the ESIA, while the Bank will conduct bi-annual supervision mission to monitor compliance to the ESMP requirements.

The loan agreement shall include legal undertaking to ensure effective implementation and monitoring of the ESMP and ESAP.

8.1 ESMP Implementation Arrangement and Training and Capacity Development

The following entities should be involved in the implementation of this ESMP as detailed out in the ESMP and ESMP Monitoring Tables above;

- KSP Senior Management;
- Project Manager;
- Contractor and Subcontractors;
- Environment, Safety and Health Department;
- NEMA;
- Project Consultant; and
- Nakuru County Government.

The Project shall undertake internal training and education activities to ensure that Project expectations regarding environmental and social performance are achieved and maintain an ESMP training matrix as follows;

ESMP Induction Training and Awareness: this training should be for visitors or individuals who do not have direct roles or responsibilities for implementing the ESMP, and should cover basic Project environmental and social commitments.

ESMP Management Training and Awareness: this training focuses attention on management, covering key aspects of the ESMP and providing an overview of the Project's environmental and social impact management expectations and the supporting processes and procedures prescribed in the ESMS to meet performance expectations.

ESMP Job-specific Training and Awareness: job-specific training should be provided to all personnel who have direct roles and responsibilities for implementing or managing components of the ESMP. This training should also include all people whose specific work activities may have an environmental or social impact.

Onsite, these provisions and responsibilities should apply to all contractors and subcontractors. Those responsible for performing site inspections should receive training by drawing on external resources as necessary. Upon completion of training and once deemed competent by management, staff will be ready to train other people. The Project will require each contractor to institute training programmes for their personnel. All contractors and their

Estimated Budget for ESMP Implementation

To effectively implement the mitigation and monitoring measures recommended in the ESMP, a total estimated cost of **USD\$ 4,044,000** has been budgeted (See Table 7.1) to be included within the Contractors costs for supervision. The cost of mitigation by the EPC Contractor shall be included in the contract as part of the project implementation cost.

9. PUBLIC CONSULTATION AND DISCLOSURE

Public participation formed an integral part of the full ESIA process and the consultation of Interested and Affected parties (I&AP's) is key to ensuring adherence to the legal requirements.

The project proponent has developed a Stakeholder Engagement Plan (SEP) and the stakeholder engagement records logged between 2013 and 2016 show that the communication principles laid out in the SEP are being followed for engagement. Additional two consultative public meetings with a total attendance of 159 local community members were held during the field exercise on 12th October 2017 to consolidate the issues affecting the project as well as capturing issues raised by the project affected persons. The local residents, Chiefs, Village elders, and other local administrative leaders were some of the target groups used during mobilization and were also in attendance. Various issues were captured and addressed during the meeting and are reflected in in Table 9.1 below.

Table 9.1 Stakeholder consultations held with key I&APs

No	Location	No of Attendance
1	Mberere Centre (Opposite Police Station) Open Ground, Nandi County.	94
2.	Kopere Market (Guhora Farmers' Cooperative Society Office Ground) Kisumu County	65

The stakeholders were informed about the proposed project and the intention of the proponent to carry out an ESIA to ensure the environmental and socio-economic sustainability of the proposed project and to identify major issues of concerns from stakeholders. The main concerns raised by the communities during the stakeholder meetings included *provision for jobs especially for the youth, women with particular emphasis on the 26 subsistence farmers on the private land*. The communities will also like the proponent to help with some community development project such as health, education and water facilities to address some urgent needs within the communities.

KSP has developed a robust and well-resourced Stakeholder Engagement Plan (SEP) with community liaison officers acting as interface for information flow between the communities and the project proponents. The SEP outlines continuous stakeholder engagement throughout the life of the project from planning, through to construction, operation and de-commissioning.

The stakeholder engagement records logged between 2013 and 2016 show that the communication principles laid out in the SEP are being followed for engagement, especially with government authorities and the local community members.

Grievance Redress Mechanism (GRM)

There is a Grievance mechanism included in the SEP but this is yet to be operationalized as the project is yet to commence. There are no records of project related grievances to date. This GRM will be sustained and enhanced by Voltalia Kenya – EPC Contractor- through the development of a project specific GRM incorporating the existing arrangements of the GRM prior to the commencement of any construction activities on site.

10. CONCLUSION

This ESIA Summary report responds to the environmental assessment requirements of NEMA and the African Development Bank's ISS. Most of the anticipated adverse impacts associated with the project can be readily managed to acceptable levels with implementation of the recommended mitigation measures within the ESMP and the ESAP.

No project related land uptake resulting in physical displacement requiring resettlement is envisaged. However there are 26 economically displaced PAPs who have been identified as land users (subsistence farmers), who are farming in the Project area and the private land owner has arranged with them to harvest their seasonal crops prior to the commencement of construction works. An employment plan shall be developed to prioritise these 26 affected farmers for the unskilled jobs on the project especially during the construction phase.

In general, the proposed project will result in appreciable benefits to the country power production and create opportunities for both social and economic development. The project is already licensed by NEMA.

Public consultations revealed that the local communities have high socioeconomic interests and a lot of expectations with the solar project. The EPC Contractor Voltalia has committed to help the local community with community development initiatives following a needs assessment exercise.

An Environmental and Social Due Diligence (ESDD) exercise has been undertaken which will lead to the development of an Environmental and Social Action Plan (ESAP) to help KSP and Voltalia Kenya to formalize the framework ESMP into project specific ESMPs and address other gaps identified but not completely captured within the ESIA as follows;

- *Document all the discussions and agreements reached with the 26 affected farmers to formalize as a livelihood restoration initiatives for the project.*
- *Develop the existing project level SEP and GRM to address project specific challenges during the construction and operational phases of the project.*
- *Develop a project Security management plan which strongly reflects the presence of two rival communities within the project area of influence and how the communication and engagement with the two communities will be undertaken.*

The ESAP will be shall be a legal undertaking of the loan agreement.

REFERENCES AND CONTACTS

1. Kopere Solar Farm Project, Kenya, Environmental and Social Review, Draft Due Diligence Report, 30th August 2018 by ERM Ltd.
2. AWEMC Environmental and Social Impact Assessment (ESIA) Addendum of January 2018
3. Environmental and Social Impact Assessment (ESIA) Report of March 2016 by AWEMC
4. AECOM Environmental and Social Evaluation Report of September 2016 (including a summary Environmental and Social Action Plan (ESAP))
5. AECOM Environmental and Social Management Plan (ESMP) of January 2017
6. AWEMC Socio-Economic Survey of January 2018
7. AWEMC Climate Risk Assessment Report of February 2018
8. AWEMC Cumulative Impact Assessment of February 2018
9. AWEMC Landscape and Visual Impact Assessment Report of February 2018
10. Updated Land Use Land Cover Mapping Final Report by GeoClim East Africa, September 2017.

For more information, please contact:

For AfDB

- Felix Oku, Senior Environmentalist: f.oku@afdb.org
- Jasmin Jakoet Senior Investment Officer: J.JAKOET@AFDB.ORG

ANNEXURE

Annex I: Site layout

