

Date **11 APR 2025**

Ref RFP No: **431**./QCBS/2024-2025/ICB/ EDCL/ EIB

REQUEST FOR EXPRESSIONS OF INTEREST (REOI)

PROJECT NAME: FEASIBILITY AND ENVIRONMENTAL STUDIES - RUSIZI III TRANSMISSION LINE (BWISHYURA-KAMANYOLA)

TENDER TITLE: UPDATING FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL AND SOCIAL IMPACT ASSESMENT (ESIA), ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP) AND THE RESETTLEMENT ACTION PLAN (RAP) FOR PROJECT AFFECTED PERSONS AND THE DEVELOPMENT OF TENDER DOCUMENTS FOR THE CONSTRUCTION WORKS OF THE 220KV LINE KAMANYOLA-BWISHYURA AND EXTENSION OF BWISHYURA SUBSTATION

1. BACKGROUND

One of the strategic objectives of the National Strategy for Transformation is to expand electricity access while at the same time improving quality of supply at the lowest possible cost. To achieve the said objectives, the Government of Rwanda through EDCL is carrying out a number of studies that will guide any future investment in the electricity network and rehabilitation of the existing infrastructure.

2. SPECIFIC ASSIGNMENT

The purpose of the consultancy service is the updating feasibility studies, detailed design, environmental and social impact assessment (ESIA), environmental and social management plan (ESMP) and the resettlement action plan (RAP) for project affected persons and the preparation of tender documents for the construction works of the 220kV transmission line Kamanyola-Bwishyura and extension of Bwishyura Substation.

The contract duration will be 8 months from the commencement date of contract. The Consultant shall be responsible for updating feasibility studies, detailed design, environmental and social impact assessment (ESIA), environmental and social management plan (ESMP) and the resettlement action plan (RAP) for project affected persons and the preparation of tender documents.

EDCL now invites eligible consulting firms (“Consultants”) to indicate their interest in providing the Services. Interested Consultants should provide information demonstrating that they have the required qualifications and relevant experience to perform the Services.

3. The short-listing criteria

i) ELIGIBILITY, Ethical conduct, Conflict of Interest,

The Bank permits consultants (individuals and firms, including Joint Ventures and their individual members) from all countries to offer consulting services for Bank-financed projects. Furthermore, it is the Consultant's responsibility to ensure that its Experts, joint venture members, Sub-consultants, agents (declared or not), sub-contractors, service providers, suppliers and/or their employees meet the eligibility requirements as established by the Bank in the Guide to Procurement (GtP 1.2).

The Bank will not provide or otherwise make funds available, directly or indirectly, to or for the benefit of an individual or entity that is subject to financial sanctions imposed by the European Union, 1 either autonomously or pursuant to the financial sanctions decided by the United Nations Security Council on the basis of Article 41 of the United Nations Charter.

The Applicants shall comply with the EIB's GtP provisions 1.4 Ethical Conduct and 1.5. Conflict of Interest by providing a duly signed Covenant of Integrity (CoI) as per GtP Annex 7.

ii) EXPERIENCE IN SIMILAR ASSIGNMENTS

The EOIs will be checked to assess whether the firms have demonstrated experience in management and execution of similar assignments over the last 10 years.

The consultant firm should have at least 3 similar assignments executed in the above-mentioned period, among which at least one in sub-Saharan Africa and at least one relevant to projects financed by Multilateral Development Banks. The similarity should be in terms of nature, complexity, and volume with the contract of at least One Million One Hundred Ninety Thousand EURO (EUR 1,190,000) or equivalent in another freely convertible currency.

In addition, the consultant should confirm that it has required key staff as described in the detailed Terms of Reference

iii) FINANCIAL CAPACITY

The interested consultant firms should demonstrate their financial capacity (Financial position) to implement this assignment.

The financial position will be verified in the Audited financial statement of the last three years:

- ✓ Average annual turnover should be at least One Million One Hundred Ninety Thousand EURO (EUR 1,190,000 or equivalent in another freely convertible currency) for the last three years (2021,2022 and 2023)
- ✓ Availability of financial resource such as liquid assets (The current ratio should be greater than 1)

- ✓ The current ratio is calculated as follow: current Asset/current Liabilities. In case of joint venture, each partner should submit their Audited financial statements of the last three years. The turnover will be calculated for each partner; the combined average annual turnover of the last three years of the joint venture company should meet the requirement. The minimum average annual turnover of each of the partners should not be less than 20% of the requested value. Each partner should have a current ratio greater than one.

The firms that will comply with the conditions of technical and financial requirements described above will be ranked according to their number of similar assignments completed. The number of shortlisted consultants will be three (3) as minimum to six (6) as maximum from the first ranked consultant.

The draft Terms of Reference (TOR) for the assignment will be published on REG Website (www.reg.rw)

4. SUBMISSION REQUIREMENTS

The following documents will be submitted:

a) **Brief overview of the firm** including company profile, organization and list of staffing as described in the Terms of Reference;

b) **Reference sheers, including completion certificates**, of similar assignments accompanied by details of firm's similar experience and related assignments covering the last 10 years (from date this PQ notice is published) and strictly related to the envisaged services, including information on contract value, contracting entity/client, project location/country, key experts involved, source of financing, duration (mm/yy to mm/yy), main activities, objectives, completion certificates.

c) **Audited Financial statements** for the last 3 years (2021,2022,2023).

d) **EIB Covenant of Integrity duly completed and signed**. It is **mandatory** to submit a complete, duly signed EIB Covenant of Integrity, Form is available under [Guide to Procurement for projects financed by the EIB](#) (Annex 3)

The consultant firms will be selected in accordance with Section 4.2 Restricted procedure as provided for in EIB's Guide to Procurement ("GtP")available at [Guide to Procurement for projects financed by the EIB](#) and more detailed information on the scope of the assignment are available in draft terms of references that will be published on REG website (www.reg.rw).

Applicants/Candidates will be informed in writing of the shortlisting decision, including a summary of the relevant reasons for that decision.

5. SUBMISSION DEADLINE

Expressions of interest must be delivered through the e-mail addresses mentioned below; by **30/05/2025** before 5.00 PM Local Time and mention: erukinirwa@edcl.reg.rw and a copy to procurement@edcl.reg.rw ;

“Consulting Firm to update feasibility studies, detailed design, environmental and social impact assessment (ESIA), environmental and social management plan (ESMP) and the resettlement action plan (RAP) for project affected persons and the preparation of tender documents for the construction works of the 220kV transmission line Kamanyola-Bwishyura and extension of Bwishyura Substation”.

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Sincerely,



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PROJECT FOR THE CONSTRUCTION OF 220KV INTERCONNECTION ELECTRICAL LINE KAMANYOLA (DRC)-BWISHYURA (KARONGI-RWANDA) AND 220KV LINE BAY IN BWISHYURA SUBSTATION

TERMS OF REFERENCE (TORs) FOR RECRUITING A CONSULTANT IN CHARGE OF UPDATING FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL AND SOCIAL IMPACT ASSESMENT (ESIA), ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP) AND THE RESETTLEMENT ACTION PLAN (RAP) FOR PROJECT AFFECTED PERSONS AND THE DEVELOPMENT OF TENDER DOCUMENTS FOR THE CONSTRUCTION OF THE 220KV LINE AND 220KV LINE BAY IN BWISHYURA SUBSTATION.

March 2025

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LIST OF ABBREVIATIONS AND ACRONYMS

Units

NB: all used units are SI/metric.

kV	Kilovolt
kW	Kilowatt
MW	Megawatt
km	Kilometer
ha	Hectare.

Abbreviations

AFDB	African Development Bank
AIDS	Acquired Immune Deficiency Syndrome
CCCR	Centre de Coordination de la Cascade de la rivière Ruzizi (Ruzizi River Waterfall Coordination Center)
CDN	National Dispatch Center
CDR	Regional Dispatch Center
CEPGL	Communauté Economique des Pays des Grands Lacs (Economic Community of the Great Lakes Countries)
CSEP	Communication and Stakeholder Engagement Plan
DC	Direct Current
DED	Detailed Engineering Design
DRC	Democratic Republic of Congo
EAC	East African Community
EAPP	Eastern Africa Power Pool
EDCL	Energy Development Corporation Limited (Electricity Transmission Company in Rwanda)
EGL	Energie des Grands Lacs (CEPGL Organization for the Energy of the Great Lakes Countries)
EHS	Environment, Health, and Safety
EIB	European Investment Bank
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
EUCL	Energy Utility Corporation Limited (Electricity Distribution Company in Rwanda)
GBV	Gender-Based Violence
HIV	Human Immunodeficiency Virus
HPP	Hydroelectric power plant
HV	High voltage
HV	High voltage
KfW	Kreditanstalt for Wiederaufbau (Development Bank) of the Federal Republic of Germany)
MM:	Man-months
NELSAP	Nile Equatorial Lakes Subsidiary Action Program

NGO	Non-Governmental Organization
PAP	Person Affected by the Project
PEAC	Pool Energétique De L’Afrique Centrale (Central African Power Pool)
PPD	Preliminary Design
PPP	Public Private Partnership
RAP	Resettlement Action Plan
REG	Rwanda Energy Group (Public holding company responsible for importing, exporting, supplying, producing, transporting, distributing, and selling electricity in Rwanda)
REGIDESO	Water and Electricity Production and Distribution Authority in Burundi
REL	Ruzizi III Energy Limited
SCADA	Supervisory Control and Data Acquisition
SESMP	Site Environmental and Social Management Plan
SHPP	Small Hydroelectric Power Plant
SINELAC	Société Internationale de l’Électricité des Pays des Grands Lacs (International Electricity Company of the Great Lakes Countries)
SMP	Stakeholder Mobilization Plan
SNEL	Société Nationale d’Electricité (National Electricity Company of DRC)
STD	Sexually Transmitted Diseases
TD	Tender documents
ToR	Terms of Reference
WB	World Bank

I. GENERAL INTRODUCTION

Rwanda Energy Group (REG) is a national institution under the Ministry of Infrastructure (MININFRA).

Rwanda Energy Group (REG) was created in July 2014, is a public company responsible for the import, export, generation, transmission, distribution, and sale of electricity in Rwanda. It is under the supervision of the Ministry of Infrastructure (MININFRA).

REG acts as Coordinator and Supervisor of two Subsidiaries (EDCL and EUCL), which are free to carry out their daily activities in accordance with their Business Plans and mandates. REG works closely with the Rwandan Ministry of Infrastructure to define and monitor national goals and objectives by the two Affiliate institutions:

Energy Development Corporation Limited (EDCL) is responsible for the identification of power generation sites, the acquisition of land, contractors, and necessary infrastructure for the development of the Power Plants and power line projects (low voltage and high voltage). Its mandate includes working closely with independent power producers across the country. For the Ruzizi III project, EDCL will be responsible for monitoring the planning, preparations, and development stages of all activities in relation to Ruzizi III and related projects.

Energy Utility Corporation Limited (EUCL) is responsible for the operation and maintenance of Power Plants, distribution networks, as well as the supply of electrical energy to consumers at a sustainable price for the distribution of electricity. For the Ruzizi III project, EUCL will be responsible for negotiating the price of electricity produced and ensuring the operation of the line built.

EGL is a regional organization of countries of Great Lake for Energy. EGL mission is to ensure cooperation between Members states in the energy sector along the following strategic lines including regional planning of the energy sector and analysis of the energy policies of the member states with a view to develop common policies for exploitation of energy resources, design, and monitoring of the implementation of community projects in the energy field training ,information and outreach with a view to strengthening national capacities in planning ,defining of energy policies and project management.

Since 1989, two hydroelectric power stations installed on the Ruzizi River, Ruzizi I and Ruzizi II, supply the interconnected network of the CEPGL, to which the national power stations of Burundi and Rwanda are also connected. Then, various initiatives to find solutions to the crucial lack of electrical energy in the CEPGL region were carried out, the search for financing for the rehabilitation of equipment of existing hydroelectric power stations (Ruzizi I, Ruzizi II) to meet the need for the coordinated management of the cascade and the completion of feasibility studies and detailed design of the Ruzizi III Hydroelectric Power Plant (206 MW).

In June 2021, a reasoned choice was made by the Contracting States (Burundi, DRC, Rwanda), the off-takers or National Electricity Companies (REGIDESO, SNEL, REG) and the EGL for a HPP Regional Ruzizi III of 206 MW in Public-Private Partnership (PPP) management structure.

Ruzizi III Energy Limited (REL) is a special purpose vehicle that has been established and registered in Rwanda to develop the Ruzizi III Regional Hydroelectric project (Project) which is a

key development project and will be one of the largest infrastructure projects in the region comprising Rwanda, Burundi, and eastern DR Congo.

RUZIZI III is the first privately financed project in sub-Saharan Africa that will utilize a common regional water resource to generate power that will be shared equally between the three countries.

The Project will be constructed and owned as a public-private partnership (PPP) among the Republic of Burundi, the Democratic Republic of the Congo (DRC), and the Republic of Rwanda (together as the Contracting States) and REL. It is an Independent Power Project (IPP) based on a Build, Own, Operate, Transfer (“BOOT”) structure and underpinned by a 25-year concession agreement and Power Purchase Agreements (PPAs).

In the framework of Ruzizi III project,

- The Government of Rwanda is responsible for attracting the necessary investors in the Electricity Sector and Empowering REG to create new Public-Private Partnerships (PPPs) in support of the investments identified in the optimal plan, rather than relying on unsolicited private sector initiatives.
- EDCL will be responsible for:
 - Coordinating the carrying out of design and execution of associated project for the construction of 220kV line Kamanyola Bwishyura and Line Bay in Bwishyura Substation.
 - Participating in the integration and harmonization of CEPGL (Economic Community of the Great Lakes Countries) policies, laws, and regulations in the general management of Programs, Plans and Projects and the development of hydroelectric power stations on the Ruzizi River waterfall (Ruzizi III, Ruzizi IV) and associated 220kV HV interconnection lines.
 - Monitoring the Environmental and Social Assessment (ESA) processes of initiated projects.
- EGL will be responsible for:
 - Diagnosis of the energy sector in three CEPGL countries.
 - Updating the regional master plan for energy development, construction of Rusizi III Hydropower plant, technical studies carrying out technical and organizational studies of energy cooperation in the great lakes’ region.
 - Mobilization of the financial resources necessary for construction for Rusizi III Hydropower plants.
 - Introduction of private sector into investments in the construction and operation of the Rusizi III.
 - Extension, rehabilitation, and stabilization of the CEPGL interconnected electrical network.

The European Union (EU), within the framework of the 10th European Development Fund (EDF), financed the Consultant STUDIO Pietrangeli (Italy) to elaborate in the years 2012 and 2014 the Feasibility Studies, Detailed design, and the elaboration of the Tender Document (TD), associated with the Ruzizi III Regional Hydroelectric Project, for the EGL Electric Network Interconnection Project comprising the:

- construction of the Kamanyola 220kV Substation.
- construction of the Kamanyola 220kV Regional Dispatching Center.
- establishment of a Cascade Coordination Center for the Ruzizi River.
- construction of the 220kV interconnection line Kamanyola substation–Bwishyura substation (Rwanda) (approx. 92.5km).

The European Investment Bank (EIB), will finance the updating of the previous studies through the EU-Africa Infrastructure Trust Fund. Based on the outcome of studies and subject to EIB governing Bodies approval, EIB will also finance the construction as well as the supervision of activities related to the Kamanyola-Bwishyura transmission line project and Bwishyura substation.

II. CONTEXT OF THE STUDY

2.1. RUZIZI RIVER HYDROPOWER CASCADE

The Ruzizi River, dotted with rapids between Lake Kivu and the Ruzizi plain, has a steep drop representing a hydroelectric potential of approximately 550MW. The Ruzizi III Regional Hydroelectric Power Plant will be the 3rd hydroelectric development on the Ruzizi River. It will be downstream of the two existing hydroelectric power stations, namely:

- The HPP Ruzizi I, located 3 km downstream from the outlet of Lake Kivu and built in 1959 with an installed capacity of 29.8MW. HPP Ruzizi I is owned by SNEL, DRC. Since the time of commissioning of the Plant, there have been agreements for the exchange of electrical energy between Burundi, the eastern region of the DRC and Rwanda.
- The 43.8 MW Ruzizi II power station, located some 18 km downstream of Ruzizi I, managed and operated by SINELAC, a company governed by international public law created in 1983 by the three CEPGL countries.

The Feasibility Studies, Environmental and Social Impact Assessment (ESIA) and detailed design of the Regional Hydroelectric Power Plant Ruzizi III, elaborated within the framework of the Public-Private Partnership (PPP) by the Project Company “Ruzizi III Energy Limited-REL”, have optimized the installed power of this plant to 206MW.

As part of the implementation of the Ruzizi III Regional Hydroelectric Project, the three member countries of CEPGL will benefit from concessional loans and grants from Donors (Africa development bank (AfDB), World Bank (WB), Agencie Francais de Developement (AFD), European Investment Bank (EIB), Kreditanstalt for Wiederaufbau (KfW) and European Union (EU) which they will retrocede to the REL Project Company, with a view to implementing this Project.

The Schedule for the implementation of the Kamanyola Substation and the Interconnection Lines to the networks of the CEPGL Member Countries is 9 months before the implementation of the Ruzizi III Hydroelectric Project, in accordance with the Project Agreements signed in 2019. It is in this context and thanks to the financing pledged by the EU-Africa Infrastructure Trust Fund, managed by the European Investment Bank (EIB) that EDCL will recruit a consultant for the revision of the Feasibility Studies, RAP, ESMP, ESIA and Detailed design of the 220 kV

Transmission Line Kamanyola substation - Bwishyura substation and the development of Tender Documents for the recruitment of a Contractor for the construction of this Line.

2.2.RUZIZI III HYDROPOWER PROJECT

After the signing of the Ruzizi III Project Agreements on July 29, 2019, the REL Project Company carried out geological and geotechnical investigations of the Initial Site and an Alternative Site upstream of the latter, to assess the state of the soil under the dam foundations. At the end of these Studies, REL proposed to abandon the initial design of the project (147MW) in favor of an alternative layout due to more favorable geological conditions and higher capacity of 206MW.

During the Workshop held in Nairobi from June 28 to July 02, 2021, the Ruzizi III Hydroelectric Project Steering Committee, representing the CEPGL Member States, decided to abandon the initial site and retained the site alternative with a capacity of 206MW.

The in-depth studies of the Ruzizi III Hydroelectric Project have been finalized on the Site selected by the Steering Committee. Also, the increase in capacity of the Ruzizi III hydroelectric power plant from 147MW to 206MW will have to be considered in the revision of the design of the 220kV Kamanyola-Bwishyura (Karongi) transmission line so that the line can transport the power generated.

2.3.KAMANYOLA-BWISHYURA (KARONGI) HV

Studies prepared in 2014 provided that the Kamanyola Substation would only be used to distribute the energy generated by the Ruzizi III hydroelectric power station to the national electricity networks. Meanwhile the Nile Equatorial Lakes Subsidiary Action Program (NELSAP) provides that the commissioning of the Kamanyola 220kV Substation should also consider the development and strengthening of the national networks and the Interconnection of the Electricity Networks of the Region. This would allow the creation of a Regional Electricity Market between the Central African Power Pool (PEAC), the CEPGL/EGL Interconnected Network and the East African Power Pool (EAPP), as shown in Map 1. This, among other factors, needs to be considered in the review and update of the Feasibility Studies, Environmental and Social Impact Assessment (ESIA) and detailed design.

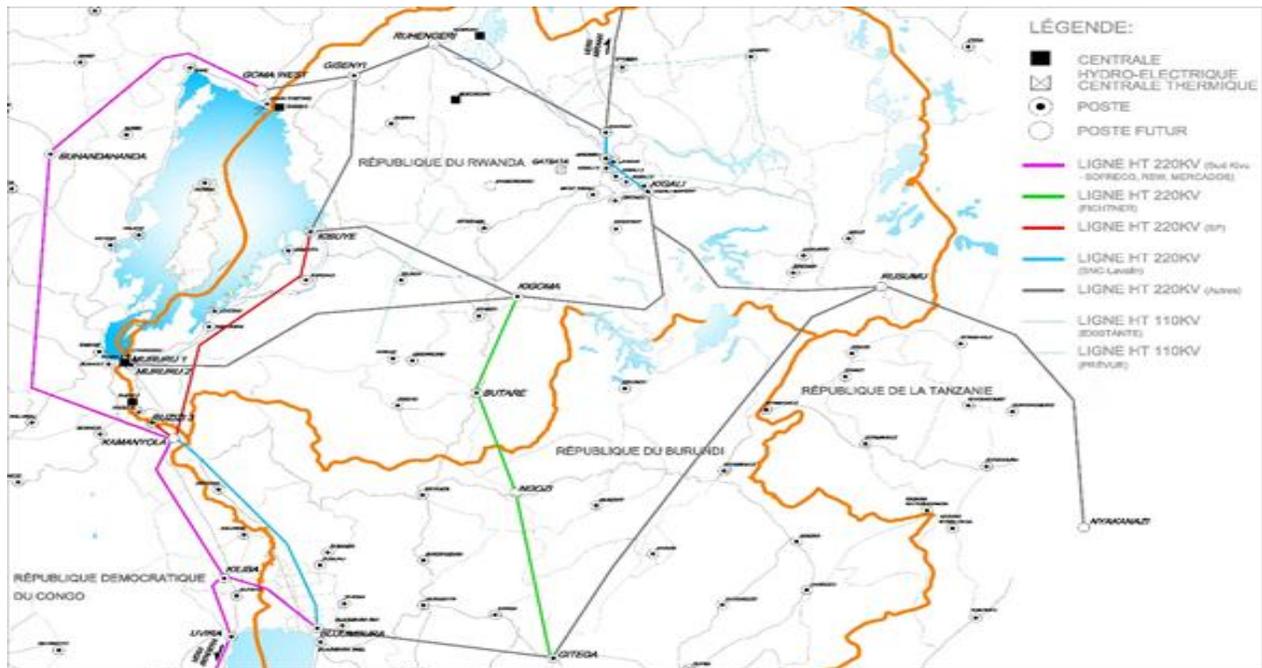


Figure 1: EGL Interconnected Regional Network

Source: Technical and institutional studies of the Kamanyola Post, the Kamanyola Regional Dispatching Center, the Ruzizi River Waterfall Coordination Center, and the lines.

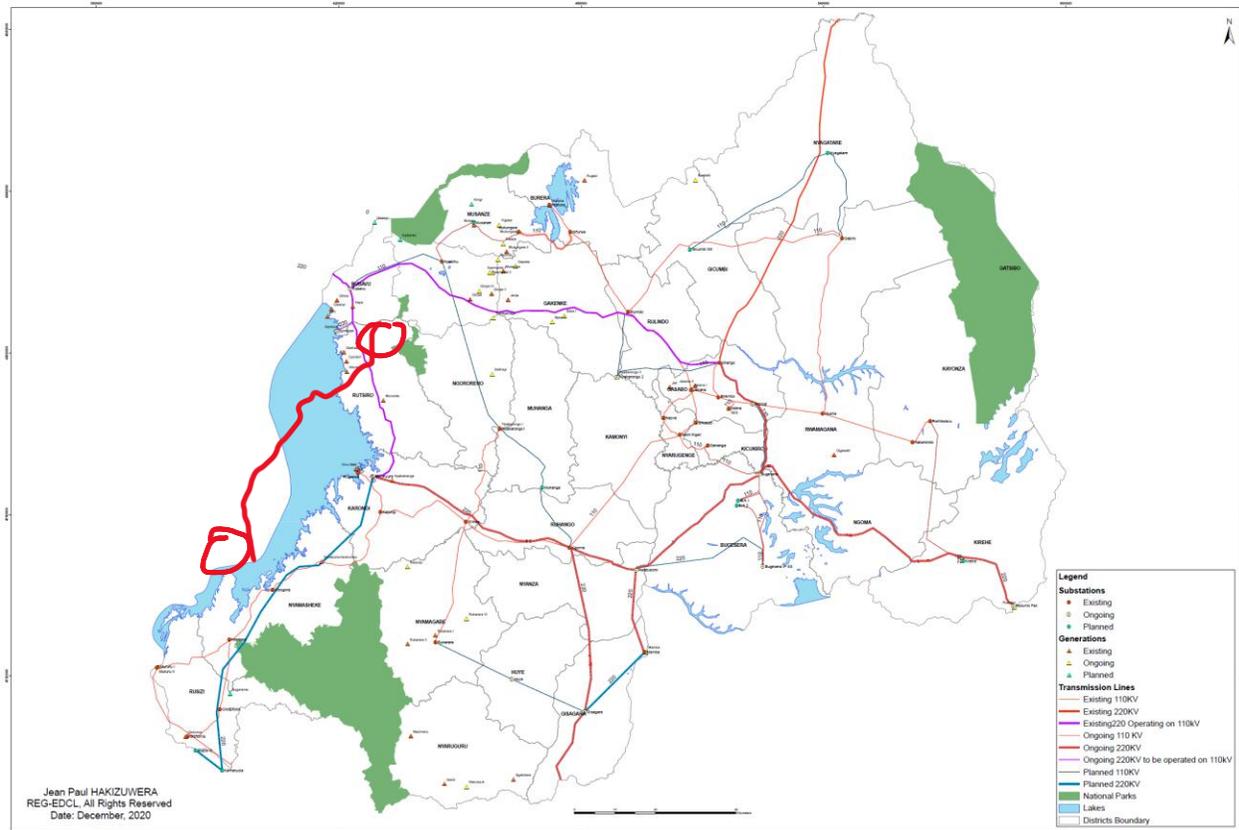


Figure 2: Map from REG Transmission master plan

With such an operating plan, the evacuation of the energy produced at the various Hydroelectric Power Plants of the Cascade of the Ruzizi River and the exchanges of electrical energy on the 220 kV Regional Interconnected Network, must respect the norms and standards imposed by the Power Pools of Central Africa and East Africa.

Among the interconnection networks for electricity exchange, there are for Rwanda:

- Goma (DRC)-Rubavu-Shango (Rwanda) HV Interconnection Line of approximately 293km.
- Kamanyola-Bwishyura (Karongi) HV Interconnection line of about 92.5km in planning (→ Subject of these ToR).
- Bwishyura (Karongi)-Rubavu HV interconnection line of about 56km,
- Kigoma-Gisagara (Rwanda)-Ngozi (on the border with Burundi) HV interconnection line of approximately 64km.
- Shango (Rwanda)-Mirama (Uganda) HV interconnection line of approximately 92km to the border.
- Shango (Rwanda)- Bugesera-Rusumo 220kV HV interconnection line (up to the border with Tanzania) of approximately 117km.

The construction of the 220kV Kamanyola-Bwishyura (Karongi) power line will supply electricity to Rwanda's national electricity grid from the production of the Regional Hydroelectric Power Plants of Ruzizi III and Ruzizi IV, for the consumption of the quota reserved for Rwanda at CEPGL level. This line will also contribute to solve Rwanda's problems in the field of electrical energy, with a view to stimulating economic activity and combating poverty.

To optimize the power of the hydroelectric developments of the Ruzizi River cascade (Ruzizi III and Ruzizi IV) and the capacity to allow electricity exchanges between the countries of the Region within the framework of the regional electricity market, the 220kV interconnection line Kamanyola substation - Bwishyura substation needs to be redesigned. It will also allow Rwanda to evacuate its share of electrical energy from the Ruzizi III Hydroelectric Power Plant. It will constitute a corridor of a Regional Electricity Market between the Central African Power Pool (PEAC) and the East African Power Pool (EAPP), in accordance with the Regional (PEAC, EAPP) and National (Burundi, DRC, Rwanda) Master Plans.

This re-design is mainly justified by:

- The evolution of the demand of the Electricity Sector of Rwanda between 2022 and 2050 considering the new design of the Kamanyola Substation, and the layout of the Bwishyura substation which is under construction and as well as the new capacity of the Ruzizi III regional hydroelectric project (206MW).
- The planning of new electricity generation projects from Lake Kivu methane gas and the evolving context of the future regional electricity market.
- The perspective of the regional electricity market between Rwanda and the other countries of the region (CEPGL, PEAC, EAC and EAPP).

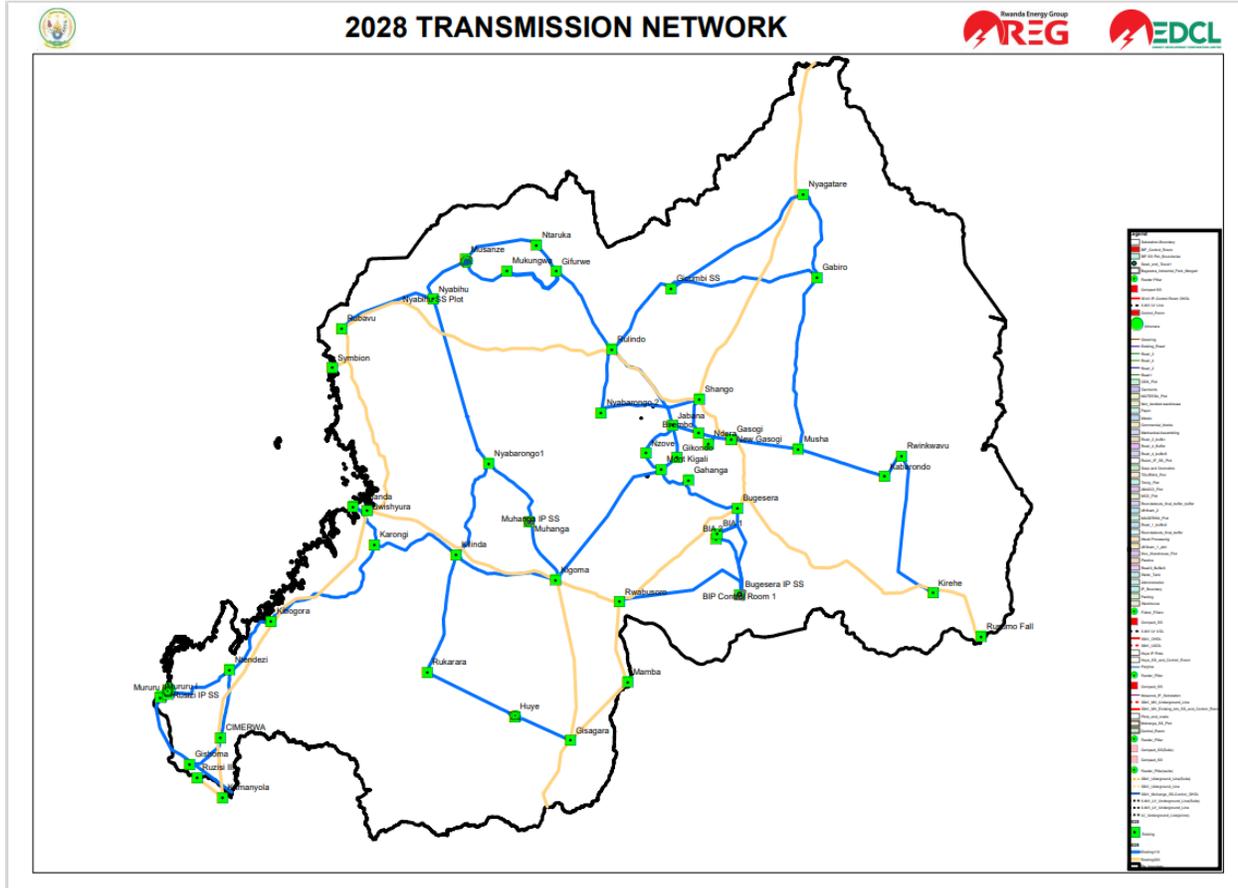


Figure 3: 220&110KV REG transmission network Master Plan:

The environmental and social safeguard studies associated with the construction of the 220kV Kamanyola - Bwishyura power line carried out in 2014 will also be revised to update the baseline, anticipate adverse effects, and better manage environmental impacts of the project. In addition, a Resettlement Action Plan (RAP) for Project Affected Persons (PAP) will be updated. All these environmental and social safeguard studies (ESIA, RAP and ESMP) will be updated in accordance with the reference framework for national legislation, EIB’s Environmental and Social Standards (ESS) and World Bank’s ESS. For the time being, Rwanda is planning the construction of the 220kV Kamanyola - Bwishyura line in double circuit instead of a single circuit which was proposed in previous studies.

In addition, within the framework of the revision of the studies of Kamanyola substation, the Center of dispatching and the Coordination Center of the cascade Ruzizi, it will be important to consider the presumed evolution of the generation and of the Line 220kV Kamanyola-Bwishyura (Karongi)-Rubavu, which will constitute a corridor for the transit of energy from or to neighboring countries.

2.4.RWANDA'S ELECTRICITY MARKET

2.4.1. Electricity Demand

According to electricity demand forecasts projected in "Least Cost Power Development Plan (LCPDP) 2022-2040", June 2022, peak demand energy for the period from 2016 to 2040 were estimated as shown below.

Years	Scenario: 8% growth		Scenario: 10% growth		Scenario: 12% growth		Scenario: 10%, 5%	
	Peak demand (MW)	Total Electricity Demand (GWh)	Peak demand (MW)	Total Electricity Demand (GWh)	Peak demand (MW)	Total Electricity Demand (GWh)	Peak demand (MW)*	Total Electricity Demand (GWh)*
2016	119	690.0	119	690.0	119	690.0	119	690.0
2017	134	750.0	134	750.0	134	750.0	134	750.0
2018	139	821.0	139	821.0	139	821.0	139	821.0
2019	147	876.0	147	876.0	147	876.0	147	876.0
2020	155	895.0	155	895.0	155	895.0	155	895.0
2021	171	1005.0	171	1005.0	171	1005.0	171	1005.0
2022	185	1085	188	1106	188	1126	188	1106
2023	200	1172	207	1217	211	1261	207	1217
2024	216	1266	228	1339	236	1412	228	1339
2025	233	1367	251	1473	264	1581	251	1473
2026	252	1476	276	1620	296	1771	276	1620
2027	272	1594	304	1782	332	1984	304	1782
2028	294	1722	334	1960	372	2222	334	1960
2029	318	1860	367	2156	417	2489	367	2156
2030	343	2009	404	2372	467	2788	404	2372
2031	370	2170	444	2609	523	3123	424	2491
2032	400	2344	488	2870	586	3498	445	2616
2033	432	2532	537	3157	656	3918	467	2747
2034	467	2735	591	3473	735	4388	490	2884
2035	504	2954	650	3820	823	4915	515	3028
2036	544	3190	715	4202	922	5505	541	3179
2037	588	3445	787	4622	1033	6166	568	3338
2038	635	3721	866	5084	1157	6906	596	3505
2039	686	4019	953	5592	1296	7735	626	3680
2040	741	4341	1048	6151	1452	8663	657	3864

Figure 4: Peak annual growth and energy demand for different growth rates

Source: Least Cost Power Development Plan (LCPDP) 2022– 2040, June 2022

The LCPDP presents an econometric assessment and forecast of annual consumption growth rates based on available data on consumption levels of residential consumers and the use of electrical appliances. It was decided to use an annual demand growth rate of 10% for the development and planning of production expansion in Rwanda. Figure 2 illustrates the projected 10% growth in energy and peak demand.

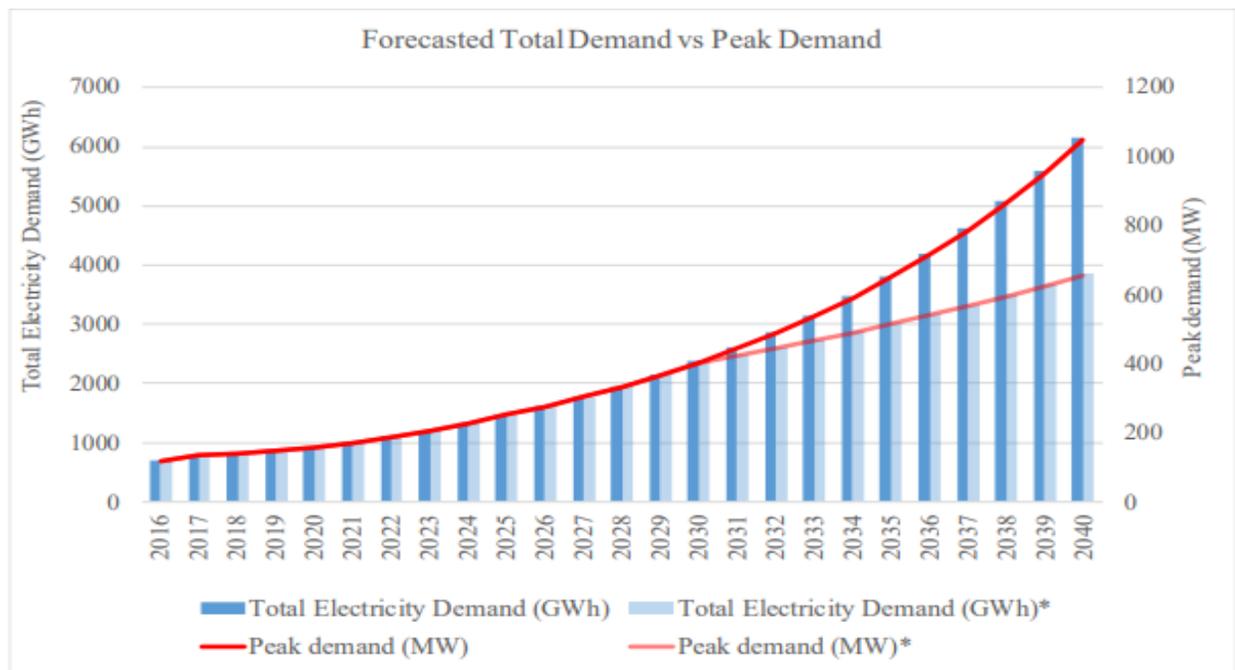


Figure 5: Projected 10% growth in energy and peak demand.

2.4.2. Situation of Electricity generation

In 2022, the total installed capacity of Rwanda was estimated at 276MW, of which:

- 107.328MW for hydropower plants (39%)
- 58.8MW for Thermal Power Plants (21%)
- 50.0MW for peat plants (18%)
- 29.8MW for Methane Gas power plants (11%)
- 12.1MW based on solar PV (4%)
- 18.1MW of imported capacity (7%)

Referring to REG annual report of 2021-2022, the total production of electrical energy was 1069.58 GWh, and technical and commercial losses were rated to 18.1%. The total energy produced in Rwanda included 60% supplied by IPPs (Independent Power Producer), 31% by Government of Rwanda (GoR) and 9% by imported energy. In addition to current installed capacity, Rwanda Energy Group intends to commission new hydroelectric power stations under construction (Ntaruka A 2.1MW), new thermal power stations (Hakan), Nyabarongo II (43.5MW), Rusumo-Falls (26.7MW), Ruzizi III (1/3 of total capacity: 64MW) energy, and several micro hydroelectric plants under development in Rwanda.

2.4.3. Electricity transmission

Electricity is transmitted via High Voltage (HV) 220kV, 110kV and Medium Voltage (MV) 30kV electrical transmission networks.

In June 2022, Rwanda's high voltage electricity network had a total length of 973.14km and consisted mainly of HV/MV substations and 220kV and 110kV lines.

The following transmission projects are in planning:

- Rukarara-Huye-Gisagara 110kV HV transmission line, of about 40.7km
- Kirehe-Rwinkwavu 110kV HV transmission line, of about 37km
- New Huye 110/30kV Substation
- Kirehe 220/110/30kV Substation
- Modernization and extension of Rukarara 110/30kV Substation
- Modernization and extension of the Rwinkwavu 110/30kV Substation
- Modernization and extension of the Gisagara 220/110/30kV Substation, currently under construction
- Kamanyola - Bwishyura 220kV HV transmission line, of about 92.5km (Subject of these ToR).

Rwanda has made commendable efforts in recent years to increase the electrical energy available to the country. The Rwandan government has taken the political decision to diversify the sources of electricity supply, adding to the main traditional networks, small networks, and off-grid connections. Households connected to off-grid solutions (solar energy and small isolated grids) also contribute to increasing electricity access rate.

2.4.4. Regional electricity market

The Regional Electricity Market stipulates that:

- The Ruzizi River Hydroelectric Development Projects (Ruzizi III and Ruzizi IV) provide that the supply of the energy produced by the said projects to the electricity networks of the three CEPGL member countries (Burundi, DRC, Rwanda) will be carried out from the Kamanyola Substation and through the national interconnected networks, among them the 220kV transmission line Kamanyola-Bwishyura (Karongi) -Rubavu.
- Electricity exchanges between the countries of the region and Rwanda will be done through the interconnection lines mentioned above, among others the planned Kamanyola-Bwishyura (Karongi) line.
- The interconnection of Rwanda's power grid to the NELSAP power grids, which is in progress, will eventually allow the import and export of electric power in the East African region.

These interconnections under construction are:

- The 220kV interconnection line between Bwishyura (Karongi), Rubavu (Rwanda) and Goma (DRC) substations
- The 500kV interconnection line of 1068km with a 2000MW capacity between Ethiopia and Kenya
- The 220kV interconnection line with a 300MW capacity between Lessos (Kenya) and Bujagali (Uganda) substations
- The 220kV interconnection line with a 300MW capacity between Uganda and the DRC

- The 220kV interconnection line of 172km with a 300MW capacity between Mbarara (Uganda) and Birembo (Rwanda) substations
- The 220kV interconnection line of 164km with a 300MW capacity between Kigoma (Rwanda) and Gitega (Burundi) substations
- The 220kV interconnection line of 172km between the Rubavu and Birembo substations (Rwanda) and the Goma substation (DRC)
- The 220kV interconnection line between Lessos Substation (Kenya) and Substation (Tanzania)

With these interconnections, there is the possibility of importing electricity in the medium term from Ethiopia from the Great Renaissance Dam (6000MW). Memoranda of Understanding between the National Electricity Companies of the Sub-Region were already signed with the Ethiopian Electricity Company (EEPP).

2.5.GENERAL PROJECT INFORMATION

Geographical area to be covered: The geographical area to be covered in the transmission of electricity supplied by the 220kV Line Kamanyola substation -Bwishyura substation is approximately 2 km on the Democratic Republic of Congo's territory, and approximately 90.5 km on Rwandan territory.

Beneficiary Country: The beneficiary country of the financing of the project of the 220kV Kamanyola substation - Bwishyura substation interconnection line and construction of the 220kV line bay in Bwishyura substation is the Republic of Rwanda. Thus, the recruitment of a consultant in charge of the revision of the feasibility studies and detailed design and the development of the tender document (TD) for the recruitment of contractor for the construction of this line and the recruitment of a consultant for the supervision of the works will be carried out by EDCL.

Project Promoter: The Project Promoter is the organization of the CEPGL for the Energy of the Great Lakes Region (EGL), representative of the Contracting Countries of the Ruzizi III Project and the future Ruzizi IV hydroelectric power plant.

Contracting Authority: The Contracting Authority for the revision of the Studies will be exercised by the EDCL Company of Rwanda (EDCL), Subsidiary of Rwanda Energy Group (REG) and under the supervision of the Ministry of Infrastructure, in collaboration with EGL.

Funding: The Funding granted to EDCL for the revision of the studies is provided by EIB through the EU-Africa Infrastructure Trust Fund and a grant agreement will be signed between EIB, the Ministry of Finance and Economic Planning (Minecofin) of the Republic of Rwanda and EDCL, as grant beneficiary and implementing agency.

2.6.NEED FOR REVISION OF STUDIES.

The existing studies were carried out in 2014, i.e., 9 years ago, and therefore require an update. The revision of these studies requires an in-depth rational analysis of the transmission capacity of this line, by optimizing the voltages at the nodes and the losses on this line itself, considering the import/export of the estimated electricity from and to EAPP countries. In the case of the 220kV

Kamanyola-Bwishyura (Karongi) HV transmission line, the imported, active, and reactive powers will have to be considered, contrary to previous studies.

These Terms of Reference (TOR) concern the revision of these Studies. Indeed, since then, the context of energy demand has evolved, and the Regional Electricity Market is being created between the Central African Power Pool (PEAC) and the CEPGL and between the CEPGL and the Eastern Africa Power Pool (EAPP).

Due to the high capacity required to pass through the Kamanyola-Bwishyura (220kV transmission line, a revision of the 2014 studies, carried out by the Consultant STUDIO Pietrangeli, is urgent to allow, in the medium term, the possibilities of electricity exchanges on the interconnected network of the Region (CEPGL/EGL, PEAC, EAPP).

III. SCOPE OF WORKS OF THE CONSULTANT

These terms of reference (TOR) relate to the recruitment of a consultant in charge of the following works:

Update and revision of the Feasibility Study (FS) and Detailed Engineering Design (DED) for the 220kV Kamanyola-Bwishyura (Karongi) transmission line, to consider new developments on the social and environmental aspect, the generation and transmission of electricity while integrating the new regional electricity market context between EGL, NELSAP, EAC and EAPP.

Establish the economic and financial Feasibility Study (FS) of the 220kV HV interconnection line Kamanyola station - Bwishyura station in Rwanda and 220kV line span in the Bwishyura substation in the context of the current situation and the future development of the interconnection of electrical systems of Central Africa and East Africa.

Establish the Detailed Engineering Design (DED) of the 220kV HV interconnection line Kamanyola station - Bwishyura station in Rwanda and 220kV line span in the Bwishyura station.

Develop the Tender Document (TD) to recruit a contractor for the construction of this line.

Update the following documentation, studies and plans related to environmental and social aspects in accordance with EIB and WB Environmental and Social Standards:

Environmental and Social Impact Assessment (ESIA).

Resettlement Action Plan (RAP).

Environmental and Social Management Plan (ESMP).

The starting point of the route of the 220kV Kamanyola substation - Bwishyura transmission line is Kamanyola Substation in the DRC, planned to the south of the city of Kamanyola at an equidistance of 2km from the city and the Ruzizi River which borders the DRC and Rwanda in the Bugarama plain. The end point will be Bwishyura / Karongi Substation (Rwanda), approx. 92.5 km away. The line will be double circuit.

The service to be provided by the Consultant also includes the study of the construction of 2 line bays to connect the new 220kV line double circuit in the Bwishyura substation; he shall ensure the

availability of the line bays in the substation under construction by referring on the technical drawing used by the Bwishyura substation contractor.

The route is characterized by minimum, average and maximum altitudes respectively of 925m in the Bugarama plain around the Ruzizi River, 1,449m in the plateau hills in Rwanda and 1,869m in the mountain ranges along Lake Kivu.

As part of the capacity development for EDCL staff, the consultant shall train the Project Owner/EDCL staff involved in the project in computer tools used to design/studies power line projects, in powerline construction and construction projects management. The training shall be given in specialized training centers and by competent experts in the above-mentioned programs.

3.1.ENVIRONMENTAL AND SOCIAL IMPACTS

Considering a 30m wide right-of-way along the route, an area of approximately 278ha will be impacted. Thus, within this corridor, there will be household homes as well as public and social infrastructure to be destroyed, various crops to be razed, trees and forests to be cut for the cleaning of the route where around 232 double circuit pylons will be installed, i.e., 4 in the DRC and 228 in Rwanda. For the pylons' foundation, there will be a definitive expropriation of 100 sqm per pylon (10mx1m), i.e., a total of 23ha.



Figure 6: Alternative Route Options for the 220kV HV Interconnection Line Kamanyola Post - Bwishyura Post Source: STUDIO Pietrangeli, February 2014

ESIA, ESMP and RAP were initially carried out by the Consultant STUDIO Pietrangeli in 2014. More than 9 years have passed since the last touch of these studies and surely several changes have occurred in the Project area in terms of population growth, spatial occupation of the population, and of natural and artificial evolution of local ecosystems.

Complete baseline data will have to be collected by the Consultant, taking also into account changes in the context of the Project area (demographic, landscape, and security). Any gaps noted on previous studies concerning, among other things, the aspects "biodiversity, cumulative impacts, management of complaints and grievances, etc...." must be filled, respecting reference frameworks (national legislation, EIB's Environmental and Social Standards (ESS) and World Bank's ESS).

The Consultant will be responsible for updating the ESIA including the ESMP and the updating of the RAP explicitly concerning the spatial and structural occupation constituted by the 220kV HV line Kamanyola - Bwishyura (Karongi) based on the technical feasibility and the route of the preferred line.

3.2. TECHNICAL ASPECTS

The profile of the 220kV HV Line will be optimized to respect the minimum safety distance between the lowest conductor and the ground, i.e., 8 m, distance between conductors of each phase, technical analysis of towers and the distances between them in using modern software like PLS CADD and PLS Tower. People will be able to continue cultivating in the line corridor, as long as

the height of any crop does not exceed 3 to 4 m. In addition, the study of the line bay will take into consideration the technical characteristics of the new equipment being installed in the Bwishyura substation.

3.3.FINANCIAL AND ECONOMIC ANALYSIS

Feasibility studies for energy projects involve a comprehensive economic and financial analysis to assess the viability and profitability of the proposed venture. These analyses help stakeholders, including investors, project developers, and policymakers, make informed decisions about whether to proceed with the project. Here are key components of economic and financial analysis in feasibility studies for energy projects:

IV. OBJECTIVES AND EXPECTED RESULTS

4.1.MAIN OBJECTIVE

The general objective envisaged in the required expertise services is to revise the technical feasibility study of the project, detailed design of the line and line bay, to ensure their complementarity with the interconnection code of electricity networks of Rwanda, and also of Environmental and Social Impact (ESIA) including the ESMP as well as the revision of the Resettlement Action Plan (RAP) of the people affected by the implementation of the project, taking into account the current situation of the electrical systems of the member countries of the CEPGL region, the forecasts of demand, and interconnection projects underway or planned at NELSAP, PEAC and EAPP.

4.2.SPECIFIC OBJECTIVE

The expected results of the Consultant by conducting this revision of the technical and financial feasibility study, ESIA and RAP are as follows:

- Update the Feasibility Study (FS) and detailed design of the 220kV interconnection line Kamanyola – Bwishyura and Line Bay in Bwishyura substation by preparing the following documentation:
 - technical feasibility studies including but not limited to layout, updated map of the Rwanda network highlighting projects under the scope, proposed line route and tower lines bays coordinates in Bwishyura Substation
 - conducting a preliminary geotechnical analysis along the selected optimal alternative
 - prepare a bill of material/ quantities needed for the transmission line and associated component of substation. develop a detailed financial and economic analysis of the project.
 -
- Update the content of the ESIA and of the ESMP by determining and measuring the nature and level of environmental and social risks and impacts, including Gender Based Violence (GBV), Strategic Environment Assessment (SEA) and Health and Safety(HS) risks, likely to be generated by the works and operation of the 220 kV Kamanyola – Bwishyura (Karongi) HV line.

- Update Resettlement Action Plan (RAP) data: a new census and socio-economic baseline survey will be conducted to identify all PAPs who will be physically or economically displaced and eligible for compensation and/or assistance.
- .
- Establish a Communication and Stakeholder Engagement Plan (CSEP) for the project.
- Develop a tender document for the recruitment of the Contractor for works

4.3.RESULTS TO BE ACHIEVED BY THE CONSULTANT.

The expected results of the Consultant are:

- Produce a revised study of the technical, economic, and financial feasibility of the 220kV line project Kamanyola substation - Bwishyura substation & line span in the Bwishyura station.
- Revise the Detailed Design of the Kamanyola-Bwishyura (Karongi) Line & line span in the Bwishyura station.
- Prepare an updated and detailed study of environmental and social risks and impacts (ESIA).
- Prepare the Environmental and Social Management Plan (ESMP).
- Prepare the Resettlement Action Plan (RAP) for populations affected by the project, including a summary of the RAP in the form of a Non-Technical Summary (NTS).
- Develop a complaints resolution mechanism
- Develop the Health, Safety and Environmental Management Plan.
- Develop a Project Communication and Stakeholder Engagement Plan
- Develop the Tender Document (TD) for the recruitment of the Construction Company for this Project.

V. TASKS ASSIGNED TO THE CONSULTANT

5.1.Update and revision of transmission line and extension of Bwishyura substation's Feasibility Study

The revision of the Feasibility Study for the 220kV Line between Kamanyola and Bwishyura substations includes the following tasks:

5.1.1. In-depth study of the load forecast

- The Consultant will update data on Rwanda's electricity demand. Based on the results of the analysis of the forecasts made during the previous Studies, it will carry out a new projection of demand by 2050, which will include the evolution of energy and power needs and will indicate the number of intended consumers.
- These elements will be detailed according to uses (domestic, agricultural, artisanal, industrial, public lighting, etc.) and (ii) the voltage levels (HV, MV, LV). The Consultant will plot the load curves and monotones for the countries concerned and for the interconnected systems, highlighting the effects of pooling the sources of supply.
- The Consultant will take care to separate the forecasts according to sales by conventional meters and by prepayment meters, by issuing plausible hypotheses on the evolution of

subscribers and consumption according to the type of meters from which the subscriber benefits.

- The Consultant will explain any discrepancies between forecasts and past sales achievements and justify the assumptions and statistical models used for the demand forecasts. To consider the probabilities of realization of these projects and other factors likely to distort the forecasts, at least three demand development scenarios will be studied.

5.1.2. Detailed study of the route of the line

- Kamanyola substation-Bwishyura substation interconnection line: the Consultant will propose the best route alternative as well as the criteria used to choose the optimal route. He will carry out the topographical surveys required to produce the plans and longitudinal profiles necessary for the establishment of the works.
- The plans drawn up at the appropriate scales following the topographical surveys will indicate in particular: the level of the land, plotting angles, obstacles in the line crossing corridor, farms with the nature of crops, places of residence, etc.
- The final layout of each line will be materialized by as many reference points as necessary.
- The Consultant will determine the exact location and boundaries of transformer stations and reactive energy compensation equipment sites.
- He will also make a detailed study of the line bay in the Bwishyura substation taking into consideration the existing equipment.
- In the event of passing through sensitive areas from the point of view of the environment or the population, the Consultant will propose alternative line routes to establish the optimum in terms of E&S risks and impacts, investment costs and costs for compensation and mitigation measures. When updating the RAP, the consultant shall document the extent to which feasible alternative project designs and/or locations have been considered to avoid and/or minimize physical and/or economic displacement. Environmental and socio-economic experts will be consulted during the selection and evaluation of alternatives to integrate their first considerations on the corridors and the challenges ahead. It should be an interactive process. A comparison should be indicated in terms of cost, environmental and social negative impact and ESMP between the proposed line route and alternatives.

5.1.3. Detailed technical analysis and definition of the characteristics of the structures

- For the network calculations (power flow, short-circuit, stability), the Consultant will justify whether the model of the electricity networks of the region of Rwanda is compatible with that of Kamanyola presented in the previous study.
- Essentially, the model will consider the high-voltage transmission network, transformers, and other associated equipment.
- To provide a sufficiently accurate representation of all the dynamic elements required, the network model must also cover all the production groups used for the defined scenarios. The model of the transmission network will cover the years 2026 (the earliest date for the commissioning of the interconnections) until 2050. Network loads will be grouped together at high-voltage substations.
- Plant models will include generators, turbines, excitation systems, automatic voltage regulators and stabilization systems (if applicable). For the representation of turbine

governors and generator excitation systems, standard IEEE models, which provide sufficient accuracy for a feasibility study, will be used.

- Preliminary power flow calculations inside each national grid in their present state will be performed at this stage to tune and validate the model and verify the operating conditions of the networks in steady state, i.e., of active and reactive power, line and transformer load, voltage, need for reactive power compensation, line losses, phase angle. For the same purpose, the preliminary short-circuit calculations (maximum three-phase fault according to the IEC) will be carried out to evaluate the safety margins, especially at the places planned interconnections.

To establish the preliminary capacities of the interconnection, the calculations should:

- Examine regional requirements for self-sufficiency in terms of electrical energy supply.
- Identify national production development plans that can be delayed or canceled in favor of power exchanges between countries.
- Identify the points of congestion of the national networks at various stages of their development.
- Quantify and determine the date when a power exchange is a viable alternative to local production.
- A crucial element that must be considered at this stage is the selection of the voltage level of the main interconnect. An evaluation of additional interconnection options in the region is required for optimization purposes and to keep all future options open in a flexible and economical manner.

The main criteria that will be observed for the design of the network are:

- The design of the transmission system, considering the optimal use of present and future equipment and the possibility of establishing maximum operating flexibility, making it possible to deal with the uncertainties inherent in the growth of the load and the development of the production.
- Overloads should be avoided during normal operation and because of loss of any major system component, such as a generating station, transformer, line, or reactive compensation equipment.
- The voltages on the Substation bars must comply with the limits set by the Network Codes and Standards of the Electricity Companies. The reactive power requirements will be analyzed under peak load and low load conditions as well as when energizing the interconnections, to ensure that the voltage can be maintained within the required range for any load condition loads transmitted in n-1 operating condition.
- The Consultant will have to carry out a study of the reactive power compensations that will have to be put in place on the network to maintain the voltage level within the standards before the commissioning of the Ruzizi III regional hydroelectric power station.
- It will issue recommendations on the management of compensation equipment after the commissioning of the Ruzizi III power plant and later the Ruzizi IV power plant.
- When analyzing current and future power transfer situations, potential bottlenecks will be identified, and measures will be proposed, which may include reinforcement of tie lines,

repairs, and identification of switchgear and of future transport corridors at strategic locations. Should a new line appear necessary at some stage of development, a preliminary route will be selected based on maps. The Consultant must specify the deadlines for foreseeable reinforcements of the interconnected network and specify the list of equipment that will be required for this reinforcement.

5.1.4. Detailed technical analysis and network characteristics for line and Bwishyura substation

- Based on the results of the in-depth demand studies and the detailed route of the Kamanyola-Bwishyura (Karongi) Interconnection Line, the Consultant will revise the technical analyzes and network operation simulations.
- The Consultant will carry out the following tasks: sizing and choosing of equipment and prepare the technical specification of all equipment for the line bay in the Bwishyura substation, sizing of the pylons, determination of the number of pylons by type, choice of line accessories and section of the conductors, specification of the equipment of the 220 kV Kamanyola - Bwishyura line. The consultant must take into consideration the technical condition of two substations (Kamanyola and Bwishyura) in terms of the design parameter of the equipment installed in the substation.
- The Consultant will examine the requirements of existing telecommunications, local SCADA, remote control and protection systems used in the various substations within Rwanda and the countries covered (CEPEGL) by the interconnection project and will make proposals regarding the communication and control equipment for the interconnected networks.

5.1.5. Preparation of detailed Designs

The Consultant will carry out the detailed design of the 220kV double circuit line *Kamanyola substation - Bwishyura substation* and (2) 220kV line bays, based on existing studies including the studies of Ruzizi III project carried out by the Consultant STUDIO Pietrangeli in 2014, considering the changes made in the overall design of these lines, namely:

- Kamanyola 220kV Substation modified by the study of STUDIO Pietrangeli
- The 220kV line Kamanyola station - Bwishyura substation will be a double circuit line.
- Two 220kV line bays will be built in the Bwishyura substation for the connection of the 220kV double circuit line coming from Kamanyola in the Bwishyura substation.
- Adjustments must be made to the first pylons departing from the Kamanyola Substation and to the last pylons from the Kamanyola Substation, the initial design of which had been made by the SOFRECO-RSW-MERCADOS Consortium, but which must be revised in the part of another market (Lahmeyer -INTEC)
- The Consultant will refine the technical analyzes and the simulations of network operation, carried out during the previous studies of STUDIO Pietrangeli to adapt them to the double circuit line to prepare the detailed technical specifications of the equipment and the complete directives and documents required for the launch of tenders for execution of works.

In particular, the Consultant shall:

- Carry out the route alignment survey
- Carry out a detailed survey (topographical work) to determine the number and types of pylons.
- Determine the number and types and characteristics of pylons, line conductors, Insulators, hardware fittings and accessories
- Define the provisions for the earthing of the pylons.
- Preparation and submission of the Design Basis Report (DBR)
- Carry out the line profiling and stringing chart. The profile shall include the following:
 - The longitudinal profiles along the centerline of the transmission line route including the bottom conductor catenaries.
 - The cross-section profile wherever appreciable difference in level exists, with references to centre-line level.
 - Route plan giving details of all objects lying within the right of way and just along the boundary of right of way.
 - Angle of line deviation duly marked left (L) or right (R) as the case may be
 - Objects and their distances along the route within the right of way from centre line, nearby villages, important pucca roads & or rivers/canals, cart tracks etc. should be marked on the route profile.
 - Crossing details with any other power or telecommunication lines, roads, railway lines, canals or rivers should be marked as clearly as possible.
- The Consultant will conduct geological investigations to determine the characteristics of the soils relating to their ability to serve as a foundation for the pylons and substation equipment in order to determine the types of foundations to be used at each tower location and each substation equipment. The consultant will prepare and submit a detailed Geotechnical report.
- Establish a staking table with an indication of the type of pylon (anchoring, alignment, angle) and the coordinates of the locations of all the pylons which will be materialized by markers (Towers schedule and Foundations schedule)
- Carry out the design of all types of towers in PLS TOWER and foundations design. The towers will be designed to support double circuits line.
- Based on the tower and body extension design, the consultant will develop structural drawings to the scale. Structural drawings shall cover the following:
 - Tower body in parts
 - Cross-arms (Tops & Bottom plan)
 - Earth-wire peak/Cross-arms
 - Details of all the Lap and Butt joints
 - Tower body extensions (3,6,9,12,15,18,21 etc.)
 - Stub-setting templates (common up to 6M extension)
 - Hill side extensions if required

➤ Etc...

Bills of material (BOM) shall be prepared to indicate the quantity of each member for 1 tower, extension, hill side extension and the stub-setting template as well as preparation of fabrication sketches.

- The global Bill of quantity shall indicate all equipment's quantity to be used in power line and all equipment's quantity to be used in 2 (two) Line Bays at Bwishyura substation. This should include quantities of all electrical equipment/materials, civil work, testing and commissioning activities.

The Consultant shall use PLS CADD, which is used in EDCL to carry out the Detailed design of the 220kV Interconnection power line *Kamanyola substation - Bwishyura substation* and (2) 220kV line bays, using

5.1.6. Detailed Financial and economic analysis

Feasibility studies for energy projects involve a comprehensive economic and financial analysis to assess the viability and profitability of the proposed venture. These analyses help stakeholders, including investors, project developers, and policymakers, make informed decisions about whether to proceed with the project. Here are key components of economic and financial analysis in feasibility studies for energy projects:

- ❖ **Cost-Benefit Analysis (CBA): Cost Analysis:** Break down the project costs into various components, including capital expenditures (CAPEX), operating expenses (OPEX), and other associated costs. Identify all direct and indirect costs related to project development, construction, and operation.
- ❖ **Benefit Analysis:** Evaluate the economic benefits of the project, such as increased energy production, cost savings, and potential environmental benefits. Consider both tangible and intangible benefits.

Net Present Value (NPV): Calculate the NPV of the project by discounting all future cash flows (both costs and revenues) to their present value using an appropriate discount rate. A positive NPV indicates the project's potential profitability.

- ❖ **Internal Rate of Return (IRR):** Determine the IRR, which represents the discount rate at which the project's NPV is zero. The IRR provides insight into the project's rate of return and helps compare it to other investment opportunities.
- ❖ **Return on Investment (ROI):** Calculate the ROI by dividing the net profit of the project by the initial investment cost. This metric expresses the profitability of the project as a percentage.

- ❖ **Payback Period:** Identify the time it takes for the project to recoup its initial investment. A shorter payback period is generally more favorable.
- ❖ **Sensitivity Analysis:** Assess the sensitivity of the project's financial metrics (NPV, IRR, etc.) to changes in key variables such as energy prices, construction costs, and operating expenses. This helps identify critical risk factors.
- ❖ **Financial Modeling:** Develop a detailed financial model that includes projections of income statements, cash flow statements, and balance sheets. The model should incorporate various financial parameters, including depreciation, taxes, and financing costs.
- ❖ **Economic Impact Analysis:** Assess the broader economic impacts of the project on the local, regional, or national economy. This may include job creation, increased tax revenue, and other economic contributions.
- ❖ **Discounted Cash Flow (DCF) Analysis:** Use DCF analysis to estimate the present value of expected cash flows over the project's life. This method considers the time value of money and provides a comprehensive view of the project's financial feasibility.
- ❖ **Financing Structure:** Analyze the proposed financing structure, including the mix of equity and debt. Evaluate the cost of capital and its impact on the financial metrics of the project.
- ❖ **Environmental and Social Cost-Benefit Analysis:** Assess the environmental and social impacts of the project. Consider the costs associated with environmental mitigation measures and social responsibilities and weigh them against the benefits.
- ❖ **Leverage Ratios and Financial Metrics:** Evaluate financial metrics such as debt service coverage ratio, debt-equity ratio, and other leverage ratios to assess the project's financial stability and risk.
- ❖ **Lifecycle Cost Analysis:** Consider the entire lifecycle of the project, including construction, operation, maintenance, and decommissioning costs. This approach provides a more comprehensive view of the project's economics.
- ❖ **Break-Even Analysis:** Determine the point at which the project covers all its costs and begins generating a profit. Break-even analysis helps in understanding the minimum level of performance required for financial success.
- ❖ **Social Cost Analysis:** Evaluate the social costs associated with the project, including potential impacts on local communities, displacement of populations, and other social considerations.
- ❖ **A well-conducted economic and financial analysis in feasibility studies provides a comprehensive understanding of the project's financial viability, risks, and potential rewards. It also helps in making informed decisions and securing financing for the project. It's crucial to update these analyses regularly as project details evolve and market conditions change. Additionally, engaging with financial analysts and economists can enhance the accuracy and reliability of the analysis.**

5.1.6.1. Market Analysis

- ❖ Risk Assessment: Conduct a thorough risk assessment to identify potential risks and uncertainties that could impact the project's financial performance. Evaluate the likelihood and potential impact of each risk.
- ❖ Market Analysis: Evaluate the market conditions and demand for the energy produced by the project. Analyze market trends, competition, and potential regulatory changes that could affect the project's financial outlook.
- ❖ Regulatory and Policy Analysis: Consider the impact of existing and potential future regulations and policies on the project's economic and financial feasibility. This includes incentives, subsidies, and compliance costs.
- ❖ Scenario Analysis: Develop different scenarios to understand how changes in assumptions or external factors might affect the project's economic and financial outcomes. This helps in preparing for various potential future conditions.
- ❖ Government and Policy Support: Assess the level of government support, subsidies, or incentives available for energy projects. Consider the stability and reliability of such support.

5.1.7. Cost Estimate Report

- ❖ Referring to costs from recent tender Documents (TD) and information obtained from suppliers of similar equipment, the Consultant will prepare a detailed project cost estimate for the Interconnection 220kV line Kamanyola substation - Bwishyura substation and 220kV line Bays at Bwishyura substation, highlighting the details of unit prices and quantities for all items including preliminary activities, electrical equipment, FAT, civil work, integration of new bays into existing network, testing and commissioning of the 220kV bays/substation. It should include the cost of all project facilities and in particular: detailed investment costs; works supervision and control costs; ESIA, ESMP and RAP execution costs; the costs of operator training and operating equipment.
- ❖ Costs will be split in foreign currency and local currency. The basic data used to determine the costs must be justified and dated. Sources of unit prices, price trend indices and economic conditions will be indicated. The Consultant will establish a project expenditure schedule.

5.2.DETAILED STUDIES OF ENVIRONMENTAL AND SOCIAL RISKS AND IMPACTS

- Based on the terms of reference of the environmental and social impact studies, the consultant will carry out the tasks relating to the preparation of the revision of the ESIA including the ESMP and the revision of the RAP concerning explicitly the spatial and structural occupation constituted by the Line 220kV Kamanyola - Bwishyura (Karongi) (92.5km)
- Note: The consultant must prepare an update of the RAP, ESIA, ESMP and CRM (Complaint Resolution Mechanism) to comply with national environmental and social procedures, the environmental and social standards of the EIB and WB.

During the project kick-off meeting: EGL and EDCL will discuss with the Consultant all aspects relating to the execution of the study including:

- ❖ The necessary documentation of previous studies and the management of environmental and social risks and impacts:

ESIA/ESMP and RAP, previous EHS produced by Studio Pietrangeli; ESIA for Ruzizi III; Previous Feasibility and Detailed Design Studies; Legal and legislative texts of the DRC and Rwanda relating to environmental management and social development; Promoter's environmental and social requirements; Environmental and social requirements of the European Investment Bank (EIB) and the World Bank and physical and socio-economic geography of the project area.

- ❖ The methodological approach that was prepared and submitted with the Consultant's proposal and will be followed to achieve the expected results under the review of the previous environmental and social assessment.
- ❖ Armed with useful information gathered in this meeting, the Consultant will prepare and present an Inception Report which will include:

Scope of Works of the Consultant, the scientific method for collecting and analyzing data; The tasks to be carried out within the framework of the study; A work plan indicating the detailed schedule of activities to be carried out for the collection of basic data; A consultation plan for project stakeholders, vulnerable groups, and a public communication strategy.

A socio-economic survey questionnaire including (i) the current socio-economic profile of the PAPs, (ii) an assessment of vulnerability and the need for special arrangements, and (iii) degrees, types, and nature of impacts.

- ❖ The Inception report should be presented during a workshop organized by consultant and EDCL for advice and comments.
- ❖ Land inventory or project scoping:

By comparing the activities required for the execution of the Kamanyola-Bwishyura / Kibuye 220 kV HV Line project and the sensitivity of the physical, natural and human environment of the direct and indirect impact zone of implementation of the project (ecosystems, livelihoods, spread of Covid-19 and other communicable diseases, sexually transmitted diseases and potential gender-based violence causing unwanted pregnancies), the Consultant will briefly describe, up to there, all the direct, indirect and cumulative positive and negative impacts that will be induced by the execution of the project with their weight characteristics.

The inventory report to be drawn up will be based, on the one hand, on the information drawn from the Feasibility Study of the project which describes in a technical manner the overall development and the equipment which will be installed in the corridor of the 220 kV Kamanyola-Bwishyura / Kibuye line and, on the other hand, on the nature of the works to be carried out under the project.

The present value of the significance of the impact will have to be determined in a contributory way with all the experts in charge of the technical study in the field (geotechnical, electromechanical, topographer) while considering the opinions and considerations of the local

community and especially the aspirations of the PAPs and the direct or indirect beneficiaries of the socio-economic benefits of the project.

The methodology of the fieldwork should enable the Consultant to classify the level of E&S risk of the project regarding the generally accepted norms and standards in this area, in this case, the ESSs of the EIB and the World Bank or the Operational Safeguards (SO) developed by the AfDB in the Environmental and Social Assessment Procedures (ESAP).

At the end of this inventory, the Consultant must:

- ❖ Meet the institutions in charge of environmental management in Rwanda, ie Rwanda Environment Management Authority (REMA) and Rwanda Development Board (BRD) in order to prepare a project registration file and have the team of consultants validated;
- ❖ Prepare a Memorandum of classification of the level of Environmental and Social risk of the project, according to the importance of the identified or anticipated impacts and the applicable legal framework of the CEPGL Countries and the Environmental and social safeguard standards of development partners including the European Investment Bank and world Bank.

The Project Inventory or Scoping Report will be concise and must be submitted to EDCL for validation and advice on the depth of environmental and social analysis to be devoted to the study and then begin the process of applying for authorization and certificate of environmental and social compliance for the execution of the project.

5.2.1. Preparation of the ESIA

According to the level of classification of the E&S risk level assigned to the project of the 220kV Line Kamanyola substation - Bwishyura substation (92.5km), the Consultant will prepare the ESIA accordingly by carrying out further field investigations to complete the environmental and social data compiled in the Scoping Report of the project (establishment of the magnitude of the impacts and potential mitigation measures) and considering the comments given during the feedback and validation workshop of the Scoping Report.

Specifically, the Consultant will undertake the following tasks:

- ❖ Define, map, and analyze the current state of the impact area or the restricted and extended study area relating to the corridor of the 220kV line Kamanyola - Bwishyura (Karongi)
- ❖ Describe the project by providing a summary of its relevant components likely to impact the surrounding environment.
- ❖ Update the analysis of the political, legal, and administrative framework in which the project falls and prepare the relevant references of the applicable texts and institutions involved in environmental and social management at the local, national, and international level.
- ❖ Compare the legal and regulatory requirements of Rwanda with the ESSs of the EIB and the WB and highlight the requirements of Rwanda.
- ❖ Describe and analyze the conditions of the physical, biological, and human environments of the impact or study area before the execution of the project. This analysis must make it possible to clearly understand the interrelationships between the environmental/social components and

the importance that the local populations attach to these components, to identify the environmental and social components of high value or of particular interest.

- ❖ Present and analyze the alternatives for the route of the 220kV Kamanyola-Bwishyura (Karongi) Line, including the "without project" option, by identifying and comparing the different options on the basis of technical, economic, environmental and social criteria; assess the ability of alternatives to mitigate the environmental and social impacts of the project; the investment costs and recurrent charges corresponding to the mitigation measures and the relevance of these measures in relation to local conditions; as well as the needs in terms of institutions, training and monitoring for their implementation; quantify the environmental and social impacts for each of the alternatives, as far as possible, and attribute an economic value to them when possible.
- ❖ Appreciate the mitigation measures contained in the current ESIA and amend and/or propose realistic and appropriate additional measures, allowing either to avoid, mitigate, minimize, or compensate for the risks and negative impacts, to prevent and manage their impacts, or to optimize positive impacts and assess the related costs, this considering the ESS requirements relevant to the project.
- ❖ Identify and assess the significance of potential additional negative and positive, direct, indirect, and cumulative, short, and long-term, temporary, and permanent environmental and social impacts, based on a rigorous scientific method, for the final site chosen for the 220kV line Kamanyola substation - Bwishyura substation.
- ❖ Analyze the indirect and cumulative impacts considering the activities of the project and those of the projects already carried out, the projects in progress and the projects to come in the district of the project 220kV line HV Kamanyola- Bwishyura (Karongi)
- ❖ Particular attention should be paid to: (i) the risks of uncontrolled development of Sexually Transmitted Diseases (STDs/HIV-AIDS) and Gender-Based Violence (GBV) - in particular exploitation and sexual abuse/harassment (EAS/SH), risks due to the large influx of workers from different backgrounds and their cohabitation with the population of the area of intervention, (ii) the risks of climate change following the degradation of the biological environment and the emission of greenhouse gases (CO₂) emitted by the engines in operation. These risks will also have to be subject to mitigation measures with a view to their limitation or elimination.
- ❖ Ensure that affected communities and other stakeholders are involved from the start of the process and throughout the ESIA process and the life of the project, including through an effective recourse mechanism in the event of complaint.

5.2.2. Preparation of the ESMP

The overall objective of the ESMP, which will also be included in the ESIA document, is to describe the entire context in terms of issues and measures that will be taken to ensure compliance with applicable national legal requirements in terms of the environment and social issues as well as the requirements of the integrated environmental protection system by the EIB and the WB.

In this context, the Consultant will have to perform the following tasks:

- ❖ Verify, amend, and supplement the mitigation and enhancement measures previously proposed aimed at avoiding, preventing, minimizing, mitigating, or compensating for the negative

impacts or increasing the environmental and social benefits of the project, including the associated responsibilities and costs.

- ❖ Develop an environmental and social monitoring program, including objectively verifiable indicators, institutional responsibilities, and associated costs.
- ❖ Identify climate risks, and if applicable, assess adaptation measures needed for the climate risk management plan.
- ❖ Conduct a gender analysis to diagnose disparities in access to resources between groups (men, women, young people, vulnerable populations, etc.) in the project intervention area and propose specific actions to promote gender and empowerment of women during project implementation.
- ❖ Identify the institutional responsibilities and capacity building needs of different stakeholders, if necessary, to implement the recommendations of the environmental and social assessment
- ❖ Develop the Stakeholder Mobilization Plan (SMP)¹ which will precisely define the roles and responsibilities of the stakeholders, activity engagement plan, task completion time and publication of mechanisms and means of communication during the execution of the project as well as an operational system for recording and processing complaints and grievances.
- ❖ Conduct consultations with primary and secondary stakeholders (PAPs) to know their opinions and concerns regarding the impacts and measures recommended during the execution of the project.
- ❖ Meet with local authorities and organize public consultation sessions to validate the socio-environmental and climate issues of the project as well as its social acceptability. Particular attention will be given to gender and vulnerability issues² (including the risks of sexual and gender-based violence – SGBV linked to the works). Attendance lists and minutes of meetings will be appended to the study report.
- ❖ Prepare an environmental, social, health and safety risk management plan including an analysis of the risk of accident and emergency on the site, the identification of appropriate safety measures and the development of an emergency plan preliminary.
- ❖ Develop general clauses and technical clauses related to environmental, health and social aspects to be taken into account in the Tender document(TD), specifically (i) the management plan for project facilities and borrow and quarry sites, access road; (ii) the waste management plan generated by the infrastructure construction activities and (iii) the environment, hygiene, health and safety plan covering the interior of the site (site and workers) as well as the outside close to the site (the local populations of the various sites of the site).
- ❖ Develop standard and operational procedures on the following aspects: Work at height; Incident reporting and investigation; Manual lifting and handling; Individual protection equipment; Management of hazardous waste generated on site; Preparedness and responses to emergency

¹Local Government, Opinion Leaders, Civil Society, Non-Governmental Organization (NGO).

²The disabled (physical or mental); Sick people, especially people with HIV/AIDS or other serious or incurable illnesses; Old people, especially when they live alone; Households headed by women; Households whose head of household is destitute or almost destitute; Victims of Gender-Based Violence (GBV); People displaced from conflict zones (or refugees if applicable); Persons belonging to certain ethnic, cultural or religious minorities; widows and orphans; Indigenous populations.

situations; Vehicle safety and traffic management; Organize and conduct training for staff who will be responsible for monitoring the implementation of project documents.

- ❖ Furthermore, concerning the locations of the areas used by the construction company (base camp, crushed/concrete plant, quarries, borrow pits, etc.) which are not yet known at the investigation stage, the Consultant shall assess/discuss potential options/opportunities and assess potential risks/impacts, based on this assessment preferred options will be selected and further explored during construction. This will make recommendations on how the related environmental and social issues will be addressed during the installation of construction sites and the workers' base. The Consultant will also give prescriptions and standards to be observed during the installation, operation, and restoration of the premises of all the sites used at the end of the works. These requirements will also be included in the environmental and social clauses of the TD.

5.2.3. Preparation of the RAP

The RAP should report on the types of impacts, magnitude, and profile of Project Affected Persons (PAPs) with the aim of providing detailed information on those directly affected and identifying individual compensation options for different categories of people affected by Project activities. Similarly, the RAP must promote a socio-economic environment conducive to the improvement of living conditions and income of the beneficiary community during the execution and operation of the project. The preparation of the RAP will be based on the WB's NES5 and the EIB's NES6.

To this end, the Consultant shall undertake the following activities:

- ❖ The baseline socio-economic survey should identify all PAPs who will be physically or economically displaced and eligible for compensation and/or assistance. It must cover the total population of PAPs and include an inventory of all losses (heritage, trade, access to natural or cultural resources or services, etc.). The survey should also include seasonal resource users who may not be present at the time of the survey, but who have a legitimate claim to the land.
- ❖ Proceed with the identification and analysis of people to be affected by the project by producing a list containing:

Their respective identities; Their physical addresses; Their telephone numbers if available; The nature of the property affected; Photos of heads of families or their beneficiaries and the statuses of their vulnerabilities.

- ❖ List and consider the Operational Procedures and Involuntary Relocation policies of the 6th standard of the EIB, NES 5 of the WB as well as the relevant regulations in force in the CEPGL Countries for the social management of involuntary displacement.
- ❖ Provide necessary information and consult with project-affected populations in participatory meetings to:

Capturing preferences for types of compensation and harmonizing decision-making; Determining the effective date of the start of property valuation (Cut-off date); Establishing the resettlement schedule.

- ❖ To expect:

Priority jobs for PAPs and assets in the project area with attention to gender; moving assistance and support during the period of adaptation to the new environment.

- ❖ Develop community development programs (socio-economic infrastructure: water supply, schools, dispensaries, markets) that can restore or improve the standard of living of the population of the project area, accompanied by mechanisms for acquisition of capacities to ensure incomes and raise production levels.
- ❖ Provide the list of persons affected by the project (identity of the PAP, his physical address and his telephone number, the nature of the property affected, his photo if necessary and the amounts of compensation) who will have to be resettled for advice and comments.
- ❖ Propose a complaints resolution mechanism with the participation of representatives of the administration, civil society, opinion leaders and people affected by the project and a grievance mechanism must be accessible by the project partner (EIB and WB) during the project execution.
- ❖ Provide monitoring and evaluation mechanisms to adapt each situation from one stage to the necessary corrective measures.
- ❖ Establish a support and supervision plan for the groups of vulnerable people affected by the project after having identified them by name, based particularly on households headed by women, orphaned children, the disabled, the elderly, to name but a few.
- ❖ Propose means of strengthening the people affected by the project during the post-project period to avoid falls and various risks that may surprise them due to the lack of follow-up.
- ❖ At the end of the development of the Environmental and Social Impact Study for the Project of the 220kV Kamanyola substation - Bwishyura substation line, the Consultant will write in English three (3) separate documents in accordance with the rules and environmental procedures of Donors EIB and WB and the legislation in force within the CEPGL.
- ❖ ESIA document for making decisions including the ESMP with the Communication and Stakeholder Engagement Plan as well as the complaint resolution mechanism.

Full RAP document

Non-technical summary document from RAP for decision makers

In addition, the Consultant will assist EDCL in obtaining the environmental and social compliance certificate which will be issued by the competent authorities of Rwanda Development Board (RDB).

5.3.PREPARATION OF TENDER DOCUMENTS (TD)

The Consultant will prepare the Tender Documents (TD) for the recruitment of the Project Construction Company. The TD will also consider the conclusions of the Final Report of the Environmental and Social Impact Studies (ESIA) relating thereto. The tender document must be clear and coherent to avoid any ambiguous interpretation.

The specifications of the equipment must consider, for reasons of management of spare parts and ease of operation, the existing equipment on the networks of the countries concerned by the Project. The Consultant will also design the compensation and stabilization equipment identified during the various network studies. He will develop a draft of Contract to be negotiated.

The TD for the recruitment of the Contractor for the Construction will include the following documents:

- ❖ The Invitation to Tender (IT).
- ❖ The General Conditions of tender document
- ❖ The Special Conditions of the tender document
- ❖ The Form of the commitment letter
- ❖ Technical Specifications of equipment for 220kV transmission line and extension of Bwishyura substation
- ❖ The drawings for 220kV transmission line and extension of Bwishyura substation
- ❖ The form of Submission letter
- ❖ The Schedule of quantities
- ❖ The form of Bill of quantities and prices
- ❖ The form of Bid Guaranty
- ❖ Form of Performance Guaranty

The contract shall be a single lot.

5.4. Training of EDCL staff.

- ❖ The consultant shall train the Project Owner/EDCL staff involved in the project; 10 people will be trained in computer tools used to design/studies power line projects, in particular Advanced AUTO CADD, Power factorial (DIG Silent) PLS-CADD, PLS TOWER, Arc GIS, 10 others in powerline construction and 10 other people in construction projects management to build the capacity of the personnel involved in this project. The training shall be given in specialized training centers and by competent experts in the above-mentioned programs.
- ❖ The total cost of the training must be considered during the preparation of the financial proposal and must also include transport costs to specialized training centers in these fields, accommodation costs and the mission per diem of the employer's personnel to be trained.
- ❖ The training plan and methodology will be provided by the consultant and approved by EDCL before conducting those trainings.

VI. REPORTS FROM THE CONSULTANT

All Reports must be written in English.

6.1. INCEPTION REPORT

The Consultant will prepare and submit to EDCL by email within 4 weeks after the entry into force of the contract, the inception report that includes, among other things, a summary of the progress of the study and the results of the document review, the staff used and the intervention times per specialist and per task or subtask, the completion rate for each task, the problems encountered and the measures taken or envisaged to resolve them; and the tentative monthly plan of activities. The consultant will also submit the ESIA and RAP Inception report together FS inception report.

It should include as well:

- ❖ The Consultant's detailed methodology (including all tools to be used)
- ❖ The activities and schedule clearly indicating the delivery dates of the various deliverables.
- ❖ The organization of the meeting mission with the authorities and stakeholders of the project.

6.2.MONTHLY E&S PROGRESS REPORT

The Consultant shall submit to EDCL concise E&S Monthly Progress report in electronic form latest on the 3rd calendar day of the following month. The Consultant shall prepare Monthly Progress Report (progress of the study) indicating:

- ❖ The type of work carried out.
- ❖ The encountered difficulties
- ❖ Gaps observed.
- ❖ Action strategies to be implemented.
- ❖ The Experts involved and the time provided.
- ❖ The results achieved compared to the overall study.

The monthly report is submitted to EDCL in electronic form latest on the 3rd calendar day of the following month.

6.3.MAIN REPORTS

The main reports include:

- ❖ Feasibility Study (FS)
 - ❖ Detailed Engineering Design (DED)
 - ❖ Environmental and Social Impact Assessment (ESIA)
 - ❖ Environmental and Social Management Plan (ESMP)
 - ❖ Resettlement Action Plan (RAP)
-
- ❖ These Reports must contain all the appropriate documents, data, maps, drawings, diagrams, and references.
 - ❖ The reports will first be produced in a provisional (draft) version and then finalized after their approval by the Client.
 - ❖ Provisional main reports shall be submitted 12 weeks after the contract effectiveness. After receipt of the draft and final reports, (IFS, DED, ESIA/ESMP, RAP and TD), the Client has 30 calendar days to submit comments and observations.
 - ❖ The final reports will be drawn up by the Consultant no later than two weeks after receipt of the observations and comments. To be considered finalized, each Report must be formally approved by the Client.
 - ❖ Three hard copies of the Final Reports will be submitted to the Client in addition to an electronic version (CD-ROM or flash drive) in PDF and in an editable version.
 - ❖ The Consultant shall include in his offer a provision for the organization of 2 meetings with EDCL and/or EGL for each Report.

6.3.1. Feasibility Study Report

a. Provisional report

Provisional report must be submitted within 12 weeks from the effective date of the contract. It will be produced in a provisional version and, after approval, in a final version in accordance with the contractual deadlines. It will contain:

- ❖ The results of the detailed study of demand and supply
- ❖ The results of the technical and economic evaluations and the indication of the simulation methods and the means of calculation implemented.
- ❖ The presentation of the institutional and organizational schemes chosen
- ❖ Estimates and work schedule.

b. Economic and financial analysis report

The Consultant will carry out the economic and financial analysis of the 220 kV HV Interconnection line between Kamanyola and Bwishyura substations, he will determine the economic and financial rates of return. He will carry out sensitivity analyzes to assess the impact of variations in parameters, such as the level of demand, the cost of investments, work completion deadlines, etc. on the economic and financial profitability of the Project.

c. Project Risks Report

The Consultant will assess the risks incurred in the Project area crossed by the 220 kV HV Interconnection Line Kamanyola substation - Bwishyura substation and by resorting, on the one hand, to an external source of supply for the satisfaction of electricity needs and/or, on the other hand, by basing part of its income on the export of electricity.

- ❖ It will analyze the various risks to propose concrete measures for eliminating or mitigating technical, socio-environmental, climatic, organizational, legal, and financial risks. The Consultant will identify the stakeholders who must bear the various risks not eliminated.
- ❖ The Kamanyola-Bwishyura (Karongi) HV interconnection line construction work schedule will be defined in such a way that the deadlines are as short as possible. The scheduling of tasks will be precise and detailed. When establishing the schedule, it will be necessary to consider the weather conditions (particularly periods of heavy rain) in the region which may have a negative impact on the progress of the work.
- ❖ The Kamanyola Substation must be operational 9 months before the implementation of the first Group of the Ruzizi III Regional Hydroelectric Power Plant to allow testing of the turbo-alternator groups.
- ❖ In developing the schedule, the Consultant will consider the date of the Financial Closing of the Project which will be specified by EGL in the coming months and to schedule the end of the works no later than nine months before the implementation of the Turbo- Ruzizi III alternator.
- ❖ The Report will be submitted to EDCL in 3 copies in English and in electronic format for validation in a workshop organized by EDCL.

6.3.2. Final ESIA/ESMP and RAP Report

With the integration of opinions and comments from the validation workshop and possibly a new field investigation for the collection of additional data, the Consultant will complete the development of ESIA/ESMP Report and RAP Report and will submit to EDCL the two Final Reports each in 3 hard copies written in English with an electronic version.

a. Non-Technical Summary (NTS) of the RAP

The Non-Technical Summary of the RAP (separate document) is intended to allow the decision-maker to quickly become familiar with the project, its ins, and outs, in a precise and didactic manner.

The minimum content must include the following headings:

- ❖ Summary description of the project, goal, specific objectives, components, and main activities.
- ❖ Potential Impacts of the Project activities that resulted in resettlement, area of impact of those activities and alternatives explored to avoid or reduce resettlement.
- ❖ Legal and institutional framework for the implementation of the RAP.
- ❖ Execution cell; Inter-agency coordination; Participation of local populations and NGOs in the planning, implementation, and monitoring of resettlement; Summary of views expressed and how these views were considered in the preparation of the resettlement plan; Consultations with host communities and local authorities.
- ❖ Eligibility: definition of displaced person and criteria for eligibility for compensation and other forms of resettlement assistance.
- ❖ Difference between country laws on resettlement and donor standards (WB & EIB).
- ❖ List of PAPs and compensation measures adopted, identity of the PAPs, physical address and telephone numbers, nature of the affected property, and amounts of compensation and the methodology used in describing the value and compensation of the affected property.
- ❖ Resettlement site identification and selection criteria, site preparation and resettlement plan.
- ❖ Key provisions of the RAP: Grievance and Appeals Mechanism, Community Development Programs (socio-economic infrastructure).
- ❖ Environmental Protection.
- ❖ An assessment of the environmental impacts of the proposed resettlement plan and measures to mitigate and manage these impacts.
- ❖ Implementation timelines: target dates for achieving expected benefits for resettled and host populations. End dates for various forms of assistance.
- ❖ Cost and Budget: tables showing the breakdown of cost estimates for resettlement activities; expenditure schedule; sources of funds.
- ❖ Monitoring and evaluation: execution unit; performance monitoring indicators to measure inputs, outputs and outputs related to resettlement activities; impacts of resettlement for a reasonable period after completion of resettlement activities.
- ❖ All reports, written in English, will be submitted to EDCL in the number of copies indicated above. A complete electronic version of the reports and documents produced, including all annexes and plans, will also be delivered to EDCL in an electronic format (USB key or CD Rom). EDCL will be responsible for sending these documents to the other project partners.

b. Detailed Design Report:

This Report will be produced in a provisional version and, after approval, in a final version and delivered to the Client in accordance with the contractually agreed deadlines. The detailed design report will contain: the description of the works; drawings, maps, and diagrams; details of the standards used; the technical specifications of the equipment. The provisional version must contain, in a separate volume, the provisional version of the tender documents. Monthly progress shall be submitted in the monthly report.

c. Final Report

The final report will be submitted by the consultant after incorporating the client's comments and recommendations. It will be delivered within two weeks after receiving the customer's comments and recommendations.

6.4.TENDER DOCUMENTS (TD)

- ❖ The Tender Document (TD) for the recruitment of the Project Construction Contractor will also consider the conclusions of the Final Technical Report and Environmental and Social Impact Studies (ESIA). The provisional TD will be submitted with the provisional versions of the technical studies and ESIA/ESMP.
- ❖ The final version must consider the observations and comments prepared by the Client. The final TD will be submitted one week after the submission to the Client of other reports mentioned above (technical report and ESIA).
- ❖ Three copies final version and electronic copy (PDF & MS Word and Excel). The bidding documents will be associated with the ToRs for the recruitment of a supervision consultant during project implementation.
- ❖ schedule.

All reports will be written in **English** and each report will be submitted to EDCL in three copies. A complete electronic version of the reports and documents produced, including all annexes and plans, will also be delivered to EDCL in an electronic format (USB key or CD Rom). EDCL will be responsible for sending these documents to the other project partners.

VII. IMPLEMENTATION SCHEDULE

The Studies will be carried out over a period of 32 weeks, from the date of entry into force of the contract, in accordance with the Roadmap of the Regional Hydroelectric Project of Ruzizi III, the timetable for the execution of the revision of the Technical Studies is presented in Table 2 below.

Table 1: Schedule of Execution of the revision of the Studies

<i>Technical Activities</i>	<i>Responsible</i>	<i>Duration in weeks</i>
Effectiveness of the Contract.	EIB/EDCL/Consultant	D

Submission of the inception Report including activities on: ❖ FS and DED ❖ ESIA/ESMP and RAP	Consultant	D+4 Weeks
Monthly Report Submission	Consultant	Monthly
Submission of the Provisional / Draft Reports including: ❖ FS and DED ❖ ESIA/ESMP and RAP	Consultant	D+12 Weeks
Review of the Provisional reports by the Client	EDCL	D+16 Weeks
Submission of Final Provisional reports by the Consultant and its validation by the Client	Consultant and EDCL	D+18 Weeks
Submission of the Draft Final Reports including: ❖ FS and DED ❖ ESIA/ESMP and revised RAP of the line.	Consultant	D+22 Weeks
- Review of the draft of Final reports by the Client	EDCL	D+26 Weeks
- Submission of Final reports by the Consultant and its validation by the Client	Consultant and EDCL	D+28 Weeks
Submission of Tender document (TD).	Consultant	D+30 Weeks
Validation of Tender document (TD).	Consultant & Client	D+32 Weeks
Training of the Contracting Authority's staff / EDCL	EDCL / Consultant	2 weeks for each training

VIII. CONSULTANT STAFF

The office of the Consultant's Project management will be in Kigali preferably nearby the Client's office, but the consultant will also have the site office at the project location.

Therefore, the Consultant will be free to establish his office anywhere in the Project area if this is justified by his field interventions.

8.1. STAFF OF THE CONSULTANT FOR THE TECHNICAL STUDIES

The Consultant will develop his organizational chart according to the needs of the Project. Each position will be assigned to a highly qualified professional. Considering the schedule for the execution of the works, the Consultant will establish and present a staffing schedule showing the involvement of each expert including the location of his activities (home office and in-country).

General and specific Professional Experience are justified by Degree, completion certificates, work certificates and professional training certificates to all staff and must be submitted with CV, as supporting documents.

Key team for the realization of the Technical Study will be composed of the following main experts:

- 1) Team Leader / Project Manager
- 2) Expert in numeric modelling of electrical networks
- 3) Expert in power line design
- 4) Civil engineer expert
- 5) Expert Geologist
- 6) Economist and financial expert
- 7) Environmental expert
- 8) Expert in social development and gender
- 9) Expert in substation equipment

8.1.1. Team Leader / Project Manager (TL/PM)

For the consultant's mission to be well coordinated, a mission leader will be needed who will be responsible for coordinating the carrying out of the revision of the technical and financial, environmental, and social studies.

Qualification: The TL/PM must be an Electrical, Electromechanical or Civil Engineer with at least a master's degree.

General work experience:

- Have at least 15 years of general professional experience in designing, planning, and carrying out feasibility studies for 220kV HV Interconnection Projects and associated substations.
- Have proven experience in the operation of 220kV HV lines or beyond.
- Have experience in the management of power line construction projects including environmental and social aspects.

Specific work experience:

- Have conducted at least three (3) study assignments for associated 220kV HV power lines like this project as Head of Mission or Team Leader, confirmed by technical references.
- Have participated in assignments with specific experience in the management and supervision of an engineering team, in the management of complex studies confirmed by five technical references.
- Have carried out during the last five (5) years at least one similar / comparable assignment.
- Have carried out during the last five (5) years at least one assignment in a similar position in the region.
- Have qualities of communicator and facilitator
- Speak and write fluent English. Knowledge of French would be an asset.

8.1.2. Expert in numerical modelling of electrical networks

Qualification: The Electrical Network Calculation Model Specialist must be an Electrical Engineer, bachelor's degree in electrical engineering or electrical power.

General work experience: The Computational Model Specialist should have:

- an experience of at least fifteen (15) years in computational modeling relating to electrical networks, in particular the optimization of the operation of networks and associated electrical substations, the evaluation of the transferable power capacities at the level of these interconnected electrical networks and related positions through the analysis of the quality of energy supply, safety and economy and the simulation of voltage stability regimes, and the valuation of reactive power.
- Have experience in power flow calculation and in optimal calculation of the cost of the production of electrical energy (economic dispatching)

Specific work experience: The Calculation Model Specialist must have participated in.

- at least three (3) Digital Simulation Studies missions with software usable for transformers, including (i) design software based on a spatial representation by finite elements and (ii) simulation software based on a representation of the equation's electrical circuits in the 220kV HV networks and associated substations, confirmed by technical references.
- Have carried out similar missions in other sectors.
- Have carried out during the last five (5) years at least one study mission in the energy sector.
- Fluent in English. Knowledge of French would be an asset.

8.1.3. Expert in power line design

Qualification: The Power Line Design Specialist must be an Electrical Engineer, level A0.

General work experience: The Expert Specialist in electrical networks must have at least fifteen (15) years' experience in electrical networks and/or engineering of electrical systems, in particular transport networks and/or in the management of planning studies for high voltage networks. 220kV high voltage networks.

Specific professional experience: Have ensured the design of at least 3 structures in the field of electrical systems engineering, 220kV transmission networks and the management of planning studies for 220kV HV networks.

Have carried out at least one similar study in the energy sector in Sub-Saharan Africa over the past five (5) years; Fluent in English. Knowledge of French would be an asset.

8.1.4. Civil engineering expert

Qualification of the Civil Engineering Expert must be a Civil Engineer, level A0.

General professional experience: The Civil Engineering Expert must have at least 10 years' experience in the design, supervision, or construction of civil engineering works, such as 220kV HV power lines.

Specific professional experience: The Civil Engineering Expert must have carried out at least 3 similar studies for the construction of civil engineering works such as 220kV HV power lines; Have ensured the design of at least one civil engineering work of the 220kV HV power line type, in sub-Saharan Africa, confirmed by precise references; Have carried out at least one similar study in the sector over the last five (5) years of energy; be fluent in English. Knowledge of French would be an asset.

8.1.5. Geologist Expert

Geotech The Expert Geologist must have training as a Geologist or Geotechnical Engineer, or a bachelor's degree in civil engineering with geotechnical expertise.

General work experience: The Expert Geologist must have at least 10 years in geological and geotechnical investigations, in addition to a practice for the construction of 220kV HV lines for the transmission of electricity and associated substations of at least 2 years,

Specific professional experience: The Expert Geologist must have carried out at least three (3) study assignments as a surveyor topographer confirmed by specific references; Have carried out surveying survey missions in projects of a similar size to this project; Have carried out similar missions in other Sectors; Have carried out study missions in the energy sector in sub-Saharan Africa over the past five (5) years; Have carried out study missions as a Surveyor Topographer in the Energy Sector in the CEPGL Zone

Be fluent in English. Knowledge of French would be an asset.

8.1.6. Economist and financial expert

Qualification: The Economist and Financial Expert must hold a degree in economics or finance equal to or higher than A0

General professional experience: The Expert Financial Analyst must have at least 10 years of experience in economic and financial studies

Specific professional experience: The Economist and Financial Expert must have carried out at least three (3) similar missions in the field of feasibility studies for the construction of power lines. The expert should have a specific practice in the field of energy, confirmed by specific references; Have carried out specific study assignments in the field of energy, as an economist and financier; Have carried out at least one similar mission in the last five (5) years. The expert should be fluent in English. Understanding French would be an asset.

8.1.7. Environmental Expert

Qualifications: the expert should hold an A0 university degree in environmental science, natural resource management, environmental management, or an equivalent degree.

General work experience: the expert must have general experience of at least ten (10) years in carrying out Environmental and Social Impact studies for large-scale infrastructure projects.

Specific professional experience: Have conducted at least three (3) environmental impact studies for the development and installation of High Voltage electrical infrastructure as Head of Mission

or Team Leader; Have specific experience of 10 years in projects financed by one or more of the following donors: EIB, WB, KfW or AfDB

Have a good knowledge of the environmental standards and regulations of one or more EIBs and/or other donors. Have a good command of English. Fluent in Kinyarwanda.

Having knowledge of French would be an asset.

8.1.8. Expert in social development and gender

Qualifications and skills: Hold a university degree (A0 in social sciences, gender and social development, sustainable development, or any other related field (anthropology, sociology, political science, community development, etc.).

General professional experience: Justify a minimum of fifteen (15) years' experience in the field of social and gender issues in the context of regional or regional projects with proven experience in social analysis and gender mainstreaming in projects; Proven experience in using participatory approaches to development and working with civil society, NGOs, local government, private sector, women's and youth organizations and other relevant stakeholders. Have relevant references on the assessment of social impacts in development projects.

Specific professional experience: Have at least 10 years of experience in impact assessment in the development of action plans for the resettlement of socially affected persons (RAP, ESIA, PGES, GRM, SEP). Have at least five (5) years of practical experience in mainstreaming gender equality, women's empowerment and social development issues into development policies, programs and projects; Have participated as a specialist in social development and gender in the development of the Resettlement Action Plans for project affected persons, partner engagement plans and grievance resolution mechanisms; Have a good knowledge of the standards, guidelines and policies of multilateral donors (EIB, AfDB, WB, EU, KfW etc.) in terms of social and gender management; Have organized and participated in at least three (3) electric power projects working sessions with stakeholders (technical experts, engineers, local administration, PAPs, civil society) in order to collect their wishes on the expected benefits of regional projects; Have good oral and written communication in French, English and Kinyarwanda. Be familiar with donor standards and/or professional experience on projects financed by EIB and WB; experience in EAS/SH would also be advantageous.

8.1.9. Expert in Substation Equipment

Qualification: The Substation Equipment Expert must be an Electrical or Electromechanical Engineer, level A0.

General professional experience: The Substation Equipment Expert must have general professional experience of at least fifteen (15) years in the design of 220kV HV Substations.

Specific professional experience: The Substation Equipment Expert must have participated in carrying out at least three (3) study missions for 220kV HV Dispatching Substations, confirmed by technical references; Have participated in assignments with specific experience in the management and supervision of an engineering team, in the management of complex studies,

confirmed by five technical references; Have worked in at least one multilateral donor project; Have a command of French. Understanding of English would be an asset.

8.1.10. Other Experts

The Consultant may add to this group of relevant specialists a list of support experts that it deems essential for the proper performance of its activities. These temporary experts (Short-term mandates) will be based at the Consultant's headquarters and locally in the project area (Pool of Experts) to carry out their mission. They must also have a good command of the English and French language and have a diploma of at least A0 level, have a general experience of 10 years in their respective fields of activity and a minimum experience of 5 years in the development of environmental and social impact studies. It would be:

- An Expert Surveyor Topographer
- A SCADA Specialist (he also monitors communications).

If their cost must be foreseen, it will be necessary to give the minimum diploma and their experience and to give a minimum number of experts to be considered in the evaluation. The Consultant should provide a description of their qualifications and experience. The detailed CVs of these Experts are not required when submitting offers.

Support staff and technical support: The cost of technical support and support staff must be included in the Experts' fees. The Consultant must have at its headquarters a support team bringing together all the specialties. This team at headquarters will provide permanent support to staff on site and will be led by the Head of Mission.

Headquarters Support Staff: The Consultant must have at its Headquarters a Support Team bringing together all the specialties, in particular specialties in wiring and substation equipment, in telecommunications and in SCADA and in hydrology. This Headquarters Team will provide permanent support to the staff on site and will be led by the Head of Mission.

For the Support Staff at Headquarters of the Consulting Firm, a minimum number must be fixed with their qualifications, experience, and functions in case their cost must be included in the financial offer. The cost of technical support and support staff must be included in the Experts' fees.

It is therefore necessary to review the arrangement of the Consultant's staff to ensure a good understanding by the bidders.

The detailed CVs of these Experts are not required when submitting offers. If their cost must be foreseen, each Support Staff at Headquarters must present (i) a qualification, (ii) a General Professional Experience and (iii) a Specific Professional Experience.

Expert Surveyor Topographer

Qualification: The topographic surveyor must have a university education equal to or greater than A0.

General professional experience: The Expert Surveyor Topographer must have at least ten (10) years of experience in the field of design of interconnection lines and 220kV HV substations, in addition to specific practice in the field of energy.

Specific professional experience: The Expert Surveyor Topographer must have carried out at least three (3) study missions as a Surveyor Topographer in the field of design of interconnection lines and 220kV HV Substations, confirmed by specific references; Have carried out Land Surveyor Study missions for at least two (2) Design Projects for interconnection lines and 220kV HV Substations, or of a size similar to this project; Have carried out similar missions in other Sectors; Have carried out study missions in the Energy Sector in sub-Saharan Africa over the past five (5) years; Have carried out study missions as a Surveyor Topographer in the Energy Sector in the CEPGL Zone; Fluent in English. Understanding of French would be an asset.

Supervisory Control and Data Acquisition (SCADA) and communications specialist

Qualification: The SCADA Specialist must have a university education in communications in electricity transmission networks, or in telecommunications, equal to or greater than A0.

General professional experience: The SCADA Specialist must have at least fifteen (10) years of professional experience in electrical network telecommunications and have a good knowledge of the standards and protocols for data transmission in electrical network control systems (E transmitters, Remote Terminal Unit (RTU), Communication protocols allowing communication between servers and RTU transmitters, Data server intended for archiving data and supplying human-machine interfaces (HMI) ; Have experience in using SCADA in the management of Dispatching Substations to detect current flow and line voltage and monitor the operation of circuit breakers, etc.

Specific professional experience: The SCADA Specialist must have carried out at least three (3) work control missions in the Studies or the control of the realization of functional modules of modern Centers in general during the last five years; Have carried out missions as a dam engineer in the design of hydraulic or hydroelectric dams; Have carried out similar missions in other Sectors; Have carried out study missions in the energy sector in sub-Saharan Africa over the past five (5) years; Have carried out study missions as a Surveyor Topographer in the Energy Sector in the CEPGL Zone; Be fluent in English, Understanding of French would be an asset.

8.2.MAN-MONTHS FOR THE ASSIGNMENT

<i>NS</i>	<i>TECHNICAL EXPERT AND ESIA EXPERTS</i>	<i>Duration at the Home office</i>	<i>Duration at field</i>	<i>Total duration</i>
1	Resident Team Leader / Project Manager	2	6	8
2	Expert in electrical network calculation model	2	1	3
3	Power line design expert	2	2	4
4	Civil engineer expert	1	2	3
5	Expert in Geology	0	2	2
6	Economist and financial expert	2	1	3
7	Environmental expert	0	3	3
8	Expert in Social development and gender	0	3	3
9	Expert in substation equipment	2	1	3
10	Other Experts	3	3	6
	TOTAL	14	24	38

IX. SELECTION CRITERIA

a) Technical requirements:

- The EOIs will be checked to assess whether the firms have demonstrated experience in management and execution of similar assignments over the last 10 years. The consultant firm should have at least 3 similar assignments executed in the above-mentioned period, among which at least one in sub-Saharan Africa and at least one relevant to projects financed by Multilateral Development Banks. The similarity should be in terms of nature, complexity, and volume of the contract (at least One Million One Hundred Ninety Thousand EURO (EUR 1,190,000 or equivalent in another freely convertible currency)
- The proposed staff should meet the qualifications and experience.

b) Financial requirements:

The interested consultant firms should demonstrate their financial capacity (Financial position) to implement this assignment.

The financial position will be verified in the Audited financial statement of the last three years:

- ✓ Average annual turnover should be at least One Million One Hundred Ninety Thousand EURO (EUR 1,190,000 or equivalent in another freely convertible currency) for the last three years (2021,2022 and 2023)
- ✓ Availability of financial resource such as liquid assets (The current ratio should be greater than 1)
- ✓ The current ratio is calculated as follow: current Asset/current Liabilities. In case of joint venture, each partner should submit their Audited financial statements of the last three years. The turnover will be calculated for each partner; the combined

average annual turnover of the last three years of the joint venture company should meet the requirement. The minimum average annual turnover of each of the partners should not be less than 20% of the requested value. Each partner should have a current ratio greater than one.

The firms that will comply with the conditions of technical and financial requirements described above will be ranked according to their number of similar assignments completed. The number of shortlisted consultants will be three (3) as minimum to six (6) as maximum from the first ranked consultant.

X. SERVICES AT THE CHARGE OF THE CLIENT

EDCL is the project developer. As such, EDCL is responsible for preparing the study, monitoring its implementation through validation workshop meetings that he convenes and chairs. A project budget will be provided for the holding of report validation meetings.

- EDCL will facilitate the Consultant's access to documents and archives of any kind. EDCL, in collaboration with EGL, will also facilitate contacts with public or private institutions in the countries related to the study, especially to enable the Consultant to acquire information and documents in their possession related to the study.
- EDCL, supported by EIB and EGL, will monitor, and evaluate the studies through the expected results notified to the Consultant in the Terms of Reference. The quality of the study will be assessed regarding the compliance of the results with the terms of reference and with the comments and recommendations resulting from the validation workshop. The organization of report presentation and approval workshops will be proposed by EDCL and EIB at each phase of the study.
- EDCL will submit all study reports prepared by the Consultant to the validation partners in a timely manner.

XI. REFERENCE DOCUMENTS

- Least Cost Power Development Plan (LCPDP) 2022 – 2040, June 2022.
- NELSAP-Consultancy Services for Power Network Analysis of Interconnection of Electric Grids of NEL countries.
- Rwanda Energy Policy/ 17th March 2015, Republic of Rwanda. Ministry of Infrastructure.
- Feasibility and Detailed Project Report (DPP) studies and preparation of a Tender Document (TD) for the recruitment of a construction company for the 220kV HV transmission line Kamanyola substation-Bwishyura substation (formerly Kibuye) in Rwanda, STUDIO Pietrangeli, 2014.
- Preliminary studies for the Development of a community hydroelectric site of Ruzizi III on the Ruzizi River and the development of the Energy Component of the activities of the Economic Community of the Great Lakes Countries (CEPGL) – Lot 1: Pre-Project Study Detailed (PPSD) of the hydroelectric development of Ruzizi III (Ruzizi IV), Final Report, FICHTNER, May 2011, including in particular:

- Setting up in Public-Private Partnership (PPP) of the Ruzizi III Regional Hydroelectric Project, 2010.
- Institutional and Financial Arrangement of the Option chosen for the Ruzizi III Regional Hydroelectric Project and the management of the Ruzizi River waterfall, 2011.
- Development of the International Convention on the integrated management of the water resources of Lake Kivu and the Ruzizi River and the Statutes of the Lake Kivu and Ruzizi River Basin Authority (ABAKIR), 2011.
- Report on the Bankability of the Ruzizi III Regional Hydroelectric Project, 2011.
- Diagnostic Study of the Community Hydroelectric Power Plant of Ruzizi II,
- Complementary Study of the Environmental and Social Impact and the Action and Resettlement Plan (ESIA/RAP) of the Ruzizi III Regional Hydroelectric Project, May 2012.
- Preliminary studies for the Development of a community hydroelectric site of Ruzizi III on the Ruzizi River and the development of the Energy Component of the activities of the Economic Community of the Great Lakes Countries (CEPGL) – Lot 1: Feasibility study for the Ruzizi III hydroelectric development (Ruzizi IV), Final Report, FICHTNER, May 2010.
- Technical and Organizational Studies in the Energy Cooperation Sector in the Great Lakes Region, EGL, 2007.
- Study of the Master Plan for the Electrification of the Great Lakes with funding from the European Union, TRACTEBEL, 1993.
- Study on standards for protection, control, command and simulation equipment, communication and monitoring equipment and interfaces between networks of the Economic Community of the Great Lakes Countries (CEPGL) and the East African Community
- AFRICAN DEVELOPMENT BANK (AfDB); AfDB Integrated Backup System. Series on Safeguarding and Sustainability. Statement of Policy and Operational Safeguard. Tunis, June 2013.
- INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT / WORLD BANK: World Bank Environmental and Social Framework, 2017
- PIETRANGELI STUDIO: Final Report of the Kamanyola-Kibuye ESIA. Non-Technical Summary, January 2014
- PIETRANGELI STUDIO: Final Report of the Kamanyola-Kibuye ESIA. Environmental and Social Impact Study; January 2014
- PIETRANGELI STUDIO: Final Report of the Kamanyola-Kibuye ESIA. Environmental and Social Management Plan, January 2014.
- STUDIO PIETRANGELI; Final report of the Kamanyola-Kibuye ESIA. Resettlement Action Plan, January 2014
- STUDIO PIETRANGELI: Call for Tender Documents (TD) 220kV Kamanyola-Kibuye Line, November 2013.
- SOPRECO-MERCADOS: Environmental and Social Assessment. Environmental and Social Procedures Manual, March 2016.