



**AFRICAN DEVELOPMENT
BANK GROUP**

**PROJECT: RWANDA-BURUNDI ELECTRICITY
INTERCONNECTION PROJECT**

COUNTRY : MULTINATIONAL (BURUNDI – RWANDA)

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) SUMMARY

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Project Name:	BURUNDI-RWANDA ELECTRICITY INTERCONNECTION PROJECT	SAP Code:	P-Z1-FA0-077
Countries:	BURUNDI - RWANDA	Category:	1
Department:	RDGE	Division:	RDGE-1

1. INTRODUCTION

This document is the summary Environmental and Social Impact Assessment (ESIA) of the Electricity Interconnection Line linking Rwanda (Kigoma-Butare) to Burundi (Ngozi-Gitega). Interconnecting the electric grids of Burundi and Rwanda by linking the localities of Gitega, Ngozi, Butare and Kigoma is part of the Multinational Power Grids Interconnection Project for the Nile Equatorial Lakes Subsidiary Action Programme (NELSAP) countries. The total expected length of the 110-220-kV line is 140.7 km, including 61.5 km in Rwanda and 79.2 km in Burundi. There are also plans to construct two new sub-stations and extend two existing ones. Pursuant to the African Development Bank's (AfDB's) Integrated Safeguard System (ISS) and the national regulations, the project is classified in Category 1 due to its nature and the number of people affected by the transmission line corridor and the land required to construct new sub-stations.

An ESIA was prepared in 2012, covering the entire project in both countries. After the Federal Republic of Germany suspended cooperation with the Republic of Burundi in June 2015, KfW withdrew from the Burundi section of the project, while project studies and implementation continued on the Rwandan section. Subsequently, the Environmental and Social Management Plan (ESMP) of the Burundi section of the project was updated in 2017 without updating the biophysical and socio-economic environment data. Two Resettlement Action Plans (RAP) were also prepared in 2017 for Rwanda and Burundi. The RAP for Burundi was prepared based on the 2015 census and inventory data. With its recent involvement in the project, mainly in financing the Burundi section of the line, the Bank demanded and financed the update of the ESIA, ESMP and RAP on the Burundi section to align them with the ISS requirements.

This summary is based on the following documents: (i) the Rwandan section ESIA prepared in 2012 and the additional study on avian fauna prepared in 2018; and (ii) the ESIA and ESMP for the Burundi section updated in 2018. The RAP was the subject of a separate summary. This summary was prepared pursuant to the Bank's ISS requirements and Environmental and Social Assessment Procedures for Category 1 projects. It presents the project itself; the alternative solutions explored versus the selected option; the political, legal and administrative framework; the description of the project environment; the significant environmental and social impacts and recommended mitigation and enhancement measures; the concerns raised during public consultations; the environmental and social management plan summary; and monitoring mechanisms.

2. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

2.1. Legal and Regulatory Framework

The policies, laws and regulations of Rwanda and Burundi applicable to the project are presented along with the corresponding environmental and social issues covered by the ISS.

Rwanda: With regard to environmental protection, the OS1 requirements are covered by the national environmental policy published by MINIRENA (2003); Organic Law No. 04/2005 on the environment (REMA, 2005) and Ministerial Order No. 003/2008 (MINIRENA, 2008) specifying the requirements

and procedures for conducting environmental impact assessments. The challenges linked to involuntary resettlement under OS2 are included in the National Land Policy (MINIRENA, 2004), the National Land Use and Development Master Plan (MINIRENA, 2004), Law No. 32/2015 (MINIJUST, 2015) specifying the conditions and procedures of expropriation in the public interest and the national land policy published by MINIRENA (2004) on appropriate land management systems as being crucial for land security; the Land Management and Development Master Plan (MINIRENA, 2004). The challenges of biodiversity are covered by Rwanda's 2015 National Biodiversity Strategy and Action Plan, and Ministerial Order No. 007/2008 of 15/08/2008 establishing the list of protected animal and plant species. Rwanda is also signatory to the Convention on Biological Diversity. These instruments cover OS3. For its part, OS4 is upheld by the Integrated Water Resources Management (IWRM) policy, 2010. With regard to working conditions covered by OS5, Law No. 13/2009 du 27/07/2009 (MIFOTRA, 2009) governs work in Rwanda.

Burundi: OS1 concerning the environment is covered by Law No. 1/010 of 30 June 2000 which lays down fundamental rules of environmental management and protection as well as Decree No. 100/22 of 7 October 2010 on environmental impact assessment procedures. With regard to involuntary resettlement, OS2 requirements are included in Law No. 1/13 of 9 August 2011 to revise the land tenure code and Decree No. 1/6 of 3 March 1980 specifying the legal status of protected land. The OS3 requirements are reflected in the law on the establishment and management of protected areas in Burundi, Law No. 1/07 of 15 July 2016 to revise the Forestry Code and Decree Law No. 1/033 of 30 June 1993 on plant protection and the Convention on Biological Diversity. OS4 is covered by Law No. 1/02 of 26 March 2012 to institute the Water Code. Finally, OS5 is treated by Decree Law No. 1/037 of 7 July 1993 instituting the Labour Code.

2.2. Institutional Framework

Rwanda: The environment, land and energy are managed by several bodies. The main ones are the Ministry of Infrastructure (MININFRA); Rwanda Energy Group (REG) responsible for project implementation and its two subsidiaries: Energy Utility Corporation Limited (EUCL) and Energy Development Corporation Limited (EDCL) tasked with energy development and public service provision respectively; the Ministry of the Environment (MoE); the Rwanda Environmental Management Authority (REMA); the Rwanda Land Management and Use Authority (RLMUA); the Rwanda Development Board (RDB); and local governments.

Burundi: The institutional framework of project management involves the Ministry of the Environment, Agriculture and Livestock (MEAE); the Burundi Environmental Protection Authority; the Ministry of Hydraulics, Energy and Mines; the Ministry of Health; the Ministry of Trade, Industry and Tourism; the Ministry of Transport; and the Ministry of Equipment and Regional Development. The following structures are involved in the implementation of the project: REGIDESO, provincial and communal authorities and civil society organisations.

2.3. International Standards

African Development Bank

The project is subject to the ISS requirements, especially the Operational Safeguards (OS). The project will trigger the five OSs: (i) OS1 due to nature; (ii) OS2 since the project will affect 1,561 households; (iii) OS3 considering the potential impacts on avian fauna; (iv) OS4 due to potential waste production during works and the use of SF₆ gas which when emitted can affect the ozone layer; and (v) OS5 given

the hazards to which workers are exposed especially those working at an altitude. Other relevant policies and guidelines remain applicable once triggered under the ISS. The main ones include the Policy on Poverty Reduction (February 2004), the Gender Policy (2001); the Framework for Enhanced Engagement with Civil Society Organisations (2012); the Disclosure and Access to Information Policy (2013); the Handbook on Stakeholder Consultation and Participation in AfDB Operations (2001); and the Bank's Policy on Population and Strategies for Implementation (2002).

KfW

The line section in Rwanda is financed by KfW. Therefore, KfW's sustainability standards are applied. The following framework is required: (i) all applicable laws and regulations governing the environment, health and safety at work and social law; (ii) international law, including conventions and treaties adopted by the host country (Rwanda and Burundi respectively) and applicable to the project; (iii) the applicable World Bank (WB) environmental and social safeguards; (iv) fundamental ILO labour standards; and (v) the World Bank Group Environmental, Health and Safety Guidelines (EHS). KfW also applies guidelines for human rights and gender related standards and principles to be mainstreamed in programme proposals for German bilateral technical and financial cooperation; and the United Nations Basic Principles and Guidelines on Development-Based Evictions and Displacements, namely §§ 42, 49, 52, 54 and 60, for resettlement aspects. With regard to workers' accommodation, the project will comply with international standards governing workers' housing such as "Workers' Accommodation: processes and standards - a guidance note by IFC and the EBRD".

International Guidelines of the Electricity Sector

Specific international energy-sector guidelines also apply to the project. These include: (i) the International Commission on the Non-Ionizing Radiation Protection (ICNIRP) Guidelines for limiting exposure to time-varying electric, magnetic and electromagnetic fields (up to 300 GHz); and (ii) DIN Guidelines and those of the International Council on Large Electric Systems concerning the use of SF₆ gas in switching systems and the European Parliament/Council Directive 2004/40/EC of 29 April 2004 on minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields) within the meaning of Article 16(1) of Directive 89/391/EEC.

Furthermore, Rwanda and Burundi are signatories to several international conventions on environmental and social matters which will apply to the project.

3. PROJECT DESCRIPTION AND JUSTIFICATION

The proposed 110/220kV Kigoma-Butare-Ngozi-Gitega overhead transmission line between Rwanda and Burundi is part of the NELSAP Regional Transport Programme aimed at linking five Nile Equatorial Lakes Region countries, namely Burundi, the Democratic Republic of Congo (DRC), Kenya, Rwanda and Uganda. The general objective of the line, the subject of this project, is to help to improve the population's living conditions and the economic and social development framework through a greater availability of electric energy at affordable cost.

The project is in line with the priorities outlined in the Country Strategy Papers for Burundi and Rwanda. For Burundi, this involves the 2010-2015 Growth and Poverty Reduction Strategy Framework, which is still in force because the crisis situation which made it impossible for the country to adopt a new strategic framework. For Rwanda, this is the second Economic Development and Poverty Reduction Strategy (EDPRS II). The development of energy infrastructure is one of the pillars of both countries' national strategies. Indeed, the economic and social development of Burundi and Rwanda is beset by major difficulties due to such constraints as the structural deficit and very high cost of energy. The electricity access rate is low in both countries, standing at around 10% in Burundi and 30% in Rwanda in 2016. The Burundi-Rwanda interconnection project is ranked among the priority integrative projects that will help to optimize the use of energy resources by pooling the power generation and transmission facilities of the East Africa region.

The project will comprise the construction of a 220-kV transmission line between Kigoma (Rwanda) - Butare (Rwanda) – and Ngozi (Burundi) - Gitega (Burundi), as well as the construction and extension of the corresponding sub-stations. The new 220 kV level reflects the region’s projected medium- and long-term electricity needs. Although the transmission line will be designed to carry 220 kV, it can also initially run on 110 kV if that becomes necessary.

In Burundi, the project will: (i) construct a 220 kV, single-circuit transmission line at the Rwanda/Burundi border at Ngozi and then from Ngozi to Gitega; (ii) construct a 220/30 kV sub-station at Ngozi with a connection to the existing 30kV distribution network; (iii) transform the 110 kV sub-station at Gitega to a 110/30 kV one by installing a set of 110 kV bars and 2 additional 110 kV busbar connections at Ngozi; and (iv) connect the line to the Bujumbura central control centre.

In Rwanda, the project will: (i) construct a 220 kV, single-circuit transmission line from Kigoma to Butare, and from Butare to the Rwanda/Burundi border; (ii) extend the existing 110 kV sub-station at Kigoma; (iii) construct a 220/30 kV sub-station at Butare and connect it to the existing 30kV distribution network; and (iv) connect the line to the Kigali central control centre.

The total length of the transmission line to be constructed is about 140.7 km (79.2 km in Burundi and 61.5 km in Rwanda). The project components are the following:

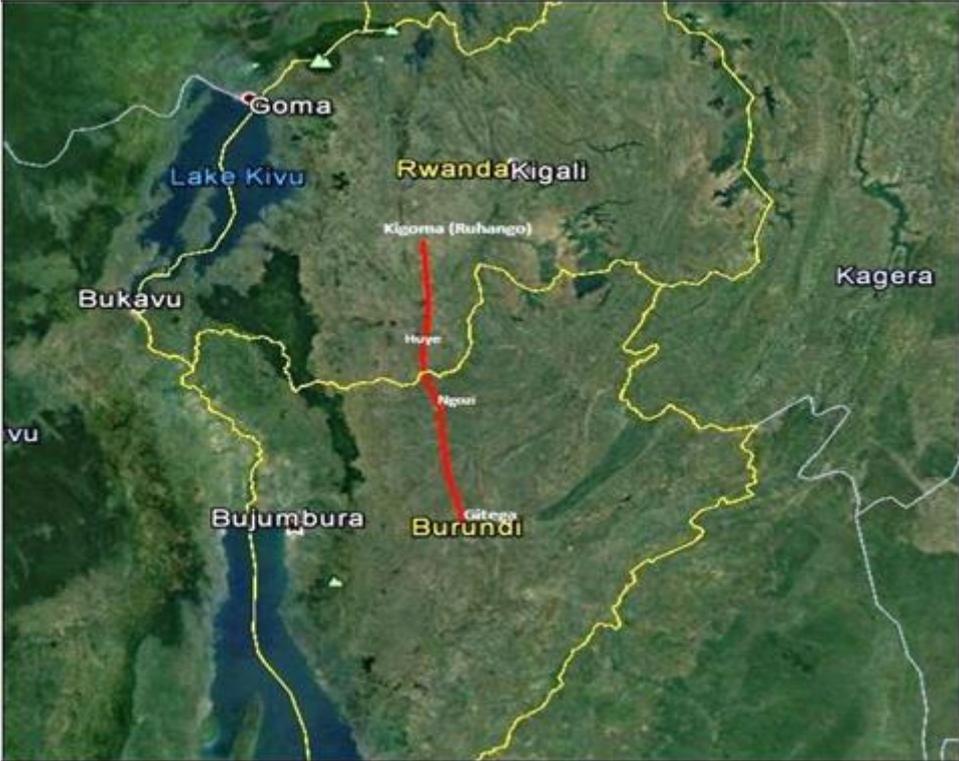
A. Construction of transmission line

- Line
- Sub-stations

B. Project management

- Operation of the National Project Implementation Unit;
- Works control and supervision;
- RAP implementation (including Information-Education-Communication (IEC) campaigns);
- Financial audit.

Transmission Line between Rwanda and Burundi



Project implementation is underway. In Rwanda, contractors have been recruited for the construction of the line and sub-stations. In Burundi, bidding documents for the recruitment of construction contractors have been prepared in accordance with KfW standards, but the tenders have not been published.

4. DESCRIPTION OF THE PROJECT ENVIRONMENT

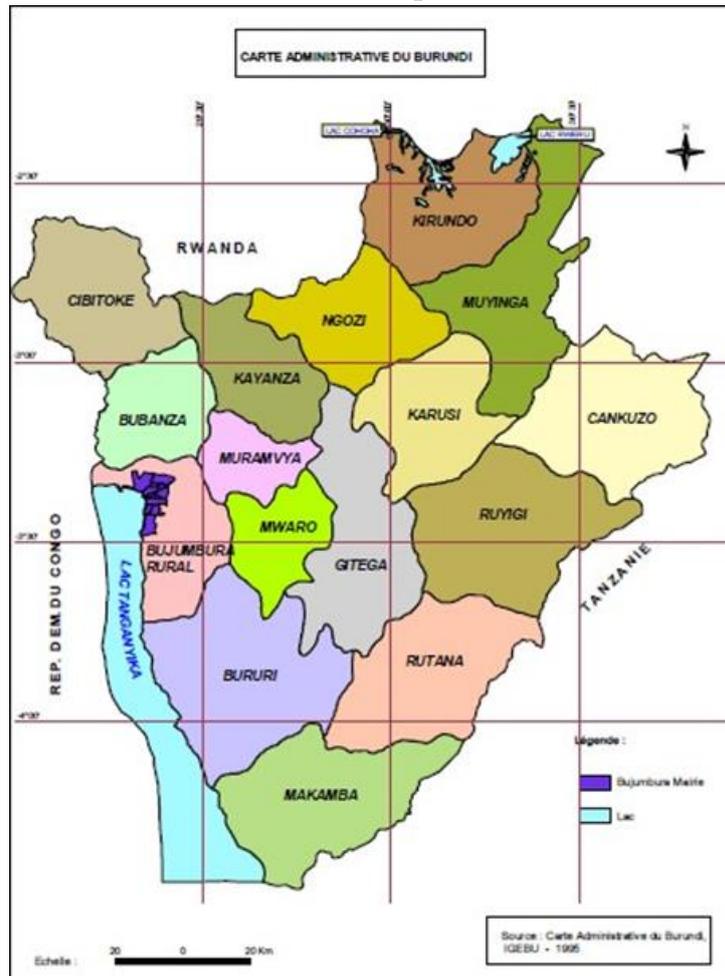
4.1. Study area

The biophysical study area covers the line corridor and sub-station sites as well as their immediate environment. Socio-economically, the study area in Rwanda is situated in the Western Province which stretches from Kigoma in Ruhango District to Gisagara District at the border with Burundi. Therefore, it crosses the districts of Ruhango, Nyanza, Huye and Gisagara. In Burundi, the study area covers the central part of the country and crosses the districts of Ngozi and Gitega. The communes concerned are Mwumba, Ngozi (Ngozi province), Muhanga (Kayanza province), Mutaho, Giheta and Gitega (Gitega province).

Administrative Map of Rwanda



Administrative Map of Burundi



4.2. Physical Environment

Geography: In both countries, the study area lies in the mountainous Central Plateau which in Rwanda, consists of mountains, steep hills and deep valleys. Much of the area stands at an altitude exceeding 1,433 m. In Burundi, the altitude of the Central Plateau ranges from 1,350 m to over 2,000 m.

Geology, seismology and soils: Both Rwanda and Burundi are situated in the East African Rift valley, where the Earth's crust extends over 3,000 km in length. This zone is prone to earthquakes and has several volcanoes. Earthquakes of magnitude 5 to 7 struck the Lake Kivu region in 2005 and 2008, causing significant damage in the southwest border region between Rwanda and the Democratic Republic of Congo (Bukavu region). Although the earthquakes were also felt in Kigali, no damage was reported there. The 2008 earthquakes were also felt in Burundi, disrupting hydro-electric energy and causing power cuts around the Great Lakes. However, in the study area, the major seismic risk remains relatively low overall. In general, soil erosion is a major problem in Rwanda and Burundi. FAO classifies about 40% (800,000 ha) of land in Rwanda as having a very high risk of erosion. Soils in Rwanda are generally dominated by alternating granite and gneiss formations while ferralsols and ferrisols predominate in Burundian soil. Shale and micaceous acid rocks are the main basic materials. Fertility is variable on Central Plateau soils, where the study area is located, due to over-use, erosion and poor agricultural practices.

Landscape: The entire study area is surrounded by a very dense network of rivers and streams used for agricultural purposes. Many hills have small wooded areas with eucalyptus, cypress and pine plantations on their summits and are separated by large, flat and marshy valleys where rice is grown. Despite the green plant cover, the general impression is that the study area's landscape is of uniform nature. According to the landscape evaluation system, the landscape quality in the whole study area can be classified as "good". No protected areas or areas of exceptional landscape are found in the study area.

Climate: The study area's climate is tropical, but temperate due to altitude. In the Rwandan part, annual rainfall varies between 900 and 1,600 mm and the average temperature is up to 19°C. In the Burundi part, the transmission line is in the climatic region of the High Plateaux of the centre, recording up to 52% of Burundi's total rainfall. The average annual rainfall of this region is from 1,200 to 1,500 mm and the average annual temperature is 17°C in the west and 20°C in the east.

Hydrography and hydrology: The study area crosses numerous small creeks and rivers. Most of the river basins are used for agriculture (wetlands for rice cultivation). The largest river in the study area is the Akanyaru which borders Rwanda and Burundi. In the urban centre of Ngozi, the steep slopes provoke floods in the heavy rainy season. The natural region of Buyenzi in Kayanza Province is characterised by marshes in the river basin catchment areas of the Ruvubu and the Nkokoma. The rivers found in the commune of Gitega are part of the Nile Basin catchment area, the main tributaries being the Ruvubu and the Ruvyironza.

4.3. Biological Environment

Rwanda: Although Rwanda is a small country, it has a remarkable variety of ecosystems, flora and fauna. Biodiversity is very high in protected areas and birds in IBAs. In densely populated areas where intensive agriculture is practiced like the study area, biodiversity has declined. With growing human settlements and expanding agriculture, wildlife (large mammals) has become scarce. With regard to birds, the country's three national parks (Akagera, Nyungwe and Volcano National Park) and the

related birds as small herons, cranes and egrets which use for example the rice paddies as feeding habitats. The following maps show bird zones within the project area in Burundi.

Zone with bird presence in Burundi



Birdlife is abundant in the study area due to the presence of wetlands conducive for water birds and sower birds. The crest of Mount Gihinga and the valley of River Ruvubu are corridors for migratory birds. Three bird species in the study area feature on the IUCN Red List, namely: *Ardeola idae* (Endangered), *Chloropeta gracilirostris* (Vulnerable) and *Falco naumanni* (Least Concern). Note that no critically endangered species is affected by the project.

4.4. Socio-economic Environment

Demographics: The population of Burundi was estimated at 10.4 million in 2017, 50.8% of them women and 49.2% men, and an annual population growth rate of 2.4%. If this pace continues over the next two decades, Burundi will have 11.5 million people in 2023. The population is over 90% rural and comprises three ethnic groups: the *Hutus*, *Tutsis* and *Twas*. With a population density of 310 inhabitants per km², Burundi is among the most densely populated African countries. In Rwanda, the population grew from about 2.6 million in 1960 to 8.2 million in 2002. In January 2018, the Rwandan population was estimated at 12.3 million people, representing a 2.40% increase over 2017. Due to external migration, the population dropped by 16,486 people. The male-to-female ratio was 960 men for 1,000 women, which is lower than the global ratio. In 2012, the population density was 415 inhabitants per km². Compared to its neighbours, Rwanda is the most densely populated country in the region.

Gender: Women living in the study area still suffer the aftermath of recent conflicts. Improving their situation, pursuant to the national laws of both countries is high on the agenda of Rwanda's 2020 Vision and Burundi's 2025 Vision as well as the Millennium Development Goals (MDGs). Despite the visible progress achieved by Rwanda (more than in Burundi), particularly as far as gender parity in local government is concerned, access to healthcare and education remains a challenge. With regard to the project, gender disparities are mainly linked to access to property rights.

Land Use: Land in the study area is mostly used for agriculture (60% to 80% of the land area). Although banana plantations are frequent, coffee is the only export crop. The forest cover is very low (5-10%), consisting mostly of eucalyptus plantations. Most forest areas are situated on hills. The stand structure is dispersed and agricultural plots measure 0.5 hectares or smaller.

Livelihoods: The population in the study area practices traditional low-yield subsistence farming. Agricultural extension services are not present and programmes undertaken in recent years to improve the population's living standards by increasing agricultural production and food security are rare and where they exist, have not yet yielded positive results.

Education: Rwanda has made tremendous progress in improving the access of boys and girls to education at all levels and promoting gender equality in the educational system. Although the RIDHS 2008 census shows a net improvement of education for all Rwandans, much still remains to be done in the education sector. Enrolments have risen significantly, to close to 90% in primary school. The level of education of Rwandan citizens aged 15 to 49 years has also improved. In Burundi, access to basic social services including education is limited. The gross rate of enrolment which was up to 67.8% in 1993, fell to 42% in 1996. Although the situation gradually improved, needs remain very significant given the number of school-age children, the destruction of infrastructure due to the crisis, the drop-out rate especially among girls and the shortage of teachers. The number of pupils per teacher in the study area is greater than 60 pupils.

Health: The health sector in Rwanda has made significant progress over the last few years, but continues to depend heavily on external financing. In 2007, 56% of health expenditure was financed from external sources, creating problems of sustainability. Efforts to fight AIDS and malaria have been very successful: HIV prevalence was 2.8% in 2008, one of the lowest in sub-Saharan Africa; and the number of severe malaria cases fell by 32.3% between 2006 and 2007. However, these two diseases continue to overstretch Rwanda's health system and, in 2008, added to HIV/AIDS-related opportunistic infections, accounted for 35% of cases of hospital deaths (Ministry of Health, 2009a).

Historical and Cultural Sites: In Ruhango, Nyanza and Butare Districts, no cultural or historical site is situated in the study area. Four cultural/historical sites have been identified in Gisagara District: Mount Buntu, Ityazo rya Ruganzu, Mount Nyarubuye and Nyirabarakobwa. In Burundi, no evidence of historical and cultural sites has been found in the study area.

Tourism: Lake Kivu and the Volcano National Park with its mountain gorillas are key tourist destinations in Rwanda. Attractive regions for tourists in Burundi are the Nile-Congo divide, Bujumbura and Lake Tanganyika, the Mosso region, and the depressions to the east and north-east of the country. The study area itself has no key tourist destinations and no developed tourist sites are found along the transmission line area.

5. PROJECT ALTERNATIVES

5.1. No-Project Option

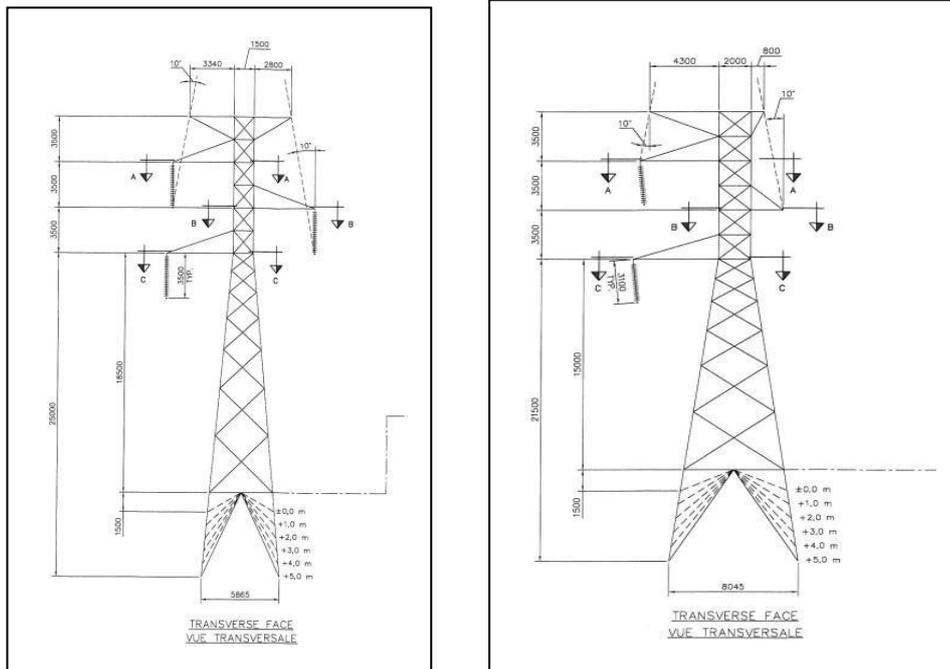
As presented in the project rationale, Rwanda and Burundi face a significant shortfall in electricity generation which especially affects rural areas. This shortage is felt in all the socio-economic sectors of both countries. Therefore, to not implement the project would be tantamount to hindering the economic development and consequently, efforts to reduce poverty in these countries.

5.2. Project Alternatives

Pylon Design

During implementation of the proposed project, the highest priority will be given to minimizing necessary resettlement activities. As a result, a pylon design where all conductors are arranged at the same level was rejected since this pylon type would require a wider right of way with implications for resettlement. The type of pylon selected has a three-level conductor with the shortest possible crossarms to minimize the required right of way.

Pylon Types proposed for the 220kV Transmission Line



Pylon heights here range between 30 and 40 m, depending on the landscape structure and pylon type (for example, the high-tension line tower). The dominant horizontal span is about 300 m. The total length of the 140.7 km line will require about 460 pylons. The proposed line's vertical clearance relative to the road will be 9 m and 8 m for pedestrian areas. For telecommunication lines, the minimum clearance will be 5 m and 4.5 m.

Choice of conductors

2x240/40 Aluminium Conductor Steel Reinforced (ACSR) cables will be used instead of the heavy 1 x 570 ASTER AAAC (*All Aluminium Alloy Conductors*) which need much heavier wire-fitting machines, which will in turn require wider access roads and enhanced bridges, etc. The incidence on the scale of resettlement activities will be significant since houses are often built very close to roads.

Choice of Transmission Line Alignment

Five technical alternatives for the Rwanda – Burundi interconnection were explored:

- **Variant 1:** Kigoma (Rwanda) - Rwegura (Burundi), direct connection, no intermediate sub-stations;
- **Variant 2:** Kigoma (Rwanda) - Butare (Rwanda) - Rwegura (Burundi), direct connection with the Butare sub-station in Rwanda;
- **Variant 3:** Kigoma (Rwanda) - Butare (Rwanda) - Ngozi (Burundi) - Rwegura (Burundi), with the Butare and Ngozi sub-station, Bujumbura is not inside the 110/220 kV loop;
- **Variant 4:** Kigoma (Rwanda) - Butare (Rwanda) - Ngozi (Burundi) - Gitega (Burundi), with the Butare and Ngozi sub-station, Bujumbura is inside the 110/220 kV ring;

- **Variant 5:** Kigali Airport (Rwanda) - Kigoma (Rwanda) - Butare (Rwanda) - Ngozi (Burundi) - Gitega (Burundi), with the Butare and Ngozi sub-station, Bujumbura is inside the 110/220 kV loop.

Variants involving Rwegura will require crossing the Kibira National Park, about 16% of which is made up of a primary mountain tropical forest and adjoins two large tea plantations at Teza and Rwegura. As the sacred nature of this forest even before the colonial period, contributed to its conservation, options that did not cross the protected area (Variants 1 to 3) were explored. The line extension up to the Kigali Airport sub-station (Variant 4) was deferred because this sub-station did not exist at the time. Finally, the variant to interconnect Kigoma to Gitega via the Butare and Ngozi sub-stations was selected.

Positioning of sub-stations

For the Ngozi sub-station, different possible sites were studied. The first option, (1a), was rejected because the site is an old cemetery. Recently dug graves were found close to the site. Option 1b was determined to be the most feasible as the site has a good link to a major road also usable by heavy-duty trucks. It is partly covered by eucalyptus trees of no major ecological value and will not require resettlement since the site is occupied by government facilities.

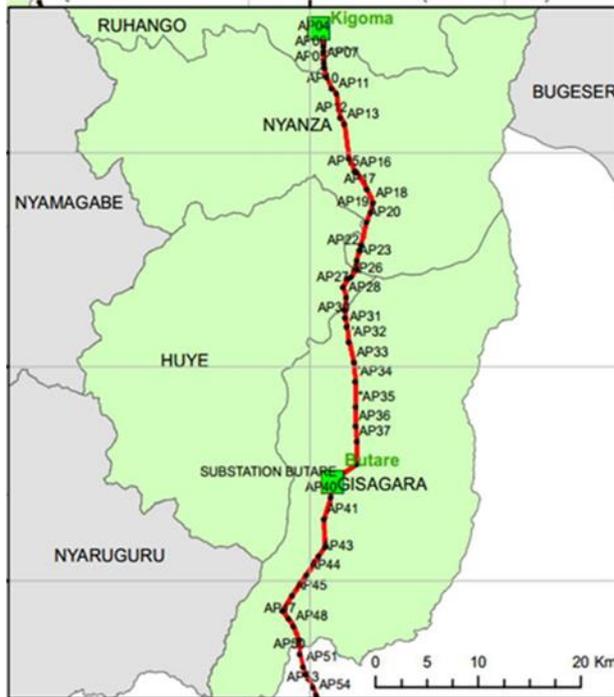
Project Option selected

The project option selected after analysis of variants is described in the following sections.

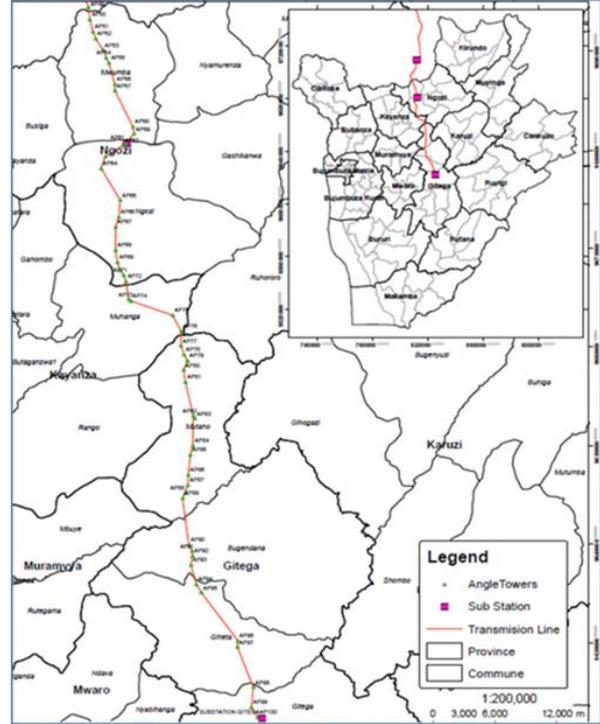
Alignment

The transmission line design is a 220kV line, initially operated at only 110 kV, but subsequently upgradable to 220 kV. The planned line's total length will be 140.7 km, with 61.5 km of the line corridor situated in Rwanda and 79 km in Burundi. The latter comprises the Kigoma-Butare section (44.6 km) and Butare-Burundi border section (16.9 km). The Burundi section of the transmission line comprises the Ngozi-Gitega (62.7 km) and Rwanda border- Ngozi (16.5 km) sections.

Line alignment in Rwanda



Line alignment in Burundi



Right of Way

The electricity transmission line's right of way is a strip of land to be used by the electricity utility company for the construction, operation, maintenance and repair of line facilities. Generally, the right of way should be left free of unauthorized structures that might interfere with the electric line. The right of way width depends on the line voltage and height of structures. As the line will ultimately be upgraded to 220 kV, a right of way of 30 metres was defined, pursuant to national guidelines, making fifteen metres on each side of the centre of the line. This right of way will also serve as a buffer zone. The land will remain the property of its current owners and agricultural activities authorized therein except for commercial trees standing taller than 1 metre since they can interfere with the line and hamper maintenance activities.

Towers

Towers will comprise tangent pylons necessary when the line changes direction, and interval pylons to hold up the line between tangent towers as needed and based on topography. Pylon height will range between 30 m and 40 m, depending on landscape and pylon type. The maximum area for permanent pylon installation, mostly for foundation, will be 100 m² (10 m x 10 m) per pylon. There are plans to construct forty-nine (49) tangent pylons in Rwanda and fifty-four (54) in Burundi. The number of interval pylons required has not been confirmed and will depend on detailed design work.

Sub-stations

Rwanda: The connection at Kigoma will be via the existing 110kV sub-station, which will be extended accordingly. A new sub-station will be constructed at Butare. The exact scale of extension of the Kigoma sub-station has not been worked out in detail, but it must be about 2.5 ha and will only concern land belonging to the Government, used as military camp. The new sub-station at Butare will be built about 7 km to the East of the city centre, on an area of 2.75 ha. The site was used earlier as a quarry; but part of it is now used for agriculture.

Burundi: The new sub-station at Ngozi (Vyegwa) will be built close to the existing industrial zone on a 2.5-ha area. The site land chosen was given to REGIDESO by the Town Planning Services. The connection at Gitega will be made via the existing 110 kV sub-station, to be rehabilitated and extended accordingly. The exact scale of extension of the Kigoma sub-station has not been worked out in detail, but it must be about 3 ha. Since the land already belongs to REGIDESO, no residential houses will be affected.

Access Roads and Borrow Site

Access roads and borrow sites for materials will be necessary. Some roads will be temporary just for construction purposes but others will be permanent to facilitate access for maintenance and inspection. Although existing borrow sites can be used, other new sites may be needed. The location of these roads and borrow sites will be identified and the detailed design prepared by the works contractor.

6. POTENTIAL IMPACTS AND MITIGATION MEASURES

6.1. Planned Works

The following works are likely to generate negative and positive impacts in the project area.

Clearance of right of way and access roads: Shrubs and trees standing over one-metre tall situated in the 30-metre corridor, will have to be cleared and felled. Additional clearing beyond that point may also be required for access roads during construction to enable the transportation of construction materials and staff from the road position nearest the line corridor.

Erection of pylons: Lattice-type 30-40-m steel towers will be erected at regular intervals of 300 metres to carry overhead conductors. Each tower will be supported by 4 concrete foundation plates measuring 2 x 2 m x 2.5 m deep; the total encumbrance of the pylon will not exceed 100 m² (10 x 10 m).

Construction of sub-stations: The Kigoma sub-station extension will cover about 2.5 hectares while the construction of the Butare sub-station will require 2.75 ha. On the Burundi portion, a new sub-station will be constructed at Ngozi, close to the existing industrial zone, on an area of 2.5 ha. The Gitega sub-station will be rehabilitated/widened while the Kigoma sub-station will be widened.

6.2. Negative Impacts

Impacts during pre-construction phase

During the pre-construction phase, several impacts will be avoided due to the choices made during the selection of project options. The narrow conduits and light conductors used will help to reduce the right of way and the need for wider access roads. This will limit environmental impacts and resettlement. In addition, thanks to the alignment selected, impacts on the Kibira National Park and facilities (for example, airports, airstrips and communication stations) will be avoided.

Negative Impacts during the Construction Phase

The main negative impacts identified during the construction phase, are of medium to high intensity if no mitigation measures are applied.

Impacts on the **physical** environment include: (i) declining air quality; (ii) increase in noise level; (iii) compaction and possible soil erosion, and the risks of soil contamination; and (iv) potential modification of water quality through contamination of surface and groundwater.

At the **biological level**, habitat loss will be observed, including a fragmentation of the terrestrial habitat of certain species on small portions of project land. Meanwhile, all land affected by the project is highly influenced by human activities and used mainly for agriculture. Most trees therein are the eucalyptus and pine species, plants that are not endemic to Rwanda or Burundi. Endangered or threatened fauna and flora and significant breeding habitats are not represented in the line corridor. Aquatic and semi-aquatic habitats will be avoided to the extent possible but river and stream crossings will disturb the associated local fauna and flora. Construction projects can generate different types of wastes that can contribute to pollution if not adequately managed.

Avian fauna habitats: The bird habitats found along the proposed transmission line are already highly degraded. Clearing activities will probably have an impact on natural trees and riparian vegetation, but deforestation will mostly affect eucalyptus and pine plantations. In a context of degraded landscape, these plantations/trees and the residual natural vegetation can serve local bird communities mostly as nesting sites for certain birds. However, habitat loss is deemed to be minimal and no critically endangered species will be affected by potential losses of vegetation since the only endangered species present in the zone is located in the marshes which are avoided by the line alignment.

Construction activities will also lead to more noise, likely to disturb the bird species present in the zone. Noise can reduce the local effectiveness of bird communications. This impact can be greater during the reproduction season because the noise could compete with mating behaviour. However, birds can migrate to similar but quieter habitats situated close to the construction zones. In the short term, this could lead to greater competition for habitat, given the concentration of bird communities in these adjacent habitats.

In **socio-economic terms**, the project's greatest impact will be the physical and economic resettlement of the people located along the line's 30-m passage corridor on sites identified for sub-stations and on the alignment of access roads and potential borrow sites to be identified subsequently. In Burundi, the project will affect 1,561 households (6,712 people), 124 of them physically resettled. In Rwanda, 950 households (3,904 people) will be affected, and 140 of them will be physically resettled. Most households will suffer losses of crops and trees. The high number of affected persons is due to the small size of farming plots and population density.

The other social impacts will relate to: (i) disruption in the quality of life, health and safety of the local population and employees during works due to increased traffic, risk of communicable diseases, changes in air quality and surrounding noise; (ii) social cohesion considering possible tensions between workers and locals, disruption in women's livelihood activities and resettlement-related friction; (iii) the cultural heritage with possible disturbance or destruction of sites unidentified at this stage; and (iv) a temporary degradation of the landscape due to the erection of pylons.

Negative Impacts during operation and maintenance

The **physical** environment can be affected during the operational and maintenance phase by: (i) noise coming from the new line, especially the "corona effect", which, as similar 110/220kV projects have shown, is not considered a significant issue. The intensity of noise created by this effect is influenced by weather conditions. Humidity, fog or rain raise the noise level, but these weather conditions are not the dominant characteristics of the study area. The noise generated on sub-station sites will also be minimal and will not affect the population outside the enclosure but there is risk of soil contamination by oil on the sub-station sites; (ii) during line maintenance works, noise and dust could be observed. Ultimately, the main potential negative impact will be the permanent modification of the landscape due to the presence of the line.

Biologically, the presence of the transmission line can modify and degrade the bird habitats in these two countries, since the line is an obstacle that can cause electrocution or collision leading to wounds or death. However, the risk of electrocution associated with the line between Kigoma and the Burundi border is expected to be low since active components will be at a distance of 3 m from the nearest sensitive zone. As the wing span of the largest bird, the African Goshawk, is 2.75m for females, this risk can be considered low or even nil. According to IUCN, a study was conducted on the grey crowned

crane (*Balearica regulorum*), an endangered species, in the Rwasave wetlands near the study area in Rwanda. The low density of trees in the region and presence of agricultural fields nearby can encourage birds of prey to use the pylons as perches. The frequent presence and behaviour of predator birds close to the high-voltage line can lead to higher rates of mortality among them, especially the black kite and the augur buzzard generally studied across the study area.

The main **socio-economic** challenges will be linked to the health and safety of workers and the local population. This aspect is analysed in greater detail in Section 8.

6.2. Positive Impacts

One of the main expected positive impacts during the works and operational phase is the creation of about 50 jobs during the construction phase, 35 of them semi-skilled, and 5 jobs during the operational phase. Construction works will also contribute to skills transfer to local workers. Apart from direct jobs, the presence of the works site will lead to the supply of different goods and services to meet workers' needs.

In the operational phase, the project will supply electricity to about 720,000 targeted city and rural dwellers by 2025, which will help to improve the beneficiaries' well-being and create conditions for more income-generating activities and better public service quality (health and education) in the urban centres served.

7. MITIGATION AND ENHANCEMENT MEASURES

7.1. Regulatory and Contractual Measures

During the construction phase, the standard mitigation measures applicable to construction sites will be implemented. Before works commence, a framework for managing works-site impacts will be put in place and aligned to the Contractor recruitment and pre-construction stages.

Choice of Contractors: Environmental and social clauses will be included in bidding documents (BD) to better protect the general and socio-economic environment during works. Additionally, the Contractor must ensure compliance with national environmental laws and regulations, land laws and AfDB requirements. The Control Office will ensure that the Contractor obtains the required permits and authorizations to carry out the works.

Contractor's Undertaking: Contractors will be bound to submit a Site Environmental and Social Management Plan (SESMP). This Plan must be approved by REGIDESO within 45 days of award of the contract. The SESMP will treat potential worksite impact, including the conditions for deforestation and reforestation, air quality, surrounding noise level, the management of traffic, wastes, soils and erosion, works in wet areas, health and safety, and damages during works. The contractor will also prepare a local staff recruitment plan and code of conduct. The SESMP shall constitute the sole reference document in which the contractor details the organisational and technical measures he intends to implement to comply with contractual obligations relating to the environment, hygiene, health and safety.

Prior Compensation: The project affected persons identified in the Resettlement Action Plan must be fairly and equitably compensated before the commencement of works.

7.2. Construction Phase Measures

The following measures will be implemented for impacts on the **physical environment**:

- **Air Quality:** Measures here mainly concern the regular maintenance of construction site vehicles, reducing their speed and the number of unnecessary trips, regular watering of access roads, covering transported materials with tarpaulin and prohibiting the burning of worksite wastes.
- **Sound Environment:** The sound environment should be preserved through the use of vehicles in good condition, regular maintenance, the optimisation of the movement of trucks and reduction of their speed, compliance with noise limits in residential, institutional and educational areas and use of protectors for workers in case of exposure to high noise levels.
- **Soil Quality and Erosion:** Working methods and various types of measures will be rolled out. These include avoiding sensitive areas, working in the dry season, removing as little topsoil as possible, protecting excavated materials against runoff, using excavated materials to rehabilitate degraded land along the line, and replanting grass and shrubs in the pylon sites on the steepest slopes. The erosion management plan will supplement these measures.
- **Contamination of Soil and Water:** Apart from regulatory measures pertaining to works inside or close to watercourses, the Contractor will make provisions for emergency intervention measures in case of spillage as well as the for the collection and disposal of wastes, and used oil/water.

In addition to management plans related to the **biological environment**, the following key measures are planned:

- **Flora:** During the topographical survey, identify protected tree species like *Pterygota mildbraedii* and minimize zones to be deforested by using GPS technology and the manual labour to avoid additional deforestation attributable to heavy equipment. Shrubs standing under 5 metres tall in the right of way as well as low-lying vegetation along watercourses and steep slopes must be kept on a strip of land 20 m wide. Furthermore, it will be necessary to use existing access roads and quarries, reduce as much as possible the required right-of-way width for the installation of conductors when the transmission line crosses plantations, offset the loss of vegetation through compensatory reforestation on a 2 to 1 ratio and compensate the owners concerned for the loss of commercial trees. The Contractor will also ensure that invasive exotic species are not introduced and prohibit the collection of non-wood forestry products by workers.
- **Fauna:** In a bid to disturb faunal habitats as little as possible, biological corridors will be preserved by keeping most vegetation intact and limiting felling within the corridor to a certain height so as to enable small animals to cross. To respect the habitat of organisms, watercourses, marshes and trenches will be kept free of debris from vegetation and other wastes. Poaching will be prohibited.

In **socio-economic terms**, the principles measures recommended are the following:

- **Land and livelihoods:** Preparing a Resettlement Action Plan which will make it possible to identify and compensate persons whose properties and livelihoods are affected.
- **Social cohesion:** Risks linked to social cohesion due to resettlement and the presence of the works site will be limited by the strict implementation of RAP measures, the establishment of a complaints management system and the compensation for property which, though outside the agreed right of way, are affected by construction activities.
- **Gender:** The need to bridge inequalities and protect women against potential violence will be factored in by involving women during compensation for loss of livelihood, employing about 40% of women on the works site, targeting women and girls in particular for awareness raising on the risks of pregnancy and the dangers of contracting HIV/AIDS or other sexually transmissible diseases and raising awareness among workers on zero tolerance for sexual harassment at the work place or in workers' camps during the day or at night.
- **Quality of life:** Measures targeting the reduction of noise, dust and greater traffic generated by works will be implemented. Besides, an STD awareness-raising plan will be prepared targeting the local population and workers including free and voluntary counselling services and tests and distribution of condoms.
- **Cultural heritage:** In case of a chance discovery, the position of the pylons will be shifted to avoid potential sacred, cultural or archaeological sites. Furthermore, the works will be interrupted and the competent authorities informed.

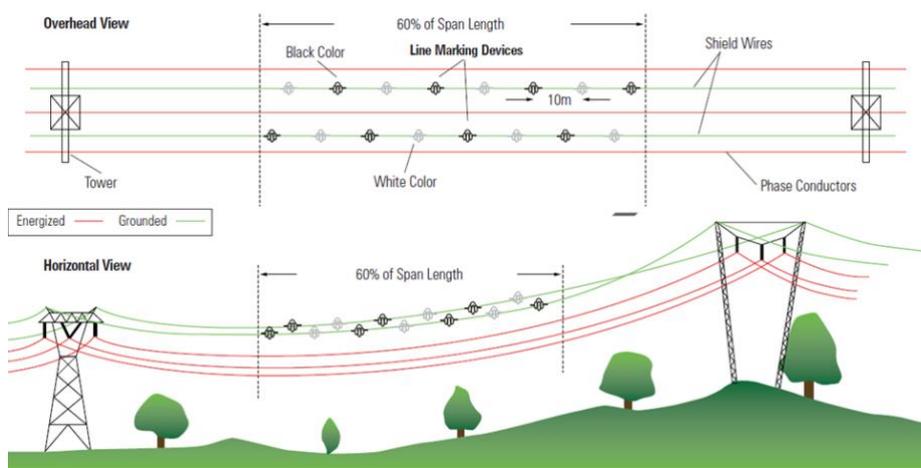
7.3. Operational Phase Measures

Impacts on the **physical environment** during the operational phase will be minimal: the noise generated due to the corona effect will not require any measure due to its low magnitude. In the new sub-stations, oil recovery basins equipped with oil separator systems will be installed under the transformers to prevent soil contamination. Measures recommended during the construction phase will also be applied, as appropriate, during maintenance works.

The main **biological** impact will be on avian fauna. Construction works will be avoided during the mating and nesting season in sensitive zones. For the grey crowned crane observed in Rwanda in the Rwasave wetlands situated about 7 km from the transmission line, the laying period is from January to December with gathering during the dry season. Different measures to minimize deforestation will also be applied, especially in the humid zones bordered by agricultural fields often used as reproduction sites. Nesting is inhibited if the plant cover of humid zones is removed.

Furthermore, diverters (Firefly™ Bird Flapper/Diverter type or equivalent) will be placed in sensitive zones to improve line visibility and avoid collisions. In Rwanda, bird deviation systems will be placed 1 km on each side of the Mushaduka reservoir, at appropriate intervals to make the lines more visible for birds. In Burundi, environment-related data indicates that the identified birds should not be affected by the presence of the transmission line. As a precautionary measure, a study on avian fauna in Burundi will be conducted before the commencement of work.

Typical Installations of Bird Diverters



The main potential negative **socio-economic** impact concerns risks linked to the health and safety of workers and the local population. These aspects will be captured in the Emergency Plan to be prepared by contractors.

7.4. Cumulative and Residual Impacts

Thanks to the project alternatives selected, interactions between the line and existing facilities, especially airports, airstrips and communication stations, are minimized.

Given the nature of the project and the proposed mitigation and compensatory measures, most impacts will be brought under control. Nonetheless, pylons will be permanently present on the landscape.

7.5. Enhancement Measures

Reforestation and Agro-forestry

In addition to the compensatory reforestation programme, the few forestry resources that will be affected by the project will be regenerated as part of a reforestation and agro-forestry programme. In most districts or communes, there are zones specifically allocated for forest plantation and regeneration.

Depending on the priorities of the sectors and villages concerned, trees can be given to households (as under a “one tree per household” project). Fruit trees especially the avocado tree would be the preferred tree species, as they would not only improve the forest cover and prevent erosion but also provide opportunities to generate additional income. Agroforestry and planting of forage species will also be appropriate.

Although another option will be to plant trees in deforested or erosion-prone zones, where agriculture is practiced, such tree planting cannot be carried out in the right of way. It is recommended to not plant eucalyptus over native species adapted to the eco-region of each district or commune as this will also enhance forestry biodiversity.

The compensation budget for trees effectively felled and belonging to State land will be used to replant twice as many trees on land designed by districts and communes and to build a nursery for three years. Close monitoring of these plants will be required during implementation of the project. Planting should commence just after clearing of the right of way during the survey.

Rural Development Initiatives (solar energy)

For the Rwandan portion of the line, a 12 km 30kV line section between Gisagara and Save was added to the project to improve rural electrification. For the Burundian section, it is recommended that efforts to restore and improve the affected population's livelihood should be extended by supporting rural development initiatives, including drinking water supply and the supply of solar power to health centres and schools, etc. In many villages visited during site inspections, health centres were still not equipped with electricity. During the update of the 2018 surveys, investigations helped to identify 9 schools, 1 health-centre and 2 trading centres for which solar electrification was planned. A sum of EUR **71,500** will be earmarked in the Livelihoods Improvement Programmes of the Resettlement Action Plan for electrification studies and works. The works contractor will conduct a detailed study for this electrification programme to specify its feasibility and costs.

8. ENVIRONMENTAL RISKS AND CLIMATE CHANGE

8.1. Natural and Environmental Risks

Seismic Risks

Finally, depending on the seismic level assessed along the line corridor, the pylon and sub-station loads will be calculated with horizontal acceleration of 0.1g and vertical acceleration of 0.05g during the design. In this way, the seismic situation will be adequately reflected in the design.

Risk of Electrocutation

Birds perching on electric poles and/or conductor cables can be killed if they provoke a short circuit. Electrocutation can also be amply avoided if poles, conductors and insulators are appropriately designed. As per the bird protection clause of the German industrial standard (DIN VDE 0210/12.85), "Crossarms, insulators and other parts of power lines shall be constructed so that birds find no opportunity to perch near energized power lines that might be hazardous". Electric poles with suspended isolators are relatively safe provided the distance between the crossarms and live parts (conductors) are at least 60 cm. Conductors must be spaced at least 140 cm apart. The arrangement of pylon conductors and insulators proposed in the pre-feasibility study meet the above requirements to avoid bird electrocutation.

Risk of Fire

Fire walls will be installed between transformers to prevent fire from spreading in case a transformer catches fire. There are also plans to install a sprinkler head system around transformers. It is worth noting that transformer fires are rare events and, virtually impossible if sub-stations are adequately maintained. Mobile fire extinguishers will be placed in control buildings and regularly inspected. All firefighting measures instituted to prevent cable and other fires will meet international requirements. Staff will be trained to manage sub-station fires. If these mitigation measures are taken, the impact of transformer fires will be low.

Electromagnetic Fields

International threshold values for electrical and magnetic fields (50 Hz) for the public and work places are based on criteria defined by the International Commission on Non-Ionizing Radiation Protection.

For the public, the following threshold values are accepted internationally:

- Electrical field: max. 5 kV / m;
- Magnetic field: max 100 μ T;

In work places, the recommended maximum is 10 kV/m for electrical fields and 500 μ T for magnetic fields.

Based on previous studies conducted in Rwanda, it is estimated that field density is calculated under undisturbed conditions following German standards DIN VDE 0848 and 26 BImSchV15. Based on these estimates, the maximum permissible magnetic field strength of 100 μ T will never be exceeded, even near the conductors. The threshold value for electrical field 1 m from the ground shall never exceed 3.23 kV/m, which is below the 5 kV threshold. However, it is recommended that electrical and magnetic fields be measured in houses situated close to the line once it is fully operational. Judging from similar projects, the expected intensity of electrical and magnetic fields in sub-stations will be below the permissible workplace threshold values of 10 kV/m and 500 μ T respectively. It is also recommended that these fields should be measured on sub-station sites during the commissioning phase.

Since the ICNIRP thresholds for the public will not be exceeded for magnetic field at any distance from conductors, it is considered safe to farm beneath the conductors. As a precautionary measure, roof edges of houses must be at least 7 m from the lowest conductor. As concerns the public and sub-station workers, the impact on human health due to exposure to electrical and magnetic fields of the proposed transmission line is considered low.

Sulphur hexafluoride (SF₆)

Sulphur hexafluoride (SF₆) is used in insulated switchgears in sub-stations since this gas allows for the safe transmission and distribution of electricity. Sulphur hexafluoride offers excellent insulation and arc extinction performance. The gas itself is inert and without influence on humans, animals or plants, but because of the electric arc, extremely small traces of health-impairing agents can be formed. Further, SF₆ is a very aggressive and persistent greenhouse gas and must be handled appropriately in accordance with international directives and mindful of the recommendations of the International Council on Large Electrical Systems. By following these guidelines, it is expected that the quantity of SF₆ released in the atmosphere will be reduced to the bare minimum.

An Emergency Plan will be prepared by the Contractor to control and tackle the identified risks that workers might face. Besides, information, education and communication campaigns targeting the populations will include safety aspects.

8.2. Climate-Change-Related Risks

By its nature, the project should not contribute significantly to climate-change phenomena. During construction works, vehicles and machines will temporarily emit exhaust gases, contributing very little to overall emissions in Rwanda and Burundi. Besides, as deforestation works will be carried out, the planned compensatory reforestation will help offset losses due to tree felling and exhaust gases emissions. Finally, to protect installations from extreme weather events such as floods and violent winds, the choice of pylon positions sought to avoid marshy or erosion-prone areas and design foundations that take into account the geotechnical context and reference speed of prevailing winds.

9. ENVIRONMENTAL AND SOCIAL MONITORING PROGRAMME

9.1. Environmental Monitoring and Reporting

The aim of environmental supervision is to ensure compliance with: (i) the mitigation measures planned in the ESMP; (ii) the requirements of the Environment Code; the EIA-related implementing decree and orders; (iii) commitments to local communities and ministerial authorities; (iv) requirements relating to other laws and regulations governing Hygiene and Public Health, management of the living environment of the population, protection of the Environment and natural resources. Environmental monitoring will concern both the construction phase and the operational phase. It will be performed by the Control Office during the works phase and by REG and REGIDESO during works as well as during the ongoing operational phase.

9.2. Monitoring Plan

The aim of environmental monitoring will be to verify, on the ground, the accuracy of the assessment of certain impacts and the effectiveness of mitigation or compensatory measures contained in the ESMP. Information derived from the environmental monitoring will be used to correct mitigation measures and if necessary, to revise certain environmental protection standards. The Monitoring Programme describes: (i) the elements to be monitored; (ii) the monitoring methodology used; (iii) responsibility for monitoring; and (iv) the monitoring period. Environmental monitoring will be implemented by the Directorate of the Environment and the competent technical services of each country.

Monitoring indicators were developed for the most significant impacts:

- effects stemming from the loss of land;
- impacts stemming from line maintenance;
- the effectiveness of bird protection measures;
- the protection of wetlands;
- the protection of soils against erosion
- control of the spread of HIV/AIDS;
- Measures for managing risks of EMFs and potential SF₆ leaks.

9.3. Organizational Responsibilities and Capacity-Building

REG and REGIDESO will be tasked with project implementation in Rwanda and Burundi respectively. They will recruit works contractors and control offices which will play a major role in works supervision.

Rwanda

REG has a team of 4 environmental and social safeguard experts who are well qualified in their areas of competence. However, it is recommended that they should be given additional training, in particular in applying international standards. Greater cooperation among technical and social staff would also be useful.

Burundi

There is no HSE Department in REGIDESO, but the unit tasked with implementing transmission line projects has a qualified Environmental and Social Expert. It is recommended that assistance in project implementation should be provided with the recruitment of more staff, especially a Health and Safety Expert and a Resettlement Expert. They should also be given training in health (for example, electrical and magnetic fields), safety (working in heights, working under high voltage, etc.). Such a department will also manage social issues and monitor effective implementation of the ESMP and RAP.

Rwanda and Burundi

In general, the HSE staff of REG and REGIDESO must be trained to implement the ESMP's monitoring actions. From an environmental standpoint, the use of the SF₆ gas is a significant aspect of the project. As it is very likely that in future, whole sub-stations will be part of the electrical network in Rwanda and Burundi, training on the use of this gas is recommended. The staff of REG and REGIDESO will also be trained in how to use EMF metres and to interpret results.

A key need during project implementation with respect to environmental and social aspects is monitoring the implementation of all requirements stated in the ESMP and the environmental permit obtained. Since capacity for such supervision is limited within REMA and MEAE, a training session will be conducted by an internationally experienced Monitoring Expert.

Since project implementation is ongoing in Rwanda, a joint workshop will be organized for Burundi on public consultations and compensation and resettlement procedures for all communes concerned. The purpose will be to streamline procedures and reference frameworks and agree on the resettlement procedures and complaints management modalities. For a smooth ESMP implementation, the project must first be presented at ministerial level, followed by the establishment of a project working group to regularly discuss pending matters, modifications of the ESMP schedule and implementation.

9.4. Supervision and Monitoring Reports

A supervision form should be designed to document, analyze and register parameters being supervised. The form should draw attention to environmental issues and give an indication of the future stages of work. The mitigation and enhancement measures adopted during the final design will explicitly feature in the bill of quantities so that performance and completion can be easily documented. Environmental

issues (spills, dust, noise, etc.) as well as safety incidents will be reported and summarized in quarterly environmental reports as part of contract management.

Each environmental and social expert in REG/REGIDESO with the support of the Control Office will assess the contractor's practices and, if non-conformities are noted, he will request that corrective measures be implemented. Photographic documents will be prepared as tools of environmental monitoring. A complete file will be kept as part of standard follow-up of the contract. All applicable regulations should be applied by REGIDESO, REG and the Control Office. ESMP implementation reports will be transmitted every quarter to REMA, MEAE as well as AfDB.

Monitoring indicators, the location of monitoring zones as well as the monitoring frequency and responsibilities are described in the ESIA and ESMP reports.

10. PUBLIC CONSULTATIONS AND INFORMATION DISSEMINATION

10.1 Stakeholder Engagement Plan (SEP)

A SEP was prepared for the project and is being implemented. The aim of the SEP is to ensure that adequate, clear and timely information is given to project-affected persons and other stakeholders and that these groups have the opportunity to express their concerns and opinions to influence project decisions.

Public participation and community consultation were incorporated into the project's environmental and social assessment process. The consultation made it possible to identify not only project-related concerns but also the needs of people likely to be impacted. This participatory process contributed to reducing the public's resistance to change and enabling locals to participate in the decision-making process. Different consultation activities were carried out in the project areas to minimize the project's probable negative impacts, consult affected stakeholders more profoundly and respond to the concerns expressed. A detailed SEP report has been prepared in a separate document.

10.2. Consultations held and Concerns Expressed

During preparation of the environmental and social impact assessment, meetings were held in 2011 and 2012. The aim was to engage stakeholders early in the project, encourage their support and contributions and obtain the best results for the project. Other meetings were held subsequently in 2015 before the start of the RAP during the socio-economic survey. Focus-group discussions, individual meetings and public consultations were organized. The 2015 meetings brought together about 100 people in Burundi and 140 in Rwanda in all communes and districts through which the line runs. Additional consultations were held in July 2018 when the ESIA and RAP were updated. Finally, feedback meetings were organized by REGIDESO after finalization of the ESIA and RAP in August 2018. The 2018 meetings were held in Ngozi, Gitega, Bugendana and Kayanga and brought together about 100 persons. The main concerns expressed during these meetings in Burundi are summarized in the following table:

Concerns raised during public consultations

Problem raised by PAPs	Information transmitted
Project implementation schedule	After finalization of data collection and preparation of RAP, the RAP will be implemented and property owners compensated based on Burundi laws and AfDB policies. Construction activities will begin after payment for affected properties. We cannot state the exact date, but this is a priority for our country and the entire region.
Will compensation be in cash or in kind?	When we implement this project, the homeowners affected by the project will be compensated with another house (the Government of Burundi will construct a new house for the owner). For land, that will depend on the owner's choice, but for crops and trees, in-kind compensation will be applied.
As we are aware, the transmission line wires reach a height of 15 or 20 m. How can coffee plants disrupt the project? We think that trees could affect the project, but coffee plants cannot.	During construction, the project staff and materials could affect your coffee plants but coffee plants under 30 m should not be affected. To minimize the budget, we could consider your point of view and maintain coffee plants found in the right of way, but compensation will be paid only for coffee plants affected by construction activities. REGIDESO will assess whether the coffee plants must remain on the alignment right of way.
For some projects, implementation comes before compensation/payment for affected properties. Is that the case with this project?	No. For this project, the compensation process will come rapidly, and after payment, PAPs will have a three-month period for preparation. No PAP shall leave their property before receiving payment.
For some projects, implementation comes before compensation/payment for affected properties. Is that the case with this project?	True, that is one of the country's priorities. Implementation will not start soon since different studies are required. However, we promise to speed up all procedures. We hope to start construction activities next year.
Our coffee pants and fruit trees are still productive and will remain productive for over 10 years. How do you aim to handle this problem for compensation?	Burundi's expropriation laws are clear. Compensation is done once in 10 years, but calculation of the rate for different properties depends on the period and market price.
We propose that the compensation amount should be deposited in a bank account and not handed directly.	Yes. This is a good proposal and will be taken into consideration when paying compensation.
This project will create job opportunities, but we suggest considering the local population rather than workers from other communes.	This project will create jobs for skilled and unskilled persons during the construction and operational phases. During the recruitment phase, priority will be given to the local population. Gender will also be considered during these recruitments.

Apart from these concerns, the consultations held in 2018 gave rise to additional demands linked to the electrification of affected villages and the development of income-generating projects. The project plans to electrify community health and educational facilities by solar power. The detailed assessment of this sub-project will be entrusted to the project contractor for the Burundi section. In Rwanda, this concern was captured in the design of a 30kV line project for rural electrification. Compensation-related concerns were captured in the RAP while employment and gender issues were considered in the ESMP but also in the RAP as far as income-generating activities are concerned.

The ESIA and RAP summaries will be published on the Bank’s website for a period of 120 days before the project is presented to the Boards of Directors. Complete reports will be made available on request in accordance with the Bank Group’s Policy on Disclosure and Access to Information. These documents will also be disseminated on the REGIDESO website.

11. COST OF ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

It should be noted that the Rwandan section of the project is being implemented alongside the associated ESMP. For that reason, the activities and costs presented in this ESMP concern exclusively measures to be implemented in Burundi. The total ESMP cost of USD **308,500** covers measures to be implemented during works, communication and capacity-building measures, additional studies and monitoring costs. The summary cost of ESMP measures is provided in the table below. The costs of ESMP will be included in the project costs. These costs are provided as a guide and can be adjusted by the Contractor, if necessary.

Summary costs of ESMP, excluding resettlement for Burundi

ESMP MEASURES	Costs (USD)	Remarks
Remuneration 1 Health-Safety Specialist and 1 Resettlement Specialist	46,000	Salaries during the project period, or 2 years
Design and implementation of Worksite ESMP including all specific plans on Safety and Working Environment	PM	Integrated in the salaries of the staff concerned and the contractor’s contract
General mitigation measures	107,500	
Avian fauna study in Burundi	20,000	This study will be conducted by a consultant, specialist in avian fauna
Consultation, information and awareness raising	45,000	
Training on electromagnetic fields (EMF) and use of SF ₆ gas	20,000	This is a joint training to be given to workers of REG and REGIDESO. The related costs concern only Burundi.
Reforestation and agroforestry programme	20,000	The programme will be designed in collaboration with an NGO specialized in reforestation
Implementation of monitoring plan	50,000	
TOTAL	308,500	

12. CONCLUSION

The initial ESIA and ESMP covering Rwanda and Burundi, the ESIA and ESMP updated in 2018 for the Burundi section, as well as the avifauna study made it possible to show that the project will not cause irreversible environmental impacts in its direct and wider areas of influence. The identified impacts will be addressed by implementing appropriate mitigation and compensation measures, as appropriate, as described in the ESMP. Residual impacts are marginal. In contrast, the project is expected to produce positive spinoffs at the national and regional levels. Under such conditions, the project is deemed environmentally and socially acceptable.

13. REFERENCES AND CONTACTS

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