

**ENERGY DEVELOPMENT CORPORATION LIMITED**

**ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)  
REPORT**

**PROPOSED RURAL ELECTRIFICATION PROJECT IN  
BURERA AND NYAGATARE DISTRICTS**

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## **EXECUTIVE SUMMARY**

Energy Development Corporation (EDCL) Ltd, one of the subsidiaries of Rwanda Energy Group (REG) in charge of increasing generation, improve transmission and distribution, diversify the energy sources, to reduce costs and elaborate a conducive legal and regulatory framework.

It is in this regards EDCL in partnership with BADEA (Arab Bank of Economic Development of Africa)is planning the rural electrification project in Nyagatare and Burera.

In compliance with Organic law on environmental management and conservation, EDCL has prepared an Environmental and Social Management Plan Report as a way to minimize and avoid Negative environmental and Social Impacts on the surrounding environment.

Environmental and Social Management Plan is a systematic, reproducible and multilevel process of identification, prediction and analysis of significant environmental protection program and predict the different impacts (positive or negative) of a proposed project or activity and its practical alternatives on the physical, biological, cultural and socio-economic characteristics of a particular geographic area in order to provide information necessary for enhancing decision making and predict the budget needed to protect the environment in the region.

The ESMP describes the physical, biological and human environment of the proposed site, assess the planned activities and predict potential impact in order to propose mitigation measures.

From the environmental point of view, there is growing concern in Rwanda that in the execution phase, many kinds of development projects may cause damage to the environment in general and on human population. The Article 69 of the Organic Law N° 04/2005 of 08/04/2005 determining the modalities of protection, conservation and promotion of environment in Rwanda stipulates that every development project shall be required to undergo Environmental and Social Impact Assessment (ESIA) prior to its commencement. The project: Rural Electrification of Burera and Nyagatare Districts is classified in the category of projects that have detrimental and site-specific environmental and social impacts that can be minimized by the application of mitigation measures .

The present plan is highlighting potentials environmental and social impacts of the project and will facilitate to identify

corresponding mitigations measures that will be put in place for avoiding, reducing, minimizing or compensating potentials adverse impacts likely to arise during project implementation.

The potential impacts identified are: impact on land, impact on soil, impact on water resources, impact on vegetation cover, impact on health and safety. Those impacts are likely to be mitigated by the proper compensation, proper soil restoration, proper waste disposal and the provision of the personal protective equipment to all workers and visitors, Health and Safety awareness, availing first aid kit and make sure that all workers have a valid health insurance .

Overall, the project is environmentally feasible and sound with few potential negative impacts, which can be minimized or completely mitigated through incorporation of corrective, rehabilitation, restoration and instituting of appropriate mitigation measures.

The study therefore concludes that the rural electrification project in Burera and Nyagatare Districts shall not have adverse impacts on the environment hence can be implemented. However it further recommends that the project should be implemented as it has no significant adverse impacts on the environment, during implementation of the programme alternatives of “with project “should be considered, choice of the construction materials, choice of the reuse and disposal of waste water and solid wastes, some activities shall require deep attention prior to implementation of this specific project including the electrocution and magnetic charges due to working vis a vis with Cabins/transformers; the monitoring and evaluation process of the ESMP should be done parallel with the monitoring and evaluation of the overall project activities to minimize costs and save time and also an environmental audit shall be carried on a regular quarterly basis to ensure compliance with the ESMP, impact mitigation measures for avoidance, minimization and compensation.

## I.INTRODUCTION

### 1.1. Objective of the Environmental Management Plan

The global objective of this Environmental and Social Management Plan was to identify significant potential environmental and social impacts of **rural electrification project in Burera and Nyagatare Districts** to ensure that the proposed project will take into consideration appropriate proposed measures to mitigate any adverse impacts to the environment in general and population welfare in particular through all phases of his future implementation.

Specific study objectives were as follows:

- Provide a complete description of the project area
- Identify the major environmental issues of concern through the presentation of baseline data which should include social and cultural considerations and assess public perception of the proposed development.
  
- Outline the Legislations and Regulations relevant to the project and highlight how compliant the project is and will be throughout its life span.
  
- Predict the likely impacts of the development on the described environment, including direct, indirect and cumulative impacts, and indicate their relative importance to the design of the development's facilities
  
- Identify mitigation actions to be taken to minimize adverse impacts and quantify associated costs.
  
- Design a Monitoring Plan which should ensure that the mitigation plan is adhered to
  
- Describe the alternatives to the project that could be considered at that site

## 1.2. Project description

The project will be funded by the loan agreement between BADEA and GoR equivalent to eleven million two hundred thousand USD (11,200,000 USD).

### 1.2.1. Project objectives

The project aimed at electrifying 18,761 households, 4 health centers, 51 schools and 18 public offices in Burera and Nyagatare Districts.

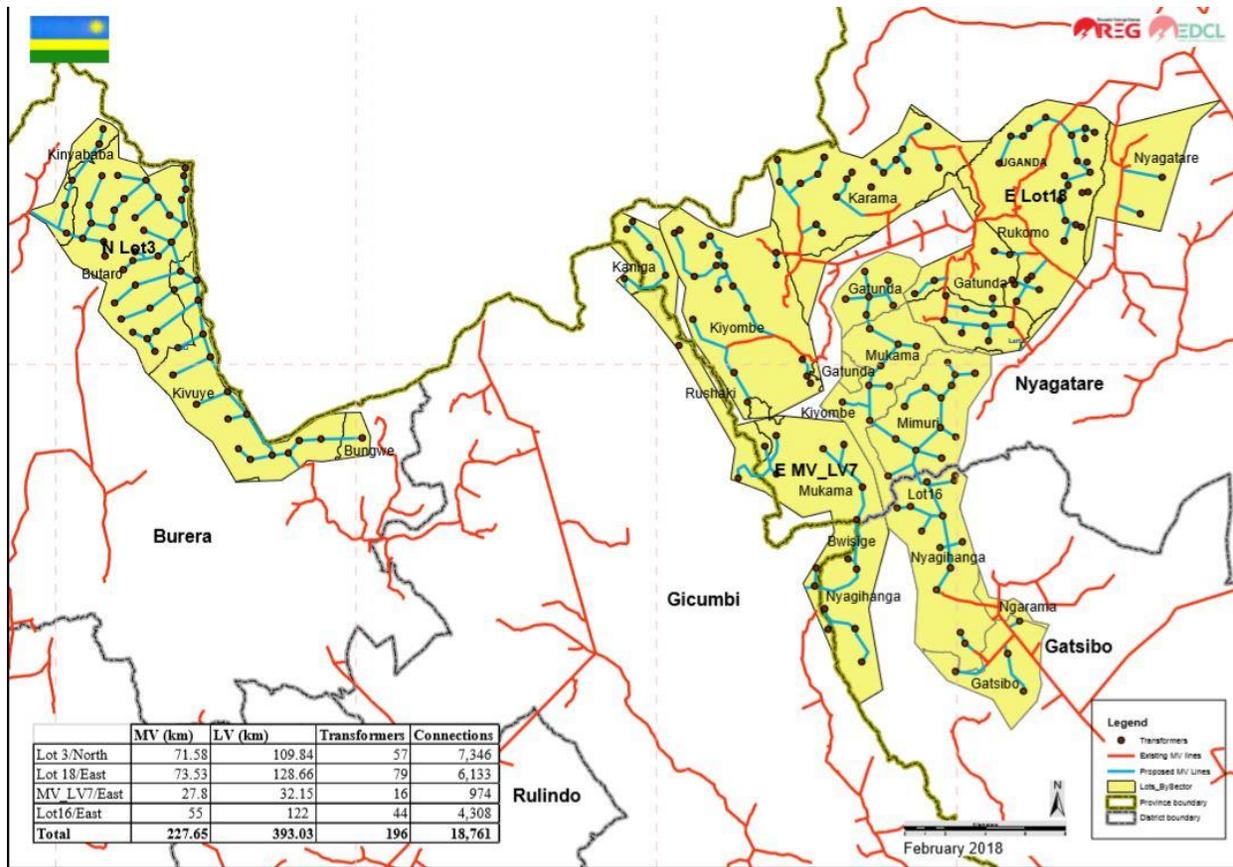
### 1.2.3. Project location

The project area is located in Districts of Burera and Nyagatare

**Table 1. Project Administrative location**

Districts	Sectors
Burera	Kinyababa
	Butaro
	Kivuye
	Bungwe
Nyagatare	Nyagatre
	Rukomo
	Karama
	Mukama
	Gatunda
	Kiyombe

**Figure 1. Project components**



**12.4. Project Components**

- ✓ Construction of 227.65 Km of Medium Voltage Lines
- ✓ Construction of 393.03Km of Low Voltage Lines
- ✓ Installation of 196 transformers
- ✓ Connecting 18,761 households

### **1.2.5. Type of poles to be used:**

- ✓ Steel poles
- ✓ Concrete poles
- ✓ Wooden Poles

## **13. Project's activities description**

### **1.3.1 Storage and transportation of equipment and materials**

Equipments and materials to be used in the construction of the power lines, will be transported and stored to the site. Other materials to be procured locally shall include: aggregates, cement, sand, stone and other miscellaneous supplies and services.

### **1.3.2. Clearing of all vegetation within the Right -of -Way**

The construction and operation of the proposed overhead lines will require a right of way of 12m for medium voltage which shall be cleared of vegetation.

These will be trees, which could damage the power line if they fall on it or those whose branches may extend such that they could damage the lines.

### **1.3.3. Foundation excavations:**

The poles will have concrete footings with foundation with depths and height depending on nature of the soil.

### **1.3.4. Tower erection**

After the transportation of steel poles on site, erection will proceed.

### **1.3.5. Stringing**

Once the poles are erected, the conductors and shield wires will be strung and appropriately tensioned to provide the minimum clearance between ground and the wire.

## **II.LEGAL AND INSTITUTIONAL FRAMEWORK**

This section presents existing regulations, policies and institutions that will govern the construction of the power lines.

### **2.1. National Legislation and Standards**

The institutional framework for environmental management is currently set out in the Organic Law determining the modalities of protection, conservation and promotion of the environment in Rwanda, published in the Official Gazette RWA N° 9 of the 1st May 2005, particularly in Chapter III relating to the establishment of the institutions.

The Rwanda Environment Management Authority (REMA) is responsible for managing environmental issues in Rwanda and has a duty to implement policies and laws related to the environment. REMA was established under the Organic Law (No. 04/2005 of 08/04/2005) and given responsibility to oversee, co-ordinate and supervise the EA process in Rwanda.

According to the recent restructuring, governmental institutions involved directly or indirectly in environmental management include: Ministry of Environment (MOE), Ministry of Land and Water(MINILAF), Ministry of Local Governance (MINALOC) through provinces and decentralized entities (districts, sectors), Ministry of Agriculture and Animal Husbandry (MINAGRI), Rwanda Environment Management Authority (REMA), Rwanda Water and Forestry (RWFA), Rwanda Bureau of Standards (RBS), Rwanda Utilities Regulatory Agency (RURA) and Rwanda Energy Group( REG) Ltd.

#### **2.1.1. National Policy on Environment (NPE)**

The first comprehensive statement of National Policy on Environmental (NPE) of Rwanda was approved by the Council of Ministers in November 2003. It was based on the policy and strategic findings and recommendations of the Conservation Strategy of Rwanda. The overall policy goal is to improve and enhance the health and quality of life of all Rwandans and to promote sustainable social and economic development through the sound management and use of natural, human-made and cultural resources and the environment as a whole to meet the needs of the present generation without compromising the ability of future generations to meet their own needs.

The Environment Policy of Rwanda advocates the promotion of long-term sustainable socio-economic development through sound environmental management policies and provides a number of guiding principles that indicate and require a strong adherence to sustainable development:

- It is every person's right to live in a safe and stable environment, but on the other hand, they must keep it salubrious;
- The national economic growth must be based on rational use of resources and take into account environmental dimensions;
- Active and effective participation of the whole population for environment protection and management;
- A special emphasis must be laid on environmental education and sensitization programs at all levels with more involvement of women and the youth;
- Environmental impact is to be analysed while conducting studies of development projects.
- Full economic, social and environmental costs and benefits of natural resources should be incorporated into all development programs / projects and activities;
- Appropriate and affordable technologies which use renewable resources efficiently shall be adopted, developed and disseminated;
- Incorporation of impact containment measures within the design process for both public and private sector development projects, and for mitigation measures and accident contingency plans should be incorporated within environmental impact statements.
- Preliminary and full EIAs must be undertaken by the relevant sectoral ministries or departments, if in the public sector, and by the developer if in the private sector.
- EIAs must consider not only physical and biological impacts but also address social, socio-economic, political and cultural conditions;
- Public consultation is recognized as an integral part of EIA and it must be ensured that EIA procedures make provision for both an independent review and public comment before consideration by decision makers;
- Necessary institutional framework must be established with determination of linkage of its parts for undertaking, coordinating and approving EIAs and the subsequent system of environmental audits required to ensure compliance with conditions;
- Development of EIA and environmental auditing capacity and capabilities within the environmental protection authority, sectoral ministries and agencies, as well as in the regions.
- Regular and accurate assessment and monitoring of environmental conditions shall be undertaken;

### **2.1.2. Energy Policy**

The primary goal of the Rwanda's National Energy Policy is to meet the energy challenges and needs of the Rwandan population for economic and social development in an environmentally sound and sustainable manner. This Policy document takes particularly into account the structural changes in the economy and political transformations at national and international levels since 1994, where the role of the Government has changed, markets have been liberalized and private sector initiatives encouraged.

The policy objective for the development of the energy sector is to provide an input in the development process by establishing an efficient energy production, procurement, transportation, distribution, and end-user systems in an environmentally sound manner. The Energy Policy, therefore, focuses on market mechanisms and means to reach the objective, and achieve an efficient energy sector with a balance between national and commercial interests.

Specifically, the energy policy takes into consideration the need to:

1. Have affordable and reliable energy supplies country wide;
2. Reform the market for energy services and establishes an adequate institutional framework, which facilitates investment, expansion of services, efficient pricing mechanisms and other financial incentives
3. Enhance the development and utilization of indigenous and renewable energy sources and technologies,
4. Adequately take into account environmental considerations for all energy activities,
5. Increase energy efficiency and conservation in all sectors; and
6. Increase energy education and build gender-balanced capacity in energy planning, implementation and monitoring.

Domestic energy demand has grown rapidly due to population growth and the increase in economic activities especially during the last ten years. However, biomass based fuels dominate the energy scenario, with an estimated 95% of the total energy supply made up of firewood, charcoal, and agricultural residues. Historically, the lack of investment in electricity generation capacity has resulted in severe capacity deficits in electricity supply in Rwanda. At the same time, overuse of existing hydropower capacity has added a deficit in energy resources and water supply, due to its effect on water pumping stations.

The national energy policy, therefore, aims at establishing an efficient energy production, procurement, transportation, distribution and end-use systems (taping into that multiple energy potential that the country presents) in an environmentally sound and sustainable manner and required as conditions for achieving the national development goals.

### 2.1.3. Regulatory Framework of Rwanda

- **Constitution of Rwanda**

Rwanda adopted its Constitution in June 2004, which provides basic and comprehensive principles and guidelines for environmental protection, and management in the country. The concept of Sustainable Development and environmental rights are presented in several articles, particularly:

**Article 49**, states that every citizen is entitled to a healthy and satisfying environment. Every person has the duty to protect, safeguard and promote the environment. The state shall protect the environment. The law determines the modalities for protecting, safeguarding and promoting the environment.

Several other provisions in the Constitution are related to development, where highly underscored is the people's right to:

- Improved living standards and to sustainable development;
- Participate in national development and, in particular, to be consulted with respect to policies and projects affecting their community;
- The enhancement of their capacities for development and to meet their basic needs, are recognized;
- Compensation, including relocation with adequate state assistance
- Programs and projects design shall not damage or destroy the environment;
- Peoples have the right to full consultation and expression of views on development related projects;
- Government and citizens have the duty to protect the environment.

- **Organic Law on Environment**

This is the Organic Law n° 04/2005 of 08/04/2005 determining the modalities of protection, conservation and promotion of environment in Rwanda. The law sets out the general legal framework for environment protection and management in Rwanda. It also constitutes environment as a one of the priority concerns of the Government of Rwanda.

The law confirms right to every natural or legal person in Rwanda to live in a healthy and balanced environment. They also have the obligation to contribute individually or collectively to safeguard country's natural, historical and socio-cultural heritage. Several articles under this law are very explicit for the roles and responsibilities for the environment protection and management:

**Article 3:** States that every person has the duty to protect safeguard and promote environment. The State shall protect, conserve and manage the environment.

**Article 65:** clearly calls for the need to subject projects to mandatory Environmental Impact Assessment prior to its commencement. It shall be the same for programs, plans and policies likely to affect the environment. Specific details of projects referred to in this Article shall be spelt out by the order of the Minister in charge of environment.

**Article 66:** states the minimum content of every Environmental Impact Assessment Report (EIA):

- A brief description of the project and its variants.
- Analysis of direct and indirect foreseeable consequences on the environment.
- Analysis of the initial state of the environment.
- Measures envisaged reducing, preventing or compensating for the consequences.
- Reasons for the choice.
- A summary of requisitions from clause 1 to 5 of this article;
- A definition of the evaluation and monitoring methods used regularly and environmental indicators before (initial state), during and after implementation of the project or, as the case may be, at the final evaluation stage of the project;
- A financial evaluation of measures recommended preventing, reducing or compensating for the negative effects of the project on the environment and measures for regular monitoring and control of relevant environmental indicators.

- **Other national environmental related regulatory instruments**

There are also decrees, statutory instruments and ministerial orders which constitute important legal tools in Rwanda; and they concern mainly the prohibition of the use of plastic bags, cutting and selling of trees, forest related regulations, underground waters, lakes and streams and their usage, pollution and contamination of springs, lakes, streams, public hygiene and safety, city and country planning, soil conservation and usage, etc.

#### **2.1.4. Environmental Assessment Procedures and Guidelines in Rwanda**

- **EIA Guidelines**

As part of the ongoing effort to develop environmental legislation and guidelines in Rwanda, REMA has released the final version of its EIA Guideline document (REMA 2005). These guidelines follow the conventional pattern adopted in many other parts of the world, and make provision for screening, scoping, identification and evaluation of impacts, the development of

environmental management and monitoring plans, consideration of alternatives etc. At the project identification phase, based on REMA's guidelines projects are categorized in one of the following three categories:

**Schedule 1:** Projects which may have adverse and significant environmental impacts, and should, therefore, require full EIA.

**Schedule 2:** Projects whose type, scale or other relevant characteristics have potential to cause some significant environmental impacts but not likely to warrant an environmental impact study.

**Schedule 3:** Projects which would have no impact and do not require Environmental Impact Assessment.

According to the guidelines, all projects in environmentally sensitive areas are treated as equivalent to Schedule 1 activities irrespective of the nature of the project. REMA has also prepared a document on environmental impact considerations for projects in different sectors. The document provides a comprehensive statement of the types of adverse impact, which may occur, and sets out clearly the aspects, which need to be addressed in an EIA.

## **2.2. Regional and International & Multilateral Agreements**

Rwanda has adhered to several international agreements, treaties and conventions, though management legal tools are yet still to be well developed. Among other conventions ratified by the Republic of Rwanda, the most important ones which have influenced or influence proposed project are:

- United Nations Convention Framework on Climatic Changes of June 10, 1992 ratified on August 18, 1998. This convention takes into account the fact that climate change has transboundary impacts. The basic objective of this convention is to provide for agreed limits on the release of greenhouse gases into the atmosphere so as to prevent the occurrence of climate change. It also aims to prepare countries to minimize the impact of climate change should it occur.
- United Nations Convention on Desertification Control of June 17, 1991 and ratified on October 22, 1998. The objective of the Convention is to combat desertification and mitigate the effects of droughts in countries experiencing serious drought and/or desertification, particularly in Africa.
- Vienna Convention on Ozone Layer Protection of September 22, 1987 and Montreal Protocol on substances impoverishing Ozone layer of September 16, 1987, ratified on December 6, 2000. The basic objective of the Convention is to combat the negative impact on the environment and human beings resulting from ozone depleting substances by reducing the amounts released and eventually banning their commercial use through internationally agreed measures. The Montreal Protocol entered into force in 1989 to facilitate the implementation of the Convention.
- Stockholm Convention on Persistent Organic Pollutants (POP) adopted and ratified by the Presidential Order No 78/01 of July 8, 2002.

- Basel Convention on Dangerous Wastes, adopted on March 22, 1989 in Basel and by the Presidential Order No 29 /01 of August 24, 2003 establishing Rwanda adherence. The objective of the Basel Convention is to control and regulate the transboundary movement of hazardous wastes. The Bamako Convention of 1991 plays a similar role at the level of the African continent.
- Kyoto Protocol to the Convention Framework on Climatic Changes of March 16, 1998.

### **2.2.1. Regulatory requirements of international Financial Institutions**

The following provides a summary of the environmental and social requirements of the key International Financial Institutions, particularly the World Bank Group who might be involved in the financing of the Energy projects in Rwanda.

- **The World Bank Group**

The World Bank has adopted an Environmental Policy and Environmental Assessment Guideline in 1990 and 1992 respectively. The Bank has also issued an Environmental and Social Assessment Procedures (ESAP) in 2004 and the main purpose of this policy is to improve decision-making and project results in order to ensure that Bank-financed projects, plans and programs are environmentally and socially sustainable as well as in line with Bank's policies and guidelines. The ESAP formalize the use of Environmental and Social Impact Assessment (ESIA), Environmental and Social Management Plan (ESMP) and Environmental and Social Audits as instruments to enhance project benefits and (in order of priority) to prevent, minimize, mitigate, or compensate for adverse impacts. The ESAP describes the various steps that shall be followed to mainstream crosscutting issues along the project cycle, from country programming to post-evaluation. At the project identification phase, the ESAP screening exercise focuses on the environmental and social dimensions of a project to categorize it in one of the following four categories:

**Category 1:**

These are projects that are likely to have the most severe environmental and social impacts and require a full ESIA.

**Category 2:**

These are projects that are likely to have detrimental and site-specific environmental and social impacts that can be minimized by the application of mitigation measures included in an ESMP.

**Category 3:**

These are projects that shall not induce any adverse environmental and social impacts and do not need further ESIA action.

**Category 4:**

These are projects that involve investment of Bank's funds through Financial Intermediaries (FIs) in subprojects that may result in adverse environmental or social impacts. Specific requirements for this type of project include an assessment of FI capacities to handle environmental and social considerations.

Due to the small right of way, the size of the poles to be erected and the location of the project, Rural Electrification in Burera and Nyagatare Districts Project falls in category 2 of the projects that are likely to have detrimental and site-specific environmental and social impacts that can be minimized by the application of mitigation measures included in an ESMP.

**III. BASELINE ENVIRONMENTAL, SOCIAL AND ECONOMIC DATA**

Baseline data consists of environmental and socio-economic status of the project site. It consists of primary data (field tests, surveys, measurements) and secondary data (published information, unpublished information available with various agencies). The baseline data for rural electrification of Burera and Nyagatare Districts Project first collected from secondary data, and then we went to the field to collect primary data. Information collected is related to:

- physical environment: geology; topography; soils;
- climate and meteorology;
- surface and ground water hydrology;
- biological environment: flora; fauna; rare or endangered species; sensitive habitats, including significant natural sites etc.; species of commercial importance; species with potential to become nuisances, vectors or dangerous; and,
- socio-cultural environment: population, land use; planned development activities; community structure; employment; distribution of income, goods and services; recreation; public health and safety; cultural aspects/properties; aspirations and attitudes.

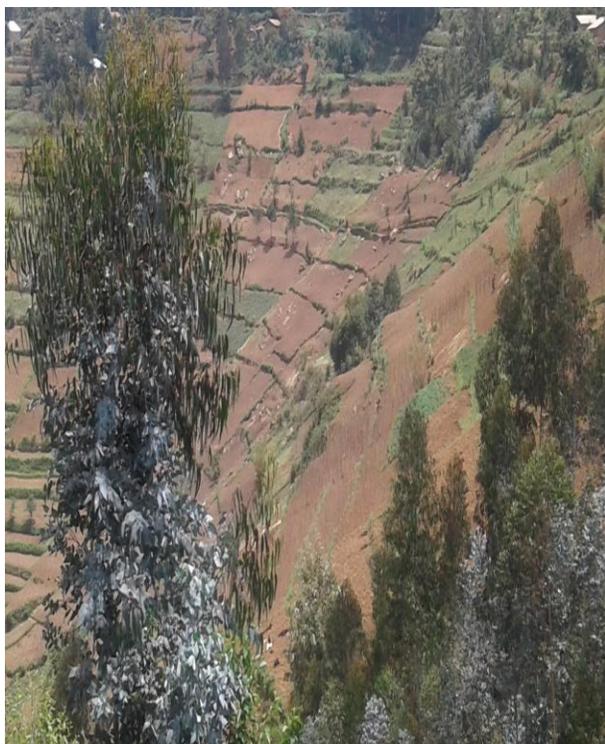
### **3.1. Physical Environment**

#### **3.1.1. Relief and topography**

The project area lies in 2 different landscapes:

The first landscape consist of highland area in Burera and west of Nyagatare(Sectors of Kiyombe, Gatunda and Karama). The topographical profile shows that altitudes varie between 1800 m and 25 00 m and the slopes exceeding 30%. This landscape has been shaped by intense tectonic action as well as rain and river erosion.

The District of Nyagatare is characterized, in general, by lowly inclined hills separated by dry valleys



**Figure 2.Type of slopes in the Burera District**



**Type of slopes in Nyagatare District**

### **3.1.2. Geology and Soils**

The soils in the project area (part of Burera and west of Nyagatare) are globally classified in humus-bearing soil which extends on along the marshlands such as Rugezi and argilo-humus bearing, some peat soils and histosol are localized in marshland areas like Rugezi

However, the low land part of the project area covering the eastern part of Nyagatare District, the soil type is ferro soil with savannah vegetation.

### **3.1.3. Climate**

The Climate regime of the project area district follows the general climate pattern in Rwanda. Despite the tropical location of the country, its climate is tempered by its high altitude averaging 2000m. Temperature variations in Burara are small and range

between 15 °C and 19°C; the annual rainfall is 1300mm. In Nyagatare, the average temperature is equal to 20°C and the average rainfall are equal to 880 mm

The climate is divided into two rainy and two dry seasons throughout the country:

- Long rainy season (February to May) with 48% of annual rainfall
- Long dry season (June to mid-September)
- Short rainy season (mid-September to December) with 30% of annual rainfall
- Short dry season (January to February) with 22% of the annual rainfall

#### **3.1.4. Hydrological network and wetlands**

The hydrological network of the project area is located in Nile basin and is composed by lakes Burera and Ruhondo and Rugezi wetlands in Burera District. Rugezi wetland is a protected area in Rwanda and is a RAMSAR site since 2005. The wetland is also very important in terms of biological diversity.

The hydrographic network is very limited in the District of Nyagatare. A part from the Muvumba River that cuts across the District, The Akagera and Umuyanja rivers passing the District constituting its limits with Tanzania and Uganda respectively, there is no other big consistent rivers that can be exploited by the population of Nyagatare. The district also has other few and small rivers such as Nyiragahaya, Kayihenda, Karuruma, Nayagasharara and Kaborogota. These are erratic and intermittent.

The weak river network constitutes a serious handicap to responding to the needs of water for people and animals.



**Figure 3. Rugezi wetland**

**Lake Burera**

### **3.1.5. Land use pattern**

Land use in the project area is primarily under cultivation of commercial crops, food crops and settlement. The local communities cultivate a variety of food crops under mixed cropping. These include bananas, potatoes, avocado, maize, vegetables etc. The commercial crops are dominated by the irrigated rice in Nyagatare District.

Cultivation occurs along the steep slopes predominant in the area of Burera District with proper soil conservation techniques of radical terraces covered by agroforestry trees.



**Figure 4. Land use in project area**

### **3.1.6. Biological diversity**

In Burera District, the vegetation disappears gradually because of the human occupation. The forests are mainly composed by plantation of eucalyptus and some agro-forest trees: *Alnus acumunata*, *Grevillea*, *Calliandra*. *Leucaena*

The Flora in Nyagatare is generally made of afforested savanna vegetation and some indigenous trees of *Acacia kirkii* around Umuvumba river as well as the agroforestry trees of *Grevillea* and plantation of banana trees.

The District also accommodates a huge variety of birds such as birds of prey, guinea-fowl, partridges, heroes and so forth. The hares,

Wild boars, monkeys and more other small beasts of the rodent family are

rarely found in the wooden savanna and in the natural vegetation. The River Umuvumba, Contains hippopotamus and crocodiles



**Figure 5. Eucalyptus trees on steep slopes in Burera District**

### **3.2.Socio-economic Environment**

#### **3.2.1. Population**

Burera district is the typical picture of the rural area of Rwanda, characterizing a predominantly agrarian society, with 98% of the population residing in rural areas. With a total population of 336,582 with a mean human density of 522 inhabitants/km<sup>2</sup> which is one of the highest in rural parts of Rwanda. This high population pressure on land has resulted into the downward cycle of land fragmentation.

Nyagatare District is one of the seven districts making up the Eastern Province. The District is divided into 14 Sectors, 106 cells and 630 Villages. It spreads over an area of 1920, 11 Km<sup>2</sup>, with Uganda at its North, Tanzania at its East, Gatsibo District at South and Gicumbi District on its West (District monograph 2012). It is the one of the largest districts in the country with the total population of 466,944(NISR2012 population census results) with a mean human density of 243 inhabitants/km<sup>2</sup>.

### 3.2.2. Habitat

The most common type of habitat in the project area in Burera District is the clustered rural settlement (known as Umudugudu). Overall 69% of the private households are of that type. It is followed by dispersed/isolated housing (21%).For Nyagatare District, 83% of the population live in planned settlement, 3.7% of the population live in scuttled settlements while 3.3% of the population live in urban area.



**Figure 6. Dominant Rural settlement type of the project area**

## **IV.ASSESSMENT OF ALTERNATIVES AND OPTIONS OF THE PROJECT**

The purpose of this chapter is to examine the possible alternatives for delivering the goals and objectives of the project. For this particular programme, some options have been considered. In seeking the best alternative, the “status quo” or “do nothing” option and the actual on grid electrification were considered and the alternatives analysis show the best alternative for implementation of the project.

### **4.1. Alternative line routes:**

#### **4.1 .1. Line route Selection**

An analysis of alternative line routes was undertaken by the surveying and design team through mapping and involvement of all the stakeholders in this selection process. At the end of this process, the line of routes chosen for this project based on the following:

The line route was chosen to avoid the involuntary resettlement and to avoid crossing public and private infrastructure for reducing the cost of expropriation.

The line route was selected to avoid the consumption of many natural resources like land and forests.

#### **4.1.2. Alternative to the project**

No project alternative: Once no project alternative (Do nothing option) is adopted, there is no adverse environmental impacts but positive impacts will be in term of increasing access to electricity in rural area

#### **4.1.3. Comparison of alternatives**

The Analysis has shown that the line routes chosen are the most feasible considering of the reducing network problems in Burera and Nyagatare Districts as well as less cost of expropriation.

The alternative of “no-build” is not feasible because electricity is included as a measure of development in a village and therefore is always given high priority in the list of developmental activities for any country

## **V.NATURE AND EXTENT OF KEY ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT**

This project and its activities will have potential impacts (both positive and negative) within and on the surrounding and connected communities, both directly and indirectly as there will be direct and indirect interactions between project activities and the environment. This chapter identifies analyses and classifies these impacts that could arise from the activities of the project, either during the construction phase or the operational phase.

The impacts also apply on socioeconomic environment (health, security, economic activities, employment, finances, population; present land use; planned development activities; community structure; distribution of income, goods and services; recreation; public health; cultural properties, etc) and to the biophysical environment (fauna, flora, water, air, soil, landscape) and.

All these impacts affect the environment and the community at different degrees, and their duration differs also. That is why the impacts are classified differently according to their range in space and time as described as such in this study.

### **5.1. Impacts classification and identification**

#### **5.1.1. Impacts Classification**

The range of the impacts varies in space and time. The intensity of these impacts is classified according to the following criteria:

- Impacts on the human health
- Impacts on fauna and flora
- Loss of habitats
- Transformation of natural landscapes
- Effects on the present use of available natural resources
- Impact on social activities in the region of the project
- Abandonment of either use or future production of natural resources.

The criteria of classification of the impacts as being high, middle or weak are according to:

- Extent/Size and geographical extent
- Ecological context
- Irreversibility
- Duration, incidence and frequency

**Table 2. Classification and analysis of significance ranking for impacts**

<b>Significance of impacts</b>	<b>Implication for project</b>	
	<b>Negative impacts</b>	<b>Positive impacts</b>
Very Low significance	Negligible effects	Negligible effects
Low significance	Acceptable effects	Some benefits
Moderate significance	Effects are serious enough to cause serious concerns. Changes to the project should be considered	Appreciable improvements to or will sustain resources
High significance	Unacceptable effects. The project should not proceed unless design is changed so that the significance of this impact is reduced to acceptable levels	Very substantial to the existing resources
Very high significance	An automatic fatal flaw. The project should not proceed unless design is changed so that the significance of this impact is eliminated or reduced to acceptable levels.	Extremely beneficial and enduring

## 5.1.2. Impacts identification

### 5.1.2.1. Impacts during Construction phase

#### A. Positive Impacts

Throughout the construction period, local inhabitants of this area are positioned to benefit in the following aspects:

- i. **Employment** to the locals with the bulk of the staff recruited from within the area. The developer will commit to a policy that gives priority to the locals in the neighborhood at the time of employing casual or skilled labor: **positive impact, local and temporal.**
- ii. **Government revenues:** revenues shall be collected by Government from the procurement of construction materials and finishes, employees' salaries, such as; VAT from sold products (the whole trading chin) among others: **positive impact, national and permanent.**
- iii. **Project as an income earner to truck and machine owners :** Truck and machine owners will earn from renting out their vehicles for transportation of construction material and machines that will do various construction activities (excavations, clearing, loading, leveling, using graders, excavators, among others) : **positive impact, national and temporal.**
- iv. **Affordability of medical insurance for workers:** Employees shall from their pay afford medical insurance (Mutuelle de santé) and even pay school fees for their children: **positive impact, national and temporal.**

#### B. Negative Impacts

As the construction goes on, there will be a soil disturbance and increased traffic around the site as a result of heavy trucks delivering various construction materials and taking away the generated waste including construction debris. All these are likely to pollute and worsen the environment, through mud slides, noise, and dust and air pollution. Potential adverse impacts emanating from construction activities are described in detail here below:

#### Heavy truck and machine movement

It is obvious that there are bound to be trucks delivering construction materials and disposing debris to dumping sites.

### ***Expected adverse impacts***

With the truck movements a number of impacts related to heavy machine and truck movements are likely to occur, which are:

- Considerable amounts of exhaust fumes resulting from various engines such as earth compacting equipment, generators, dumpers and trucks: ***negative impact, local and temporal***
- Noise pollution to neighboring residents: ***negative impact, local and temporal***

### ***Disposal of construction debris***

Most activities involved in the construction phases are waste generators, such as: metal and debris, concrete, card board, organic waste on site (from fruits, foods...), among others.

### **Expected adverse impacts**

Debris from the different activities during construction shall affect the environment. The likely impacts of such solid waste generated are:

- Contamination from cement and lime of the storm water drainage along the road: ***negative impact, regional and permanent,***
- Bad odors from waste due to decomposing organic waste (food, fruit, scraps): ***negative impact, local and temporal,***
- Dumping sites are potential habitats for vectors and diseases; e.g. mosquitoes, flies, etc.: ***negative impact, regional and permanent,***
- Sharp objects and falling debris e.g. glass, steel bars, nails from construction works, possess a threat to the workers on site because of expected injuries to be occurred, cuts and accidents and accidents from falling debris or workers falling: ***negative impact, local and permanent***

### ***Sanitary facilities***

During the planning phase of the project, temporary toilets shall be planned for being used during site preparation, construction and operational project phases. Given the big number of workers expected during the construction phase, many impacts can be predicted, which are:

- Possible bad odors from the latrines that may be a dangerous and nuisance to the neighboring residents: ***negative impact, national and temporal,***
- Likelihood of ground water and surface water contamination from the site toilets may be a potential impact: ***negative impact regional and permanent,***

#### **5.1.2.2. Impacts during Operational phase**

##### **A. Positive Impacts**

During the operational phase, the expected positive impacts or benefits include:

##### **Impacts on Local and National Economy**

##### **Employment/Jobs generation and poverty alleviation**

Implementation of the project will result in the creation of many direct new jobs/ employment opportunities for surrounding local communities and generally, other related Engineers from countrywide. This will include opportunities for employment on connected areas as well as various aspects of infrastructure rehabilitation management and safeguarding: ***positive impact, local permanent and national permanent.***

##### **Diversified impacts**

Substantial economic diversified effects will result during operation of the project. These include: Numerous jobs, will be indirectly created or supported by electricity uses activities providing goods and services to the project. Sectors of the economy that are closely related to the project include the retail and wholesale trading sectors, manufacturing, construction, transport and financial sectors; the development will enhance the value of neighboring properties: ***positive impact, national and permanent.***

##### **Improved community and public revenues**

Increased employment opportunities and other diversified effects downstream in the economy will provide opportunities for increased revenue for Rwanda revenue authority due to augmented expenditure in the form of taxes payment, v.a.t, etc from

different business created due to the presence of electricity. The businesses operating on the site will also make substantial contributions in the general development of local communities as they will be occupied by diversified activities involved in the whole development chain: ***positive impact, national and permanent.***

### **Impacts on Infrastructure and general urban development**

As all districts in Rwanda are currently being developed through a rapid urbanization (creation of commercial centers), which has not been matched by the provision of infrastructure especially in electricity and other energy sources.

- The EARP programme will aim to fulfill a growing demand and urgent need for modern property such as electricity energy infrastructures: ***positive impact, national and permanent.***
- The EARP programme development will also serve as sources of employment and development of private sector of course related national revenues like commercial destination and provide food products processing/ agro-industries for the local area and for the whole country and even the region. Due to this, it is predictable that the project will provide a gorgeous and exciting alternative marketable and commercial spirit, which will increase the economic and trading development to a great extent. The project is fully compatible with the general development tendency in the area and will maximize the potentialities of the project focused area: ***positive impact, national and permanent.***
- It is projected that the EARP programme will set a model for well planned, structured and aesthetical development in different districts in the country as well as excite the promotion and redevelopment of other possible programmes and projects as well as enhancing other development activities in the area including the area to be developed as an integrated lump providing a huge and full range of services. It is anticipated that implementation of the program together with other key projects in the whole country areas will help to persuade and push forward the agenda for the management of energy sector as whole: ***positive impact, national and permanent.***

### **Impacts on general Security of the area**

It is anticipated the project will improve the general security in the country areas from the light availability as the measures of protecting the country will be enforced also the region will benefit to this security system: ***positive impact, local and permanent.***

## **B.Negative Impacts**

As mentioned earlier in the project description, the main components of the project are: the construction of medium and low voltage lines infrastructures, the access road designing. Other additional infrastructure will be set up such as service connections facilities.

Commercial activities and other businesses will increase accordingly because of the presence of electricity. Given the size of the sites and activities involved, it is anticipated that the project will generate considerable amounts of solid wastes at the time of construction and operation (disposed wastes during construction), which will require proper management.

The mismanagement of solid and fecal wastes could be, a source of bad odor, a high potential of disease transmitting vectors and a source of leaching that can lead to ground and surface water pollution and water borne diseases. The following are negative impacts provided during operational phase:

### **Solid waste disposal**

Once the project components are fully operational, it is expected that the occupants shall generate solid waste, such as; construction Broken materials. Solid wastes from the activities mentioned above if not well managed shall have the following impacts on the environment:

- Degradation of the environmental quality. i.e. water and soil quality: ***negative impact, regional and permanent,***
- Health risk for communities, workers and neighboring residents because of mismanagement of organic wastes which could lead to disease transmitting vectors such as flies, mosquitoes, bugs, etc.: ***negative impact, regional and permanent,***
- Creation of bad odors from small fecal dumping masses: ***negative impact, local and permanent***
- Leaching from litter dumping sites: ***negative impact, local and permanent,***

## **VI.ASSESSMENT OF ENVIRONMENTAL AND SOCIAL IMPACTS AND PROPOSED MITIGATION MEASURES**

### **6.1. Positive impacts**

#### **6.1.1. Increase capacity of Burera and Nyagatare Distribution lines**

The project will allow to increase the access of Electricity in Burera and Nyagatare Districts

#### **6.1.2. Employment creation**

The project will be the opportunity of the creation of employment within the population of the project area as well as the improvement of the livelihood of the local population.

### **6.2. Negative impacts**

#### **6.2.1. Impact on vegetation cover**

During the construction phase, all type of vegetation on the Right of Way will be cleared: Forests of eucalyptus, banana plantations, and Grevillea,

##### **Mitigation measures**

- Only vegetation on the ROW will be cleared
- Reforestation plan

#### **6.2.2. Involuntary resettlement**

The construction of the power lines will generate expropriation of land, human settling structures, crops and trees for the right of way establishment.

##### **Mitigation measures**

Appropriate expropriation of damaged assets will be done as per 2015 expropriation law.

### **6.2.3. Soil degradation/pollution**

Soil erosion from exposing soils during excavation and levelling during construction. Oil spillage from refuelling of equipment or automobiles during construction

#### **Mitigation measures**

- Proper drainage of storm water
- Proper compaction
- Proper soil restoration

### **6.2.4. Air pollution**

Dust from excavation works and emission from heavy machines and tracks during construction.

#### **Mitigation measures**

- Workers shall be equipped with personal protective materials
- Reducing of speed and limited movement of vehicles.
- Routine service and regular maintenance of vehicles and Machines to reduce engine emissions

### **6.2.5. Solid waste**

Organic waste from food left overs, metal craps, cardboards, paper littered on site during construction, decommissioning of existing towers.

#### **Mitigation measures**

- Segregation of wastes
- Minimization of construction waste by good technical planning

### **6.2.6. Noise/vibration**

Excavation works, compaction, vibration activities during construction are sources of noise during construction.

#### **Mitigation measures**

- Reduction of speed of trucks crossing residential areas.

- Regular maintenance and service of building machinery and other during construction works.
- Utilization of ear protection devices by the workers if they are exposed to high noise level

#### **6.2.7. Poor sanitation**

During construction, lack of toilets on site, existence of unhygienic toilets could be a source of diseases to humans around the site.

#### **Mitigation measures**

Mobile toilets installed on site with a person in-charge of ensuring proper hygiene of these toilets

#### **6.2.8. Potential hazards**

There is a possibility on lines falling on the ground, and during the operation phase, contact with the transmission lines can result in electrocution.

#### **Mitigation measures**

The team leader must make sure that appropriate signs are posted at appropriate locations/positions to minimize/eliminate risk of electrocutions and other sites related risks

#### **6.2.9. Impact from Electromagnetic fields**

There have been some concerns about possible increasing risk cancer from exposure to electromagnetic radiation from power lines. Electric utility workers typically have a higher exposure to EMF due to working in proximity to electric power lines.

#### **6.2.10. Bird electrocution**

During operation, Migratory birds could get entangled with these conductors and get electrocuted.

#### **Mitigation measures**

Once established, the transmission line may cause increased risk of collision of birds in flight, however this risk is expected to be minimal since the route does not pass through any known migratory bird routes.

#### **6.2.11. Fire risk**

During operation, electrical circuits could be caused by broken conductors, lightning, resulting in fires.

#### **Mitigation measures**

Fire will be prevented during decommissioning by ensuring that there are adequate availability of fire extinguishers onsite. The personnel undertaking the removal of the equipment will have to be trained on fire fighting and if possible, reasonable fire grills will have to be done to enhance awareness and safety.

### **VII.PUBLIC CONSULTATIONS AND PARTICIPATION**

#### **7.1. Introduction**

The main objective of the public consultations with stakeholders is gathering information on their concerns, perceptions and uncertainties of the changes to be brought about as a result/consequence of Burera and Nyagatare elctirfication project under BADEA.

Public consultations were organized to collect first-hand accounts of benefits and grievances from interested/and affected parties by stated project. The discussions provided multiple views within a group context and were particularly useful in exploring the level of consensus on a given felt impact.

Semi structured interviews were organized to gather information from related parties in public consultation settings, by means of discussions guidance's. The guiding questions were used, and a feedback is composing the present section of this ESMP report. Whenever possible, before and/or after the public consultations, the team made physical visits and observations of the proposed power lines.

The exercise identified all the stakeholders within and in the surrounding area including local community, local authorities, civil society, government ministries and agencies, government projects and private sector among other stakeholders.

The public consultations on behalf of the Environmental and Social Management Plan (ESMP) study for stated project, was conducted and involved key various stakeholders that include among others Local authorities as representatives of different levels of stakeholders at the Cell, sector and district levels. Here we mean the one stop Centre of the District (Infrastructure and electricity officials), Sectors executive Secretaries, Infrastructure Managers and Cells Executive secretaries, to emphasize their participation and involvement through community mobilization, advocacy and facilitations on the side of contractors to come for this project.

The concerned project scope is located in sectors of Kinyababa, Butaro, Kivuye, Bungwe of Burera District and Sectors of Nyagatare, Rukomo, Karama, Mukama, Gatunda, Kiyombe of Nyagatare District.

## **7.2. Consultation findings and concerns**

The consultations held at local authorities respective offices and at project sites activity and the main objectives of the project to be implemented and what is going to be done during this study section (public consultations) as well as its importance, where parties participated appointed that meetings, are going to raise the flow discussions on the following:

- The need of the project,
- identification of different problems related to the lack of power and services to be affected by the project execution,
- Related socio- economic parameters to be considered in enhancing and mitigating associated positive and negative impacts respectively.
- Suggestions and propositions on what can be done to address raised problems due to the project development.

The meeting highlighted different challenges and benefits associated to the development of this project through the above agenda, especially site-based issues that include the following:

- Perception and awareness on expected project
- Increased income generated from this capacity and employments
- Designed power distribution approach
- Health, safety, and environmental related risks
- Provision of other related income generated business due to availability of the electricity

### 7.3. Consultations with other Stakeholders

All public institutions consulted from districts to the villages will ensure their support in public/people mobilization and their participation in relocation or displacement and related compensation process. The project has many positive effects on general development through the increasing of power capacity for concerned public, Beautification of the area, Environmental Safeguarding/protection, Job creation and promotes the social being of the public. All negative impacts will be managed through sound designed mitigation measures proposed in this study report.

After noting positive and negative effects of the proposed project, consulted public indicated different suggestions to what can be addressed to minimize and avoid those negative impacts on the communities and the general physical environment to ensure sustainable development. Suggested measures include the establishment of a competent and designed structure with appropriate standards for network management trainings for concerned district, sectors staff having electricity in their attributions.

For this, the establishment of a formal participatory system of key stakeholders to enhance the efficiency operation of the project, a full implementation of regular monitoring system and implement measures for enhancing positive impacts, sensitize and build the technical capacity of the project beneficiaries t. Below is the table summarizing discussions held with consulted different stakeholders:

**Table 3:** Public consultation raised issues and proposed response by stakeholders

ISSUE RAISED	RESPONSE
Perceptions and awareness of stakeholders and the public in general, in relation to the proposed project.	- Consulted authorities in the project area and all stakeholders involved including local authorities are aware of the project, its location, purpose and they agree and acknowledge the excellent/considerable importance of the project.
Expected risks and negative effects of the Project to the beneficiaries/community.	-When there is no people mobilization, sensitization, capacity building, appropriate

	<p>and professional construction and maintenance of project infrastructures, the project will become harm to different beneficiaries.</p> <ul style="list-style-type: none"> <li>- Risk of HIV/AIDS pandemic spreading form migration/incursion of people due to employment opportunities and social interactions.</li> </ul>
<p>Anticipated benefits likely to be occurred from the project for stakeholders.</p>	<ul style="list-style-type: none"> <li>-Increased income for different employed personnel that will contribute to the development of the project.</li> <li>-Increased power efficiency and capacity that will grow district development</li> <li>-Enforced technical capacity in safety measures from different trainings offered.</li> <li>-Improved wellbeing of Districts inhabitants and surroundings</li> <li>-Increased number of business oriented in the project area.</li> </ul>
<p>The willing to accept and participate in resources mobilization for all involved stakeholders.</p>	<ul style="list-style-type: none"> <li>-Government related Ministries and institutions to advocate and enhance the technical capacity of stakeholders (especially beneficiaries)</li> </ul>

	<ul style="list-style-type: none"> <li>-Districts/Sectors to arrange and assist the bush clearing/ROW acquisition where necessary.</li> <li>-Local communities to accept obey and maintain project activities.</li> <li>-EDCL to collaborate and coordinate different stakeholders' activities relating to the implementation of the project.</li> </ul>
<p>Raised concerns/complaints from the proposed connections</p>	<ul style="list-style-type: none"> <li>-We need to be compensated for our property to be affected according to the national standards fixed by the related law</li> <li>- We need to be considered (as priority) when employing manpowers</li> </ul>

## VIII. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

Potential impacts	Mitigation measures	Responsible	Cost	Time frame
1. Avoidance of the resettlement needs	-Selection of the line corridor in other to AVOID the resettlement	EDCL		During line selection
2. Impacts on other infrastructural facilities	The distribution lines with other lines in project area	EDCL	Included in construction costs	Construction phase
3. Soil / Erosion	<ul style="list-style-type: none"> <li>-Minimization of topsoil removing at poles sites.</li> <li>-Bringing back the topsoil to its original place after having finished the erection of the poles.</li> </ul>	EDCL	Included in construction costs	Construction phase
5. Noise pollution	<ul style="list-style-type: none"> <li>-Optimization of transportation management to avoid needless truck drives; avoidance of truck movements in residential areas at least during night time.</li> <li>- Reduction of speed of trucks crossing residential areas.</li> <li>- Regular maintenance and service of building machinery and other during construction works.</li> <li>- Shut down or throttling down of noisy machinery to a minimum.</li> <li>-Utilization of ear protection devices by the workers if they are exposed to high noise level.</li> </ul>	EDCL	Included in construction costs	Construction phase

<p>6. Air pollution by gaseous like SO<sub>2</sub>, NO<sub>x</sub>, and CO to site peripheries exhausted from vehicles and machineries will lead to various chest and respiratory tract infections of human and animals</p>	<p>-Workers shall be equipped with personal protective materials.  - Reducing of speed and limited movement of vehicles.  - Routine service and regular maintenance of vehicles and Machines to reduce engine emissions.  -Burning of rubbish on site must be strictly forbidden.</p>	<p>EDCL</p>	<p>Included in construction costs</p>	<p>Construction phase</p>
<p>7. Pollution of groundwater during construction</p>	<p>Good and regular maintenance of all vehicles and machines used on site is mandatory. Maintenance activities of the vehicles shall be performed in regular service stations.  Maintenance and re-fuelling of the construction equipment shall be done only on sealed and enclosed areas (careful handling and careful maintenance, especially of the fuel tanks).  On site storage of fuel, engine oil and lubricants in locked tanks and on sealed and shadow roofed areas.  All wastes generated through the use of fuel, engine oil and lubricants like drums and containers shall be collected and disposed of properly.  Staff training to increase awareness of waste minimization and appropriate waste disposal.</p>	<p>EDCL</p>	<p>Included in construction costs</p>	<p>Construction phase</p>
<p>8. Pollution of surface water especially during rainy seasons</p>	<p>All liquid materials and lubricants shall be stored in closed containers or barrels.  Construction material as bags of cement shall be stored in containers in order to avoid rinsing out.</p>	<p>EDCL</p>	<p>Included in construction costs</p>	<p>Construction phase</p>

	Temporary sewage treatment facilities shall be provided for the construction site and the lab our camp.			
9. Solid waste	Development of a Waste Management Plan within the HSE Management Plan considering following principles: (i) waste management hierarchy of avoidance-minimization-reuse treatment-disposal; (ii) segregation of waste; (iii) minimization of construction waste by good technical planning; (iv) training of staff. Implementation of a Waste Management System.	EDCL	Included in construction costs	Construction phase
Health and safety	<ul style="list-style-type: none"> <li>- Put in place sufficient sanitation facilities for workers.</li> <li>-Provision of HIV/AIDS protection equipment in workers camps.</li> <li>-Implementation of health and safety workshop for construction</li> <li>-Information workshop for workers about the danger and the infection risk of HIV/AIDS and other STD.</li> <li>-Availability of the firstaid kit on all sites</li> </ul>	EDCL	Included in construction costs	Construction phase
11.Poor sanitation	Mobile toilets installed on site with a person in-charge of ensuring proper hygiene of these toilets.	EDCL	Included in construction costs	Construction phase

## IX.ENVIRONMENTAL MONITORING PLAN

Potential impacts	Mitigation measures	Monitoring indicators	Methods	Frequency	Responsible
Involuntary Resettlement; loss of houses and Livelihood.	Proper compensation	Cash transfer through the bank accounts	Verify the Payment order	Monthly	EDCL
Soil / Erosion	Minimization of topsoil removing at tower sites. -Bringing back the topsoil to its original place -Replanting of grass/ shrubs at tower sites in steeper slopes.	-Soil restored and properly compacted -Site inspection report	Site inspection	Monthly	EDCL
Noise pollution	-Workers shall be equipped with personal protective materials - Reducing of speed and limited movement of vehicles. - Routine service and regular maintenance of vehicles and Machines to reduce engine emissions. -Burning of rubbish on site must be strictly forbidden.	-Vehicle and trucks with inspection certificates -Site inspection report	Site inspection	Monthly	EDCL
Air pollution by gaseous like SO <sub>2</sub> , NO <sub>x</sub> , and	Good and regular maintenance of all vehicles and machines used on site is mandatory. Maintenance activities of	Inspection report	Site inspection	Monthly	EDCL

<p>CO to site peripheries exhausted from vehicles and machineries will lead to various chest and respiratory tract infections of human and animals</p>	<p>the vehicles shall be performed in regular service stations.</p> <ul style="list-style-type: none"> <li>-Maintenance and re-fueling of the construction equipment shall be done only on sealed and enclosed areas (careful handling and careful maintenance, especially of the fuel tanks).</li> <li>- On site storage of fuel, engine oil and lubricants in locked tanks and on sealed and shadow roofed areas.</li> <li>-All wastes generated through the use of fuel, engine oil and lubricants like drums and containers shall be collected and disposed of properly.</li> <li>-Staff training to increase awareness of waste minimization and appropriate waste disposal.</li> </ul>				
<p>Solid waste</p>	<p>Development of a Waste Management Plan within the HSE Management Plan considering following principles: (i) waste management hierarchy of avoidance-minimization-reuse treatment-disposal; (ii) segregation of waste; (iii) minimization of construction waste by good technical planning; (iv) training of staff.</p>	<p>Solid wastes on sites</p>	<p>Site inspection</p>	<p>Monthly</p>	<p>EDCL</p>

	Implementation of a Waste Management System.				
Health and Safety issues	<ul style="list-style-type: none"> <li>Provision of Personnel Protective Equipment(PPE) to all workers</li> <li>-Provision of HIV/AIDS protection equipment in workers camps.</li> <li>-Implementation of health and safety workshop for construction</li> <li>-Information workshop for workers about the danger and the infection risk of HIV/AIDS and other STD.</li> <li>-Availability of the first aid kit on all sites.</li> </ul>	<ul style="list-style-type: none"> <li>-Number of workers with Personnel Protective Equipment,</li> <li>-Number of First aid on all sites</li> <li>-Number of sensitization meeting on AIDS and other diseases</li> </ul>	Site inspection	Monthly	EDCL
Poor sanitation	Mobile toilets installed on site with a person in-charge of ensuring proper hygiene of these toilets	Mobile toilets on sites		Monthly	EDCL

## **X. CONCLUSION AND RECOMMENDATIONS**

### **10.1. Conclusion**

The scoping exercise has identified a number of issues pertaining to the planned transmission line. The identified potential environmental and social impacts will be mitigated by the clear selection of the line route and proper minimisation of the resettlement needs as well as the minimisation of the consumption of natural resources: land, forests and water resources.

The Environmental Management Plan provides the way forward for the implementation of identified mitigation measures.

REG-EDCL, Burera and Nyagatare Districts shall take their responsibilities to closely monitor activities especially at construction and operational stages as well and at the same time avail funds for all planned activities

### **10.2. Recommendations**

For better implementation of the measures presented in Environmental Management Plan, we recommend the followings:

- Active involvement of all stakeholders in compensation based on assets and property valuation.
- Regular monitoring based on monitoring indicators should be done regularly for proper implementation of the Environmental and Social Management Plan (ESMP).

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## 12. APPENDICES

### APPENDIX 1: LIST OF CONSULTED PERSONS AND PARTIES

No	NAMES	POSITION	INSTTUTION	CONTACT
1	Muhayimana Celestin	Branch Manager/Burea	REG/EUCL	0788330027
	Bahoranimana Barnabé	Branch Manager/Nyagatare	REG/EUCL	0788330025
2	NTAKIRUTIMANA Jean Pierre	Good Governance	Mukama Sector/Nyagatare	0788679275
3	NDACYAYISENGA Eric	Sector Land Manager	Mukama Sector/Nyagatare	0788289834
4	NIYIBIGIRA Clementine	Agronomist	Mukama Sector/Nyagatare	0788486910
5	NSANZIMANA Jean Claude	Land Manager	Kiyombe Sector/Nyagatare	0785714071
6	DUHAYIMANA Allain	Land Manager	Kiyombe Sector/Nyagatare	0783325851
7	HAKIZIMANA JeanClaude	Land Administration	Nyagatare District	0788591475
8	NGOGA John	EX/Sec	KARAMA Sector	0784893631
9		EX/Sec	Nyagatare Sector	
8	Remy Duhuze Norbert	Dir. Environmental Regulations and Poll. Control	REMA	
9	KARARA Jean de Dieu	Environmental Analyst	RDB	
10	KARANGANWA Papias	Environmental Specialist	REG/EDCL	
11	TUYISHIME Pascal	Environmental & Social Safeguards Specialist	REG/EDCL/EARP	0783776603
12	NSHIMIYIMANA Fabien	Environmental & Social Specialist	REG/EUCL	
13				