THE REPUBLIC OF RWANDA

MINISTRY OF INFRASTRUCTURE

P.O.BOX 24 KIGALI

RWANDA ENERGY GROUP (REG)

Rwanda Energy Access and Quality Improvement Project (EAQIP)

(Project Number P172594)

FINAL REPORT

ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK (ESMF)

Kigali, July 2020

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LIST OF ACRONYMS

EA	: Environmental assessment
AFD	: Agence Francaise de Développement
CFL	: Compact Fluorescent Lamp
DP	: Development Partner
EAQIP	: Energy Access and Quality Improvement Project
EARP	: Electricity Access Roll out Program
EARP	: Electricity Access Rollout Program
EASSDP	: Electricity Access Scale-Up and Sector Wide Approach Development Program
EDCL	: Energy Development Corporation Limited
EHSP	: Environmental Health and Safety Plan
EICV	: Integrated Household Living Conditions Survey
ESF	: Environmental and Social Framework
ESIA	: Environmental Impact Assessment
ESIA	: Environmental and Social Impact Assessment
ESMF	: Environmental and Social Management Framework
ESMP	: Environmental and Social Management Plan
ESSs	: Environmental and Social Standards
EU	: European Union
GIIP	: Good International Industry Practice
GoR	: Government of Rwanda
GRMC	: Grievance redress mechanism committee
IDA	: International Development Association
LV	: Low Voltage
MINECOFIN	: Ministry of Finance and Economic Planning
MININFRA	: Ministry of Infrastructure
MoE	: Ministry of Environment
MV	: Medium Voltage
NST1	: National Strategy for Transformation one
OFID	: OPEC Fund for International Development
PAP	: Project Affected People
PCB	: Polychlorinated Biphenyls
PIU	: Project Implementation Unit

PIU	: Project Implementation Unit
PPE	: Personal Protective Equipment
RAP	: Resettlement Action Plan
RAPEP	: Rwanda Association of Professional environmental Practitioners
REMA	: Rwanda Environmental Management Authority
RoW	: Right of Way
RPF	: Resettlement Policy Framework
RURA	: Rwanda Utility Regulatory Authority
Rwf	: Rwandan Franc
SFD	: Saudi Fund for Development
SMART	: Specific, measurable, achievable, realistic and timebound
ToR	: Terms of Reference
WB	: World Bank

EXECUTIVE SUMMARY

Project context

The Government of Rwanda (GoR) through the Ministry of Infrastructure (MININFRA), with the funding from the World Bank/International Development Association (IDA) and other Development Partners (DP) is developing a project titled "Rwanda Energy Access and Quality Improvement Project (EAQIP)" financed and led by World Bank and co-financed by Agence Française de Développement (AFD) (joint co-financing), the OPEC Fund for International Development (OFID) (parallel co-financing), and the Saudi Fund for Development (SFD) (parallel). This multi-donor energy sector investment financing project will support the Government of Rwanda's energy access objectives during this period of the National Strategy for Transformation (NST1; 2017-2024). The EAQIP Project would have a total volume of an estimated US$ 288 million. The total IDA investment would be US$150 million and US$ 10 million grant from Clean Cooking Trust Fund (CFF), spread across four components of i) increasing grid electrification, ii) enhancing the efficiency of electricity service, iii) increasing access to off-grid electricity and clean cooking solutions, and iv) technical assistance, institutional capacity building and implementation support. The project will also receive the funds from other development partners namely AFD loan of EUR 80 million and The OPEC Fund for International Development and the Saudi Fund for Development with US$ 40 million investment financing.

The **Project Development Objective** is to increase access to modern energy for households, enterprises and public institutions; and enhance the efficiency of electricity services in Rwanda.

The project has four main components:

Component 1: **Increasing access to grid electricity** which will increase access to Households within 14 administrative districts located in three provinces of Rwanda namely Western, Southern and Northern Province.

Component 2: **Enhancing the efficiency of electricity service** which will include the following subcomponents: 2a) Rehabilitation of the Ntaruka Hydropower Plant (HPP); 2b) Investments to improve stability and reliability of the power system; 2c) Improvements in the operational performance of Energy Utility Corporation Limited (EUCL).

Component 3: **Increasing access to off-grid electricity and clean cooking solutions** with the following subcomponents: 3a) Increasing off-grid electricity access; and 3b) Increasing access to clean cooking solutions.

Component 4: **Technical assistance, institutional capacity building, and implementation support** which includes as subcomponents**:** 1) Technical Assistance (TA); 2) Capacity building; 3) Implementation Support; and 4) RETF grant from Clean Cooking Fund.

Rationale for ESMF and other Project safeguards documents that supplement it.

The ESMF sets out clear procedures and mechanisms as well as practical approaches to ensure the compliance of the subprojects/project activities with the requirements of the National laws and the World Bank (WB). This project entails a greater range of investments; hence, the ESMF was prepared as a framework compatible with the WB Environmental and Social framework. The ESMF is also in line with requirements of the Environmental Law (No. 48/2018 of 13/08/2018) determining the modalities for protecting, conserving and promoting the environment in Rwanda, and the Ministerial Order No 001/ 2019 of 15/04/2019 establishing the list of projects that must undergo environmental impact assessment, instructions, requirements and procedures to conduct environmental impact assessment. The WB Environmental and Social Standards (ESSs) triggered by the project are mainly ESS1 (Assessment and Management of Environmental and Social Risks and Impacts), ESS2 (Labour and Working Conditions), ESS3 (Resource Efficiency and Pollution Prevention and Management), ESS4 (Community Health and Safety), ESS5 (Land Acquisition, Restrictions on Land Use and Involuntary Resettlement), ESS6 (Biodiversity Conservation and Sustainable Management of Living Natural Resources), ESS8 (Cultural Heritage), and ESS10 (Stakeholder Engagement and Information Disclosure). **Other Project environmental and social documents that supplement this ESMF** include WB EHSG (World Bank Environmental Health and Safety Guidelines), RPF (Resettlement Policy Framework), project-specific ESIA (Environmental and Social Impact Assessment), RAP (Resettlement Action Plan), ESMP (Framework Environmental and Social Management Plan), and EHSP (Environmental Health and Safety Plan).

Potential Environmental and Social Impacts and Mitigation Measures

According to the WB ESF (Environmental and Social Framework), the project's environmental and social risk rating is substantial, considering the anticipated risks and impacts associated with construction of (medium-voltage) power distributions lines (component 1), enhancing the efficiency of electricity services (component 2), and distribution of solar systems and clean cooking solutions (component 3). It also considers technical assistance that involves sector performance improvements and forward-looking options for sector development; capacity building in planning, skills development, audit and compliance; and policy and regulatory improvement and entrepreneurship development, including targeted training for women

entrepreneurs under clean cooking solutions (part of component 4), among others. According to the law regulating Environmental Impacts Assessment in Rwanda the project involving the construction of HV (High Voltage) lines, MV (Medium Voltage) lines and Hydro dams is subject to full Environmental Impact Assessment. The project activities will involve construction of MV and LV lines within 14 administrative districts distributed in three provinces of Rwanda (West, North and South) under component 1. Further the project will involve the rehabilitation of NTARUKA HPP and installation of AVR on 220kV, power system stabilizers and government systems on main generators, building GIS system, and completing installations of smart meter for all distribution transformers and medium/large customers.

It is anticipated that the construction of MV and LV lines and related facilities will be subject to Environmental and Social Impact Assessment according to Ministerial Order No 001/2019 of 15/04/2019 establishing the list of projects that must undergo environmental impact assessment, instructions, requirements and procedures to conduct environmental impact assessment which stipulates that all projects involving the construction of MV and HV lines must undergo a full Environmental and Social Impacts Assessment. For each of these project components, the assessment will be done to analyze the project impacts on natural environment (air, water, soil, fauna, flora) and socioeconomic and cultural environment. For component 2, an Environmental and Social Audit draft report has been prepared for NTARUKA HPP for their particular adverse environmental and social impacts. For all project components the mitigation measures will be developed in Environmental and Social Management Plan (ESMP) in compliance with World Bank Environmental and Social Standard 1 (ESS1): Assessment and Management of Environmental and Social Risks and Impacts; and National Environmental law 48/2018 of 13/08/2018.

Positive Impacts

In the construction phase there will be temporary employment opportunities for local contractors and those who will be employed or supply services and provisions for workers and to contractors. Within the respective project areas there will be opportunities for petty trading and small business service provision along the construction of power electrical line in component 1, NTARUKA HPP rehabilitation. Furthermore the component 3 of increasing access to off-grid electricity and clean cooking solutions will create many employment opportunities for private sector companies, local people who will be hired and especially targeted women entrepreneurs who will receive the capacity building to be motivated to take part in the business of clean cooking solutions. It is proposed that the off-grid and clean cooking subcomponents could also benefit from World Bank

Carbon Initiative for Development (Ci-Dev), which is a result-based financing (RBF) instrument that makes payment against certified emission reductions (CER) resulting from the sustainable dissemination of off-grid solar home systems and improved and clean cookstoves envisaged under Component 3. Some of social benefits includes the enhancement of electricity supply services in the trading centres and small industries like sawmills and joineries, grain mills and other agricultural processing businesses which need electricity for efficient production. The long-term direct positive impact is therefore the access to reliable electricity supplies, which will lead to better provision and easier management of goods and services and enable new facilities for processing and storage.

Social and environmental costs, not least in noise and air pollution, associated with existing generator usage and kerosene lamp will be reduced and there will be a more limited requirement for firewood cutting and collection which will reduce indoor air pollution and contribute to the long- term environmental pollution control through the reduction of CO_2 emissions and fossil fuel use.

Adverse impact

The project is expected to have some adverse environmental impacts, but all of them will be mitigated to the extent possible to avoid any harm that this may cause to the environment. The component 1 is expected to have different environmental impacts on vegetation resulting on bush clearing, soil and water contamination resulting on the use of machinery fuel and lubricants, contamination due to the unsafe waste disposal, landscape deformation and land degradation due to different excavation works, noise pollution caused by the use of heavy vehicles and machines, and air pollution from the burning of fossil fuel, among others. The component 2 of Enhancing the efficiency of electricity service will involve Ntaruka HPP which will have negative environmental impacts such as noise pollution, reservoir sedimentation, changes to hydrological flow, and generation of hazardous and non-hazardous wastes. Environmental and social audit for Ntaruka HPP showed that there are no associated facilities to the plant. The components 3 and 4 will have environmental impacts related to waste generation from used solar panel, batteries and accessories; and TA which will develop policy and regulatory instruments including the review of tax tariff that may increase CO_2 emissions due to the promoted fuel type, and pressure on the forest through increasing population depending on the firewood due to the increased and unaffordable prices, loss of employment for people who were working previously in the charcoal sector caused by the increment in taxation on the charcoal, unemployment from the tax increase on charcoal and

decrease on the clean cooking stove due to the promotion of environmental protection through energy efficiency. All of these will be mitigated efficiently.

The project is also expected to have social and cultural impacts resulting from the temporally loss of access to land or property due to the construction works within the right of way, crop destruction in the Right of Way, aesthetics and visual related impacts, damage and loss of physical cultural properties, workers health and safety related impacts due to potential construction, operations and maintenance and camp installation. The impacts are limited to the specific project areas, minimal and minor in scale and in terms of magnitude and should be adequately mitigated through the preparation of appropriate ESMPs, EHSPs and RAPs whenever required.

The following laws, policies and frameworks were reviewed and discussed in the details for their relevancy to the project:

- The constitution of the Republic of Rwanda of 2003 revised in 2015;
- Ordinary Law N° 43/2013 of 16/06/2013 Governing Land in Rwanda, Repealing Organic Law N° 08/2005 of 14/07/2005 Determining the Use and Management of Land in Rwanda;
- National Strategy for Transformation one (2017-2024) _NST1;
- Law N° 66/2018 du 30/08/2018 Regulating Labour in Rwanda;
- The Law (No. 48/2018 of 13/08/2018) on Environment determining the modalities for protecting, conserving and promoting the environment;
- Ministerial Order N° 001/ 2019 of 15/04/2019 establishing the list of projects that must undergo environmental impact assessment, instructions, requirements and procedures to conduct environmental impact assessment.
- Law No 32/2015 of the 11/06/2015 relating to Expropriation in the public interest
- World Bank Environmental and Social Standards (ESSs);
- Law no 32/2015 of 11/06/2015 relating to expropriation in the public interests;
- Ministerial order No2 of 17/05/2012 determining conditions for occupational and health safety;
- Regulations No 002 of 26/04/2018 governing e-waste management in Rwanda;
- Guidelines on the management of waste disposal site/dumpsites (landfill) ;

- National wetland conservation program;
- RURA Guidelines for Right of Way in Rwanda;
- MININFRA, Biomass energy Strategy, A sustainable path to clean cooking solution 2019-2030

Project Coordination, Implementation Arrangement and Budget

The REG is responsible, inter alia, for monitoring the status of the projects activities and take action needed for safe implementation. REG has established Project Coordination Unit (PCU) in its subsidiary of EDCL to provide the leadership that will run the project in coordination with the departments within EDCL. The PCU is responsible for ESMF development and approval and control over its implementation and advise to EDCL and Contractor on compliance with WB Environmental and Social Standards, and national laws in the field of environmental and social protection during all project activities. The PCU will carefully analyze the project scope, their availability to the project activities and their capacity for the successful implementation of the project and its ESMF. If need be, they can suggest additional supporting staff for the project and ESMF implementation. The component three will be implemented by the BRD through REF Project Implementation Unit (PIU), where EDCL will be the technical counterpart, while BRD will administer and disburse the RBF funds.

The total budget for the implementation of this ESMF is estimated at 277,500 USD. The key indicative aspects include (1) Training and capacity building for the project PCU and PIU; (2) Training and capacity building for District Environment Officers and project liaison officers, contractor staff and supervisor staff training, including the supporting staff; (3) Meetings and consultation with PAPs and local communities; (4) Personal protective equipment; (5) Preparation of ESIAs for grid extension; (6) Preparation of site specific ESMPs; (7) Implementation of Environmental and Social Management Plan (ESMPs); (8) Monitoring and evaluation of ESMPs; and (9) grievance redress mechanism. More about the budget may be found in the table 21 of this ESMF.

Monitoring and Evaluation Framework

The arrangements for monitoring the ESMF and site specific ESIAs/ESMPs will fall under the overall responsibility of the EDCL PCU and Districts. Monthly monitoring and annual evaluations will be conducted to determine whether the monitoring and mitigation measures proposed in the ESIAs/ESMPs for the subproject components will be implemented effectively by the project implementing agencies.

Capacity Building and Training

Effective implementation of the ESMF will require capacity building of the dedicated E&S Specialists at EARP and hiring Energy Project liaison Officers at the district REG branches. EARP currently has an Environmental Specialist and a Social Specialist dedicated to World Bank projects. They have yet to receive the ESF training, however. While they are expected to be able to handle the workload of Bank projects in terms of supervision, they will need to be supported by Energy Project liaison Officers in the field. The hiring of Energy Project liaison Officers in each of the REG district branches will provide daily support and supervision of Supervising Engineers and Contractor E&S compliance. The newly recruited Energy Project liaison Officers should receive training on the ESF as well as on Occupational Health and Safety (OHS) so that they are familiar with Bank policies and requirements.

At present, EDCL has one OHS Specialist that looks at OHS compliance for all EDCL implemented projects in Rwanda. A dedicated OHS Specialist should be hired at EDCL/EARP for EAQIP who would be responsible to ensure OHS compliance and follow up with Supervising Engineers and Contractors, supported by the district Energy Project liaison Officers. This person would be responsible for ensuring that the commitments in the Labor Management Plan (LMP) and the OHS Plans are upheld.

One key bottleneck involves the processing of compensation files by EDCL Expropriation Clerks. Compensation files are prepared by the Contractors' independent valuers, in collaboration with district valuers, who verify compensation amounts. The files are then transferred to EDCL (under REG), which further verifies and clears the files and sends them to MINECOFIN for payment directly to the project affected persons (PAPs) bank accounts. EDCL currently has 15 Expropriation Clerks who review all files received for all EDCL-implemented projects in Rwanda. While EDCL Expropriation Clerks have strong experience with compensation, the large workload envisaged under this project could result in compensation delays based on current implementing project, at this point, the EDCL shall dedicate Expropriation Clerks assigned to only World Bank-financed projects to facilitate the process and avoid the aforementioned delay.

The EAQIP will fund the training of EARP safeguards staffs and the main objective of the training is to support the EARP and contractors staffs especially their safeguards to develop capacity and in the medium term to have in-house capacity to mainstream safeguard activities with specific skills in integrating environmental and social considerations early in the design concepts such as

the design of distribution and transmission lines and transformers and during surveys and project supervision.

For effective implementation of the project, district/local level environmental officers will be trained and called for their full involvement in project implementation whereby supervision and monitoring of environmental safeguards requirements in subproject construction and operations are among the duties.

It is also expected that environmental and social considerations will be considered in the contracts between EAQIP and contractors. The contract should include a clause on training requirements and other necessary support services to implement the mitigation measures.

ESMF Preparation, Approach and Methodology

The safeguard team has reviewed the relevant guidelines, policy, regulatory and institutional framework related to ESMF in the context of the Rwanda Energy Access and Quality Improvement Project (EAQIP). These include the WB EHS guidelines and environmental and social standards; international treaties and conventions on environment; and national regulatory and institutional framework that can influence or be influenced by the implementation of EAQIP. This helps to elucidate problems that will need special attention during the implementation of this project.

This ESMF establishes procedures and forms for individual subprojects at the stage of their implementation. Whereas REG will play the overall coordination of implementation of this ESMF, Contractors, Subcontractors, Stakeholders in different sectors will play a big role in its implementation. The stakeholder engagement plan was done and part of it is incorporated in this ESMF to show the results of Public consultation done and what they have committed to help the project.

Disclosure and Public Consultation of ESMF and ESIA/ESMPs

Before the implementation of the subprojects/project activities, the ESIA/ESMP for each sub-project shall be prepared to guide the subproject design, construction and operation. As required by WB ESSs under ESS 1, 5 and 10, the ESMF, ESIA and ESMP are to be disclosed to public stakeholders. If new information arises out of public hearings (may occur in parallel) for the ESMP to be updated, such update shall be made for contracted companies on a mandatory basis. The ESMP may be adjusted/updated by the successful contractor with due account of the contractor's equipment, technology, status of the facility, baseline conditions, etc. These updates shall be communicated to the PIU and be subject to approval from the PIU and the WB prior to the

implementation. The PIU/the WB would decide whether these updates are substantial enough to trigger additional public hearings. The draft Environmental and Social Management Framework will be disseminated to different key stakeholders (Ministries, Districts and surrounding communities) for the purpose of disclosure and holding of public hearings. The public consultation for this ESMF was carried out in 27 administrative districts (all 14 districts to be funded by EAQIP included) within the four provinces of Rwanda and different relevant institutions from 20th January 2020 to 26th February 2020 and the result of public consultation showed that this project is urgently needed by the population but also some issues were raised concerning the delay in compensation payment. All stakeholders consulted promised to support the project as indicated in the Annex 7 of Public consultation outcomes.

I. INTRODUCTION

1.1 Background

Energy is the backbone of the development. Energy sector plays a pivotal role in supporting socio-economic transformation and has an inherently systemic link to the growth of other sectors of the economy and contribute to the abatement of environmental pollution through the reduction of firewood, generator fossil fuel and kerosene lamp usage. Energy sector act as a boost to the development of other sectors. To this effect, one of the objectives of the First National Transformation Strategy (NST1) is to scale up electricity generation and improve quality, affordability and reliability. Generation plans will be informed by medium and long-term projections and analysis of supply and demand. Long-term generation plans will include identification of least cost sources of energy generation with the objective of ensuring a cost-reflective and competitive tariff. A pro-active strategy will be developed to attract industries for economic growth and to ensure that they are supplied with available, reliable and affordable electricity. Key sectors of focus to increase demand include mining, manufacturing, ICT and commercial premises. Quality of electricity will be improved by continuing investments in network upgrading and strengthening as well as investing in loss reduction projects. Priority will be given to productive use connections such as trading centres, industrial zones, and other socio-economic facilities such as schools and health facilities.

The aim of establishing the ESMF is to set up a mechanism in the determination and assessment of future potential environmental and social impacts of the EAQIP, and thus set out mitigation, monitoring and institutional measures to be taken during implementation and operations of the proposed investments/activities and to eliminate their adverse environmental and social impacts, offset them, or reduce them to acceptable levels.

The GoR is also further required to disclose the ESMF in-country as a separate and standalone document so that it is accessible by the general public, local communities, potential project affected people, local Joint Action Development Forum (JADF) and other stakeholders. The document must also be available on the World Bank external website and the date for disclosure must precede the date for project appraisal.

Rwanda Development Board is responsible for the screening, review and clearance of planned investment subprojects prior to implementation. The use of this ESMF by REG will be the instrument through which the subprojects environmental and social impacts are identified, assessed, evaluated and have appropriate mitigation, management and monitoring measures,

designed and incorporated within the subprojects. The World Bank assesses if the latter have been complied with its Environmental and Social Standards (ESSs) requirements.

Over the period of 2012 to 2018, the electricity generation increased by 72% and the access to electricity has improved but it is still substantially lower than target, the rural households with access to electricity increased from 5% to 27% over the same period.

In view of above, the Government of Rwanda is designing the Energy Access and Quality Improvement Project to enhance the electricity supply, improving grid reliability and operational efficiency, advancing off-grid energy and clean cooking solutions, among others.

To address environmental and social issues of EAQIP, this ESMF has been prepared based on the GoR's policy and legal frameworks, WB ESF and ESSs applicable to the project. In addition, social instruments (such as Resettlement Policy Framework (RPF)) have been prepared to address key social issues of the project.

1.2 Study objectives

The main objective of this assignment is to develop an environmental and social management framework (ESMF), including the collection of all required data, information and materials. This shall provide clear, comprehensive and practical guidance to REG through its subsidiary of EDCL to integrate environmental and social considerations into the project.

The specific objectives of the study are to:

(i) Identify all relevant potential environmental risks and social concerns that may arise as a result of the project and the subprojects that it will support;
(ii) Specify appropriate roles and responsibilities of involved stakeholders in the implementation of the ESMF;
(iii) Develop subproject review procedures as well forms, guidance and checklists to apply technical input for the subprojects;
(iv) Develop a screening procedure to identify the environmental and social issues associated with the subprojects;
(v) Prepare generic ESMP that can be applied to manage the identified environmental and social risks and set out the monitoring plan that will be undertaken to confirm correct ESMP delivery;
(vi) Develop the Term of Reference (ToR) for appropriate safeguards instruments (such as ESIAs) as appropriate and required;

(vii) Review and make an assessment of the capacity of the national project implementation entities, to screen subprojects and monitor the implementation of the project ESMP; and make proposals for capacity enhancement as appropriate;

(viii) Provide estimates for the budget required for project ESMP implementation;

(ix) Develop a public consultation and stakeholder engagement strategy;

(x) Define appropriate environmental and social standards performance indicators; and

(xi) Provide practical information resources for implementing the ESMF

1.3 Scope of work

Task 1: Preparation of an ESMF for Rwanda Energy Access and Quality Improvement Project (EAQIP) that ensures that enough guidance is provided to MININFRA, REG through EDCL and contractors in the selection, preparation and implementation of project activities in order to avoid or minimize environmental and social risks and negative impacts and enhance the environmental and social performance.

This will be accomplished through the development and application of proper selection criteria for specific investment projects, planning that takes into account environmental and social criteria, sound, implementation and monitoring, disclosure, consultation and feedback. To achieve this objective, the environmental and social risks and impacts management will carry out the following tasks through research, interviews and fieldwork:

(i) Based on a detailed description of the project, its components and the design of specific activities as set-out in approved project documentation, assess the likely environmental and social risks and impacts associated with each component and potential subproject;

(ii) Conduct field visits to different districts and commercial centres to assess social and environmental site conditions, practices (including level of compliance with existing social and environmental safeguards legislation and regulations) and verify potential risks and impacts;

(iii) Develop and provide guidance on environmental and social criteria to be used during the identification and selection of sites or any other area of project operations where social and/or environmental risks are apparent. Also develop a negative list of activities and potential subprojects not recommendable for support, due to their poor environmental or social performance;

(iv) Compile a summary of key domestic legislative, regulatory and administrative regimes, within which the project will operate, with a focus on requirements that will apply to the planning,

approval and implementation of subprojects. Provide an overview of the above legislation in relation to the World Bank environmental and social standards, and make recommendations to address the gaps with respect to the project;

(v) Establish a clear understanding of the institutional requirements, roles and responsibilities for adopting and implementing the ESMF. Importantly, this should include a thorough review of the authority and capacity of implementation entities to manage and monitor ESMF implementation. The ESMF should also consider relevant implications for management procedures, training, staffing and budgeting;

(vi) Develop a screening and assessment methodology for potential subprojects, that will include environmental and social performance criteria, allow an environmental/social risk classification and the identification of appropriate safeguards instruments;

(vii) Develop a stakeholders' consultation and engagement strategy that ensures the involvement of all identified stakeholders and potentially affected persons. The process should put in place mechanisms and plans for information dissemination and disclosure of project related information, as required by the World Bank, such as project environmental and social standards instruments prior and during project implementation;

(viii) Develop an Environmental and Social Management Plan (ESMP) for the project as a whole, to be differentiated from the subproject specific plans that may be required during project implementation. Also identify all relevant potential environmental risks and social concerns that may arise as a result of the proposed project and specific subprojects. The ESMP should recommend mitigation measures for the potential negative impacts and give associated costs; and clearly indicate the institutional responsibilities for implementation and monitoring of the mitigation measures;

(ix) Identify and describe the required instruments and procedures for managing and monitoring environmental risks and social concerns related to the priority subprojects, such as assessments (e.g. ESIA), management plans (e.g. ESMP, RAPs) and respective monitoring instruments. Also identify indicators (by subproject type) to measure safeguard implementation that can be used in the overall assessment of the project;

(x) Outline a training and capacity building programme for the institutions responsible for implementing the ESMF.

(xi) Propose realistic and effective arrangements for REG-EDCL PIU and other project implementation entities to develop the capacity to manage environmental and social due diligence processes and activities in the project portfolio. Propose reporting lines, review and

approval functions; identify the required resources and technical assistance to maintain the Client's capacity for the Project duration and beyond; and

(xii) Estimate a realistic budget to be allocated for timely implementation of the ESMF in the Project execution phase.

Task 2: Development of specific guidelines for REG-EDCL PIU and other project implementation entities to support implementation of the ESMF. This to include:

(i) Generic terms of reference for safeguarding instruments to be applied during project implementation (as set-out in the ESMF). Potential environmental and social due diligence instruments required include: ESIA (including ESMP).

(ii) Simple user manual and training materials for ESMP and GRM to support implementation of the ESMF, the prepared ToRs for ESIA, ESMP are annexed to this ESMF.

1.4 Methodology and Approach

1.4.1 Review of ESMF World Bank Requirements, National and international Policy institutional and Regulatory Framework

The safeguard team has reviewed the relevant guidelines, policy, regulatory and institutional framework related to ESMF in the context of the Rwanda Energy Access and Quality Improvement Project (EAQIP). These include guideline and environmental and social standards from the World Bank, international goals, treaties and conventions on environment, and national regulatory and institutional framework that can influence or be influenced by the implementation of EAQIP. This helps to elucidate problems that will need special attention during the implementation of this project.

1.4.1.1. Review of National Policy institutional and Regulatory Framework related to ESMF

At the national level, the safeguard team has reviewed relevant existing laws, policies, regulations frameworks and guidelines about environmental and social risk management, and policy, programs and projects associated with the Energy sector. This helped to prepare a summary of domestic legislative and regulatory and administrative regimes within which the project will be implemented. Following documents were reviewed:

- National Strategy for Transformation one (2017-2024) NST1;
- Ordinary Law N° 43/2013 of 16/06/2013 Governing Land in Rwanda, Repealing Organic Law N° 08/2005 of 14/07/2005 Determining the Use and Management of Land in Rwanda;

- Law N° 66/2018 du 30/08/2018 Regulating Labour in Rwanda;
- The Law (No. 48/2018 of 13/08/2018) on Environment determining the modalities for protecting, conserving and promoting the environment;
- Ministerial Order N° 001/ 2019 of 15/04/2019 establishing the list of projects that must undergo environmental impact assessment, instructions, requirements and procedures to conduct environmental impact assessment.
- Law No 32/2015 of the 11/06/2015 relating to Expropriation in the public interest

1.4.1.2. Review of World Bank Environmental and Social Standards (ESSs)

The safeguard team has reviewed the World Bank Environmental and Social Standards (ESSs) applicable to the ESMF for EAQIP and demonstrated how these standards will be complied with considering the local context. The WB ESSs apply to this project for the sake of interests of beneficiaries, clients, stakeholders and that of the Bank. Applying these standards allows avoiding adverse impacts on the environment and people's lives, minimizing and mitigating potential unfavorable environmental and social risks and impacts. These WB standards are:

- Environmental and Social Standard 1: Assessment and Management of Environmental and Social Risks and Impacts;
- Environmental and Social Standard 2: Labour and Working Condition
- Environmental and Social Standard 3: Resource Efficiency and Pollution Prevention and Management
- Environmental and Social Standard 4: Community Health and Safety
- Environmental and Social Standard 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement
- Environmental and Social Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;
- Environmental and Social Standard 7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities;
- Environmental and Social Standard 8: Cultural Heritage
- Environmental and Social Standard 9: Financial Intermediaries
- Environmental and Social Standard 10: Stakeholder Engagement and Information Disclosure.

There are 8 ESSs (ESS1, ESS2, ESS3, ESS4, ESS5, ESS6, ESS8, and ESS10) that apply to the project.

1.4.2 Field surveys

The safeguard team conducted field visits (from 20th January to 27th February, 2020) to 27 administrative Districts, NTARUKA Hydropower Plant, relevant government and non-government institutions including 3 companies for Solar Home Systems and 8 commercial centres selected in consultation with the District One Stop centre office and based on the proposed districts which will be covered by this project, while the centres which were selected and visited were those ones without access to the electricity and are on the list to be covered by the project. The lists of those districts and sites visited are shown in Annex 8.

1.4.2.1 Approach to field data collection

The safeguard team visited above said sites with target to collect information on location, status of infrastructure, and views and concerns of local people, respectively. Special attention was paid to key stakeholders (administrative district officials) and local people that may be involved or affected by the project. This exercise through established interview guide helped identifying criteria that will need special attention in the implementation of this project. The exercise also helped in identifying the capacity gaps and needs for the implementation of, and ensuring compliance with, environmental and social aspects of the project.

1.4.2.2 Content of consultations

Consultations were conducted with stakeholders who were directly or indirectly related to the project to better understand the environmental and social systems in the country and the environmental and social concerns of stakeholders from 20th January to 27th February 2020. During consultation, stakeholders were asked their views and concerns about the project. This helped to identify salient issues and concerns that affect different stakeholders and reach agreement on the understanding of these issues and grievances. The safeguards team ensured a favourable environment free of coercion and intimidation, gender inclusive and inclusive to vulnerable and disadvantaged groups.

At local level consultations were held with district officials (Mayor or Vice-Mayor in charge of Economic development, Director of one stop centre or Land administration/valuation officer, District Environmental Officer, District Electricity Maintenance Engineer, Executive secretaries of the sectors, sector land managers and local people). The consultations at Central level conducted with the public, academic or researchers and private institutions. The consultation outcome highlighted trade-offs, impacts/risks and social issues and bottlenecks associated with the implementation of this project, as well as the proposed mitigation measures. Moreover, the study

outcomes will be disclosed after approval of the competent officials at Nation and World Bank level.

1.4.3 Link between the World Bank ESF and National Regulation on Environmental and Social Management Guidelines and data collected during field visit

This project is in line within the framework of Rwanda's National Strategy for Transformation one that aims to achieve universal electrification, among others. The study analyses the World Bank Environmental and Social Standards and National Regulation on Environmental and Social Management Guidelines to have idea on which the environmental and social assessment is needed to categorise project related environmental and social risks and impacts (high, substantial, moderate or low).

1.4.4 Methodological compatibility matrix according specific objectives

Table 1: Compatibility matrix according to specific objectives

Objective	Methods and Techniques	Expected results
Identify all relevant potential environmental risks and social concerns that may arise as a result of the project and the subprojects that it will support	Field visits, observation, mapping, pictures, interviews with key stakeholders, review of World Bank and National Environmental and Social Standards documents, ESMF reports and World Bank Group Environmental, Health, and Safety Guidelines (EHSGs)	- Potential environmental impacts identified - Potential social impacts identified - Compatibility and Conflicts of the project and social and natural environment identified. - When GoR's regulations differ from the levels and measures presented in the WB EHS Guidelines, the project/EAQIP will be required to achieve whichever is more stringent. -
Specify appropriate roles and responsibilities of involved stakeholders in the implementation of the ESMF	Review of relevant national documents on policy, law, institutional and regulatory framework governing ESMF/ESIA; Interviews with key stakeholders	Identification and analysis of Role and responsibilities of government organisations in the implementation of ESMF Identification and analysis of PIU capacity, Administrative Districts, and organisation arrangement to implement ESMF
Develop subproject review procedures as well forms, guidance and checklists to apply technical input for the subprojects	Develop a guidance document for procedures, forms, checklists to apply technical input for the subprojects	Guidance document for procedures, forms, checklists for subprojects.

Objective	Methods and Techniques	Expected results
Develop a screening procedure to identify the environmental and social issues associated with the subprojects	Review of World bank and national guidelines and procedures for screening the projects to not/undergo Environment assessment.	Screening criteria for environmental and social impacts of subprojects. Screening criteria include trading centres without electricity connections, environmental baseline conditions of these commercial centres and other populated areas without power supply and the social economic environment within these administrative districts. Subprojects are classified in high, substantial, moderate or low risk.
Prepare an ESMP that can be applied to manage the identified environmental and social risks and set out the monitoring plan that will be undertaken to confirm correct ESMP delivery	Prepare the ESMP in compliance or conformity with World Bank and Rwanda social and environment ESMP requirements.	ESMP with potential social and environmental positive and negative impacts and their enhancement measures
Develop the ToR for appropriate safeguards instruments (such as ESIAs) as appropriate and required	Prepare the ToR, with consideration of World Bank ESF and Rwanda social and environment safeguard instruments	ToR for appropriate safeguards instruments
Review and make an assessment of the capacity of the national project implementation entities, to screen subprojects and monitor the	Review and assessment of capacity, gaps and capacity need for the national project implementation entities (REG EDCL PIU and identified Administrative Districts) to	Organizational and institutional framework for implementing ESMP Role and responsibility of organisations Key staff to implement ESMP

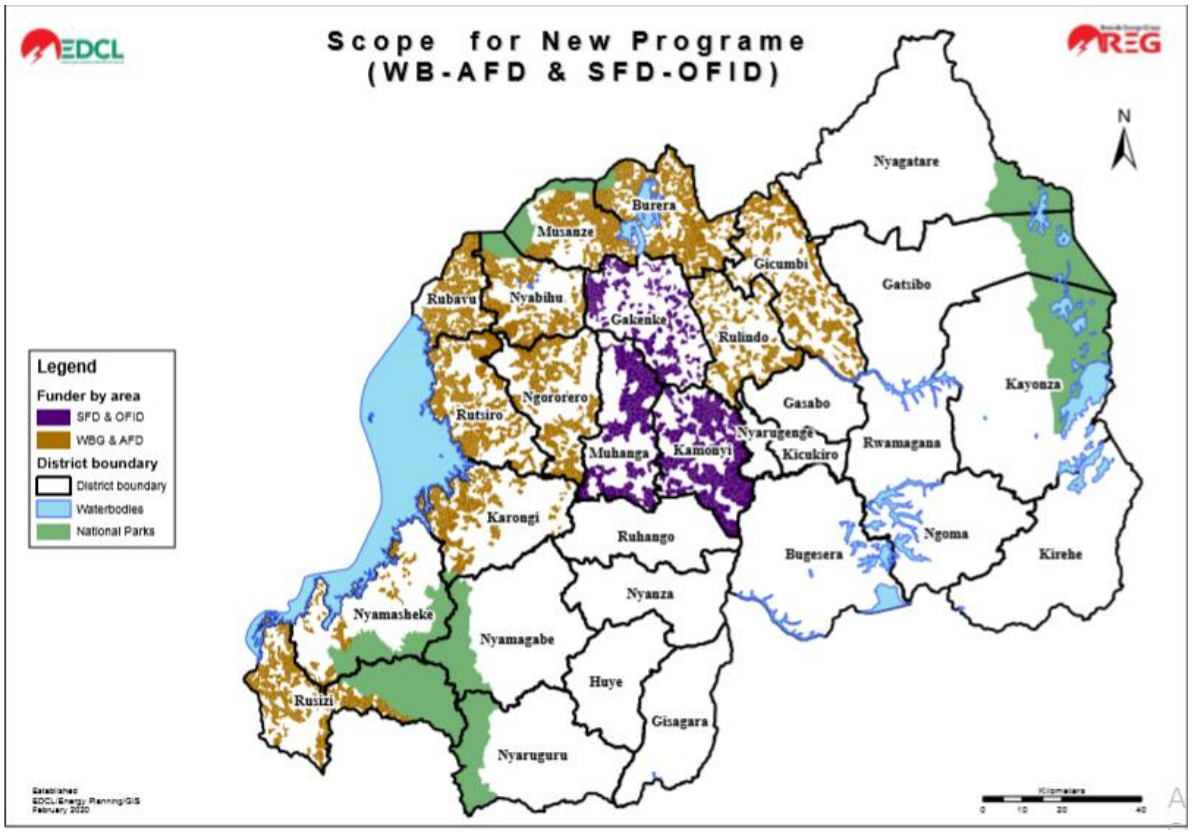
Objective	Methods and Techniques	Expected results
implementation of the project ESMP; and make proposals for capacity enhancement as appropriate	screen subprojects and monitor the implementation of the project ESMP. The assessment will be done through consultation with key staff in those entities	Gaps and capacity needs
Provide estimates for the budget required for project ESMP implementation	Costing of activities required for the implementation of ESMP. The costing will cover cost associated with rehabilitation of environmental and social damages and staff allowance to monitor the ESMP implementation	Estimation of ESMP budget
Define appropriate environmental and social standards performance indicators	Propose a set of indicators to monitor the environmental and social standards performance. Those indicators should be SMART (specific, measurable, achievable, realistic and time bound).	A set of SMART Indicators to monitor the environmental and social standards performance
Provide practical information resources for implementing the ESMF	Provide practical information resources for implementing the ESMF	Guidelines for training and capacity building Guideline for preparing site specific environmental Management and rapid Environmental assessment checklists

II. PROJECT DESCRIPTION

The proposed Rwanda Energy Access and Quality Improvement Project (EAQIP) is a large energy sector investment financing project to support the Government of Rwanda's energy access objectives during the period of the National Strategy for Transformation (NST1; 2017-2024). Project would have a total volume of an estimated US$ 288 million. The total IDA investment would be US$150 million and US$ 10 million grant from Clean Cooking Trust Fund (CFF) , spread across four components of i) increasing grid electrification, ii) enhancing the efficiency of electricity service, iii) increasing access to off-grid electricity and clean cooking solutions, and iv) technical assistance, institutional capacity building and implementation support.. The project will also receive the funds from other development partners where AFD loan of EUR 80 million and the OPEC Fund for International Development and the Saudi Fund for Development with US$ 40 million investment financing. The grid-related and technical assistance components will be implemented by the Electricity Access Rollout Program (EARP) Project Coordination Unit (PCU) in Energy Development Corporation Limited (EDCL), which has demonstrated its effectiveness under the Electricity Access Scale-up and Sector Wide Approach (SWAp) Development Project (EASSDP) project (IDA16). The off-grid and clean cooking components will be implemented by the Renewable Energy Fund (REF) a PIU in the Development Bank of Rwanda (BRD).

WBG & AFD (joint co-financing) will fund in Gicumbi, Musanze, Rulindo, Burera of Northern province and Ngororero, Nyabihu, Rubavu, Karongi, Rusizi, Rutsiro, Nyamasheke districts of Western province. SFD and OFID (under parallel co-financing) will fund in Gakenke (District of Northern Province) Muhanga and Kamonyi Districts of Southern province. All 14 Districts composing the three provinces of Rwanda namely South, North and Western provinces will be covered by this project to meet the NST1 targets by 2024.

Figure 1: Proposed map indicating the allocation of every Development Partner (DP)



2.1. Project components

The following are the key components of the project proposed to be financed by EAQIP. However, the IDA19 is spread within the all four components while other potential supporting development partners include OFID, SFD, and AFD.

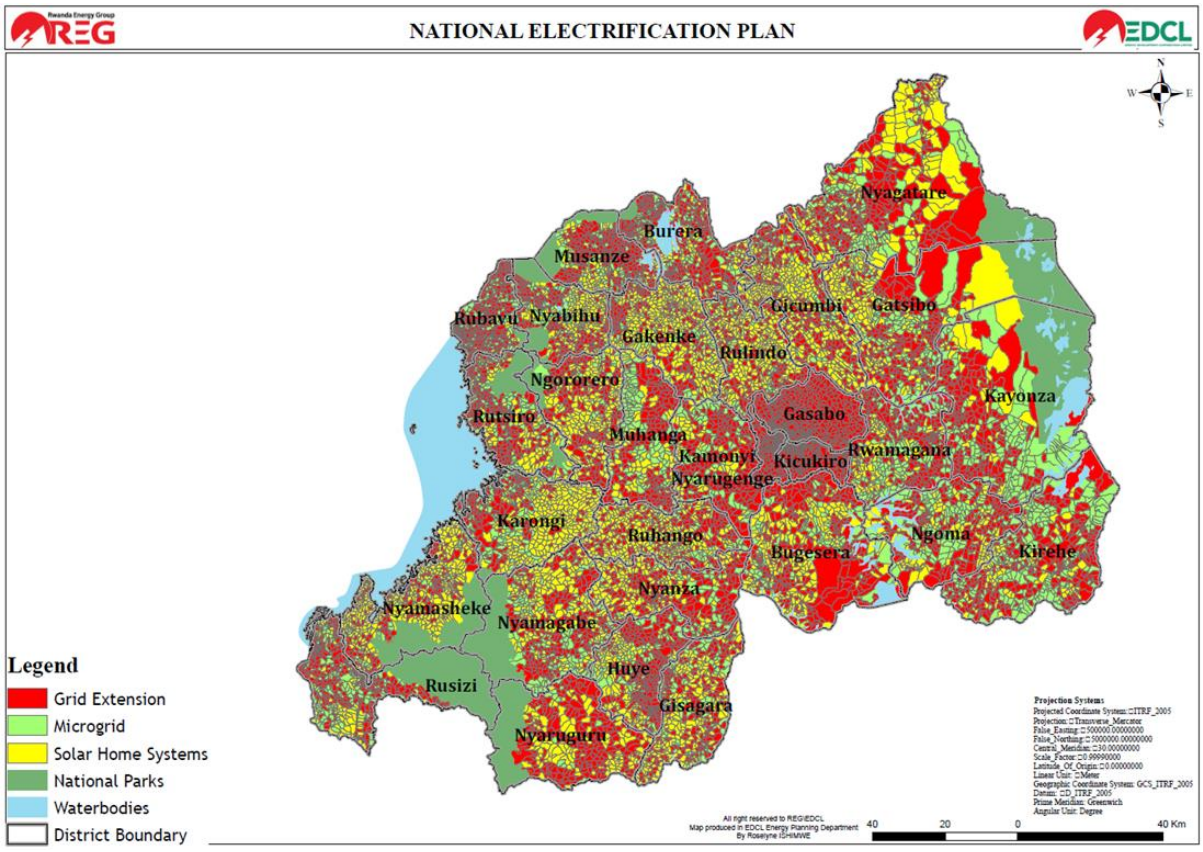
Component 1: Increasing access to grid electricity

Rwanda's ambition, outlined in the NST1, is to achieve a grid access rate of 52% by 2024; and to meet this ambition, the ESSP projects a financing need of US$ 590 million (to connect all households and productive use connections) between 2019/20 and 2023/24. It is against this background that REG has targeted an annual connection rate of 200,000 between 2020 and 2024 (including households and enterprises). It is estimated that the average unit connection cost, including backbone infrastructure, is around US$603-US$758, projecting an annual financing need ranging between US$120 million - US$150 million. This component will provide continued

support to Rwanda's electricity access program, the EARP. The component provides financing towards grid connections of new consumers, including financing of grid extensions and consumer connections.

Electrification investments under the NST1 are being guided by a state-of-the-art geospatial National Electrification Plan (NEP) prepared in 2019, which lays out the areas to be electrified by the grid by 2024 and those where off-grid solutions will step in before the grid arrives. During 2017 – 2018, the GoR developed a NEP, which defines a combination of extension and densification of the national grid and deployment of off-grid solutions throughout the country to expand electricity access while optimizing the costs of access expansion (Figure 2). The NEP takes into account the country's unique geography, high population density, and existing grid coverage, and uses geospatial electrification planning algorithms to find cost-efficient ways of expanding electricity access. Considering the 2024 target of 52 percent on-grid and 48 percent off-grid access as an input, the NEP defines a combination of extension of the national grid and deployment of off-grid solutions throughout the country that represents the least-cost option to supply forecasted demand for the 2018-2024 period.

Figure 2: Rwanda National Electrification Plan (NEP) Output



Source: REG

The IDA allocation of US$90 million for this component is expected to connect about 125,000 households and 5,800 enterprises in selected districts of northern Rwanda, namely Gicumbi, Musanze, Rulindo, Burera, Ngororero, Nyabihu, Rubavu (see Figure 7). The AFD is complementing the World Bank allocation to this component by joint co-financing of EUR 78 million for electrification of about 105,000 households and 11,500 enterprises. Further, the OPEC Fund and the SFD are providing US$40 million in parallel co-financing to this component, for connection of about 63,000 households and 3,000 enterprises in western Rwanda.

With the availability of funds, EDCL has demonstrated implementation capacity to implement the required annual number of connections targeted. Component 1 of the project will be implemented by EDCL as part of EARP. Under EARP, EDCL has progressively increased implementation capacity for grid rollout and last mile connections over the past decade. The EARP has increased the grid access rate from about six percent in 2009 to 39 percent in 2020.

EARP connected 61,047 households and 300 productive users to the grid during FY 2014/15; 66,908 households and 545 productive users during FY 2015/16; 107,613 households and 272 productive users during FY 2016/17; 140,356 households and 557 productive users during FY 2017/18; and 146,337 households and 471 productive users during FY 2018/19. Pending available funding to deliver NST1 electrification targets, EARP has the capacity to deliver the estimated 200,000 grid connections annually required to deliver the NST1 targets.

The implementation approach for component 1 will follow the guidelines in the NEP, and the procurement and implementation methods that have delivered success in the past decades. The NEP outlines a combination of grid extension and densification based on geospatial electrification planning that accounts for the country's unique geography and high population density; maximizing the benefits of electrification, while minimizing the electrification project costs. In combination with the implementation approach laid out in the NEP, EARP will use a combination of EPC contractors and local contractors to speed up the connection rate. Procurement packages will include several internationally procured EPC packages to implement backbone infrastructure. Goods packages for line construction materials for installation of connections will also be procured internationally, while labor contracts will be locally procured to implement the last mile connections. EDCL plans to adopt good labor practice, such as setting female workforce quota for procurement packages and project staff to increase female participation in the project.

A connection policy, introduced in 2017, which allows for household connections without an advance payment, will contribute to increase in the annual grid connection rates. The grid electricity connection policy was revised in 2017 to remove the upfront payment of connection fees, which was a barrier to expanding access. Consumers in Rwanda can now get connected to grid electricity without payment of upfront connection fees, which is deducted from payments for purchase of units of electricity. The EARP has been able to accelerate the electrification rate after revision of the connection policy. There are no associated facilities (AF) under component 1 as per the three criteria defining AF in the ESF

Component 2: Enhancing the Efficiency of Electricity Service

Sub-Component 2a: Rehabilitation of Ntaruka Hydro Station (HPP)

This sub-component proposes to improve, in a low-cost manner, to the efficiency of the power system through the rehabilitation of low-cost renewable energy generation capacity, which is an important part of the NST1 and ESSP. The first priority of the ESSP is "Support continued economic development and growth in household electricity access through least-cost expansion of electricity generation capacity", with one of the targets under this priority being security of supply[1].

The Ntaruka HPP, located in Kinoni sector, Burera District, Northern Province at 25km from Musanze town towards Cyanika, at the border with Uganda, has been in operation since 1959. The Plant has an installed capacity of 11.25MW but is currently only capable of operating at a capacity of 9MW and generates on average 22 GWh annually. Based on its age and current performance, it has been found necessary to rehabilitate the power plant to restore the plant capacity to its installed capacity and upgrade the control systems and other electro-mechanical equipment. After rehabilitation, the Ntaruka HPP is expected to generate 27.65 GWh in average hydrological conditions and produce peak power up to 12.3 MW. Rehabilitation of the Ntaruka HPP gives the utility the opportunity to enhance the stability and security of renewable energy supply while using a source of energy with a very low variable cost.

The main rehabilitation works proposed include: concrete surface treatment (civil works); sandblasting and paintings of trash racks and intake gates, procuring and installing a new gantry crane, installing new guide vanes for the inlet valve (hydraulic steel structures); replacing the shafts of the 3 turbines, repair of spiral casings and runners from cavitation, replacing the 3 generators, sandblasting and paintings of draft tubes (electro-mechanical works); replacing the fire fighting and excitation systems, carrying out heavy maintenance to the 3 step-up transformers and replacing the switchgears (electrical works).

[1] ESSP 2018/19-2023/24: "The HLTOs presented in this ESSP represent the key indicators to be measured. These cover vital sector issues such as generation capacity, access, efficiency and security of supply".

Sub-Component 2b: Investments to Improve Stability and Reliability of the Power System

Although investments in new infrastructure and upgrade of existing infrastructure have enhanced system reliability and efficiency, there is still considerable scope for improvement. Projects such as the World Bank funded RESSP have contributed to reducing the System Average Interruption Duration Index (SAIDI) from 44 hours in 2017 to 26 hours in 2018-19, and the System Average Interruption Frequency Index (SAIFI) from 265 in 2017 to 49 in 2018-19. While these improvements are substantial, the reliability of electricity supply is not yet at levels that underpin a robust industrial growth. Similarly, at 19%, the transmission and distribution losses of the power sector in Rwanda still illustrate poor operational efficiency and are also a direct source of lost revenues through unbilled electricity. Poor quality of electricity services hinders economic growth as well as undermines consumer confidence in the utility, making application of cost-reflective tariff rates difficult and, in effect, harming financial sustainability of the power sector. Improving the quality and reliability of electricity services and reducing transmission and distribution losses are also imperative to help reap the benefits of expanding electricity connections.

In addition, Rwanda is also looking into operation of cross-border transmission lines, to prepare for energy trading and interconnected operations. A study conducted on electricity interconnectivity in the East African Power Pool (EAPP) countries identified gaps in each country that would pose a risk to destabilization of internal country grids and gave recommendations for the different countries to help them prepare the countries for interconnection. The main gaps identified for Rwanda included the risk of voltage fluctuations due to low loading on high voltage networks, and transient stability.

Rwanda is currently operating its high voltage transmission network as a standalone in-country network. Owing to the light loads on the transmission lines, especially during off-peak conditions, there is inadequate reactive capability to control high voltages. Additionally, the power system has limited reactive capability to maintain adequate voltages during peak conditions and are hence exposed to voltage collapses due to single and multiple contingencies. The power system presently has no static or dynamic reactive capability to control high voltages during off-peak conditions and low voltages during single and multiple contingencies.

In the meantime, Rwanda is also preparing the electricity grid network for regional power trade. This includes plans to commission the ongoing 220kV transmission lines within the region, starting during 2020 with the Uganda-Rwanda interconnector, connecting the Mirama substation in Uganda to the Shango substation in Rwanda. Adding this long 140km, 220kV line to the Rwanda network will add 24MVAr of capacitive reactive capacity which will further exacerbate high voltages during off-peak conditions.

It is important, especially in the context of integration to other networks, that system responses to demand fluctuations are well managed. Beyond the risk of routine voltage fluctuations, the expansion of the transmission network of Rwanda and the interconnection with the EAPP are expected to add to signal oscillations due to more exposure to demand and supply fluctuations. The network will have to be strengthened to be able to maintain stability under these fluctuations.

The investments through Component 2(b) of the project have been designed to address the two most critical risks to interconnectivity identified, namely voltage fluctuations and transient stability. The sub-component will fund the following:

(a) Installation of static voltage compensators (SVC's) at Shango 220kV substation and Kigoma 220kV substation to reduce overvoltage created by low loading on the transmission lines. The SVC's will regulate steady-state voltage to maintain a flat voltage profile within +/- 5% of nominal 220kV voltage; control high voltage within limits during night time and weekend off-peak periods; dampen voltage oscillations during high transfer of power and during contingencies; reduce power system harmonics due to rapidly changing industrial loads; and inject capacitive capacity rapidly during system contingencies and increase power transfer capability by minimizing real time losses

(b) Installation of power system stabilizers (PSS's) and governing systems at Nyabarongo 28MW hydro power station and Mukungwa 12MW hydro power station. The PSS's will be installed in the excitation systems of the synchronous generators and will improve the small-signal power system stability by damping out low frequency oscillations in the power system. These investments are expected to mitigate frequency and voltage fluctuations in the transmission system

Sub-Component 2c: Improvements in the Operational Performance of EUCL

Through past and ongoing projects (including RESSP), REG has been focusing on improving operational performance of EUCL on several fronts. RESSP components supporting operational performance include installation of an Integrated Business Management System (IBMS) and implementation of a revenue protection program (RPP). The IBMS funded under the RESSP included: (i) enterprise resource planning to support management of corporate resources, (ii) commercial management system for all commercial functions (iii) incidents recording and management system for management and resolution of outages and other incidents in electricity supply to EUCL's customers; and (iv) a geographic information system to build-up and keep permanently updated reliable customers and network assets databases. The RPP funded under RESSP included installation of 3,000 smart meters to medium-large customers of EUCL, and operationalization of a control system.

This sub-component of EAQIP proposes continuation of the agenda of continued improvement of operational performance. The project proposes to continue with the RPP program started under RESSP and extend the smart meter program to the distribution network as detailed below.

(a) EDCL will use this sub-component to complete installation of smart meters for all of EUCL's large consumers (second phase of RPP) and subset of medium size consumers to connect to smart meters (the sub-set will be determined during implementation). The total expected number of smart meters to be installed is 4,000. This will increase the range of customers whose consumption is systematically monitored, and whose meters can be monitored in real time. This program has helped EUCL to immediately detect bypass or other attempts to tamper metering premises and enable remote reading for billing and other purposes.

(b) EDCL will also start a program of installation of smart meters on all network distribution transformers. This will put the utility in a position to detect in real time where losses are taking place, which will in turn assist the utility with proper energy accounting and quantification of losses. The utility will also be in a better position to make technical decisions to deal with high loss areas or transformers with high load imbalances.

(c) In order to improve utility cash flow, and better monitor consumer behavior, EDCL will also conduct installation of high current smart prepayment meters, both for MV and LV consumers, to gradually shift identified post-paid customers to prepayment.

(d) Because EDCL and EUCL have embarked on a program that brought in a very large number of meters, there is a need to develop the local capacity of the utility to continuously check the performance of the meters installed on the network, in addition to checking the quality of meters supplied. The sub-component will contribute to this need by financing purchase and installation of test benches for both pre-paid and post-paid meters.

(e) Finally, in order to facilitate interfacing of the GIS database with the power system simulation tools, the EDCL will conduct installation of a comprehensive electricity transmission and distribution network Geographical Information System (GIS) for building connectivity model (Geometric Network) for all REG infrastructure with smart process.

Component 3: Increasing Access to Off-Grid Electricity and Clean Cooking Solutions

Sub-Component 3a: Increasing Off-Grid Electricity Access

The NEP foresees a major role for off-grid electrification—reaching 48 percent of the population by 2024—as transitory solution before the grid arrives. The grid is eventually expected to cover almost the entire population of Rwanda, however, expansion of the grid in the medium term is constrained by high capital cost due to the country's hilly terrain. Off-grid solutions, with their lifetime of 5-8 years, are meant to ensure that households are not deprived from electricity service during the transition period towards full grid electrification. For the same reason, large scale deployment of mini-grids is not considered to be a viable medium-to long-term electrification option, given their longer investment horizon (as compared to solar home systems) and higher per unit cost of electricity (as compared to the eventual provision of grid-electricity). The result of the NEP is a map that marks distinct areas for grid and off-grid electrification, underpinned by geospatial planning (see Figure 6 above).

The current off-grid access rate of 14% falls far short of the Government's target for 48% off-grid access by 2024, despite a favourable policy and regulatory framework. The Government has identified the districts that by 2024 are meant to be served with off-grid electrification solutions.

About two dozen private companies are active in Rwanda and the GoR has made concessional debt financing available under the Rwanda Renewable Energy Fund (REF) (P160699). However, while the pace of grid electrification has increased, off-grid access expansion has slowed down despite the GoR providing debt financing through the Renewable Energy Fund (REF) project (P160699), tax exemptions, the preparation of the NEP, and the adoption of quality standards for solar products. The off-grid market slowed down from about 100,000 solar home systems sold in 2016/17 to 86,000 in FY2018, and 83,000 in FY2019, largely due to affordability constraints (see below).

Lack of affordability of Tier 1+ off-grid solar systems has emerged as a key challenge for the scale and speed of distribution off-grid technologies in the country. The market for high income households is saturated and increased competition for innovative business models is necessary to serve households with affordability constraints and/or irregular income. Of all the solar lighting products sold in 2018, 8 percent were sold to Ubudehe 1, 41 percent to Ubudehe 2 and 51 percent to Ubudehe 3. As the off-grid market in the country is saturated for higher income households, OSCs started to expand to riskier customers (with lower or irregular income), which led to an increase in their default rate (between 5 and 25 percent). This challenge is not unique to Rwanda but has being experienced by OSCs across SSA as business models are yet to have fully adapted to servicing lower income households, with limited affordability through either cash-based or instalment payments.

To address the affordability constraint, the Government of Rwanda has adopted a framework for providing partial grants through Results Based Financing (RBF) to make solar home systems more affordable to lower income consumers and is currently implementing a pilot. To accelerate the off-grid electrification market again to the 250,000 or so new connections per year needed to achieve the NST1 target, the government has decided to provide partial grants to Ubudehe 1-3 households to increase the affordability of off-grid solar products. The RBF concept was prepared by the Ministry of Infrastructure, the Rwanda Energy Group (REG) / the Energy Development Corporation Limited (EDCL), and development partners, and approved by the Sector Working Group (SWG) in November 2019. A pilot RBF (the ‘pro-poor pilot’) by Energising Development (EnDev) in collaboration with EDCL and co-financed by Power Africa was launched in November 2019, with a focus on districts in the South of the country and has

served as proof-of-concept for the national RBF mechanism that is approved by the Cabinet (see below for details).

In line with the Cabinet-approved RBF mechanism, Sub-Component 3a of EAQIP will provide US$ 15 million of financing to make access to off-grid electricity affordable at all income levels and connect at least 150,000 households. These grants will be provided through a newly created results-based financing (RBF) window of the Renewable Energy Fund (REF) administered by BRD. EAQIP will provide US$ 15 million of financing to the RBF window, bringing the total financing resources allocated by the Government to this window to US$ 30 million. This is reflective of the large expected financing needs of the sector over the period through 2024.

The results-based financing will allow sales to household and enterprise consumers. Due to the cap on the maximum subsidy amount per customer, it is expected that most beneficiaries will be households and microenterprises.

The Sub-Component will build on the experience of an ongoing US$2 million pro-poor RBF pilot supported by EnDev and financed by Power Africa and UK Department for International Development (DFID). The EnDev pilot focuses on five districts in the South of Rwanda, commenced in November 2019, and will run until March 2021, with five off-grid SHS companies as current participants and two more expected to join the scheme. Participating companies receive an incentive for every solar home system sold to an eligible household without electricity access in off-grid areas in the districts of Nyamagabe, Nyanza, Gisagara, Huye, and Ruhango. The EnDev RBF is jointly implemented by EnDev Rwanda, EDCL, and Urwego Bank, who all play a role in company selection, verification, and disbursement processes. EnDev Rwanda is building institutional capacity within EDCL to take over the program in full.

In line with best practices, the results-based grants will be provided to off-grid solar companies with the expectation that competitive pressure will induce these companies to pass on the grants to end-consumers and make their products more affordable. The pilot RBF currently delivers the total subsidy to participating companies as soon as installation has been verified. While this delivery mechanism has encouraged quick connections, the disbursement arrangement makes it difficult for the project to ensure that (1) customers pay their contribution and (2) that after sales

care is provided for the full life of the warranty. To address these concerns, the new RBF mechanism financed by EAQIP will disburse the subsidy to the companies over time, in line with the customer's contribution. This will ensure that companies focus on helping beneficiaries to complete their contribution by offering excellent customer service and competitive pricing.

The RBF mechanism will be designed to ensure that the grant is passed on from the off-grid solar companies to consumers. Companies will be able to easily calculate their expected subsidy payments and integrate it into the payment scheme they offer to customers. To ensure that the grants are passed on to target consumers, BRD will track the cost to the end-user in two ways. The first is through the application and review process. All applicants will need to share their current pricing as well as their planned pricing scheme under the RBF. The second is through the monitoring of the project. In the event a company is not reducing pricing to reflect the subsidy level, the company could be removed from the program. Grant levels and price coverage estimates will be regularly reviewed to reflect the market changes to ensure sustainability of the program. In case of return or repossession of the system, grant support will not be provided or revoked.

To avoid market distortions, beneficiaries will be required to contribute to the cost of solar kits. This will ensure ownership of the system and adequate customer rights and duties. Experience in SSA countries also showcases that access to the first off-grid technology is a pre-requisite for experiencing and understanding the benefits to access to electricity, increasing willingness to pay (realized e.g. through pooling of resources among the community) and for climbing the energy ladder over time. Public support to Ubudehe households is also well established and acknowledged in the country, and access to off-grid solutions will leverage on existing communication channels to avoid any perception of discrimination.

Off-grid solar companies' sales will be verified before RBF payments are made. Verification requirements would for example include proof of instalment, typically in the form of the contract service entered with the beneficiary, including main attributes such as name, address etc., as detailed in the Operations Manual. After sale services verification will likely be conducted based on the warranty period associated to the system (2 years as specified in the Ministerial Guidelines). Verification will be done by EDCL, supported by an external service provider as

needed, through a statistically relevant sample, as done under the EnDEV pilot. Together with ensuring adequate tracking and verification of the RBF mechanism, EDCL's verification will allow the GoR to keep track of the overall progress and potential implementation issues within the broader the GoR funded RBF scheme, as well as ensure timely verification given the capacity of the agency. Should a company fail to provide the information requested or misreport this information, an escalation process will be initiated, which may ultimately result in expulsion from the program.

In line with the EnDev pilot, the results-based grants will likely be differentiated by Ubudehe category to reflect customer affordability levels. Verification of the beneficiaries' Ubudehe level will leverage on the eligibility tool Off-grid Monitoring Information System (OMIS) developed by EnDev for MININFRA and REG (for the EnDev RBF program), as well as the Local Administrative Entities Development Agency (LODA) Monitoring & Evaluation Information System (MEIS), which provides information on national IDs, households and Ubudehe categories. Linking the OMIS, the LODA MEIS and the eligibility tool will ensure that the demographic data required will be as up to date as possible, sales across the sector are being track accurately and monitoring is streamlined.

The EAQIP allocation is expected to be topped up by other development partners to close the remaining financing gap for the achievement of the 48 percent-off grid access target. The Renewable Energy Fund was designed to be the Government of Rwanda's flagship fund to accelerate off-grid electrification, and has requested development partners to complement the World Bank's financing to meet the full expected financing needs of the RBF window, which is estimated at around US$ 90-150 million during 2020-24 to reach 1,500,000 households. In response, several partners have indicated interest in providing parallel co-financing to this component.

Sub-Component 3b: Increasing Access to Clean Cooking Solution

MININFRA recently approved an ambitious new Biomass Energy Strategy (2019-2030) and an amendment to its NDC, with targets of reducing the percentage of households that use firewood for cooking from the baseline value of 79.9% in 2017 to 42% by 2024, and phasing-out the use of charcoal in urban areas. The clean cooking agenda has been recently moved to MININFRA

and REG/EDCL have the mandate to implement it. The Rwanda Standards Board (RSB) is tasked with certifications and setting standards for cooking products and a testing lab is currently under development. In October 2019, MININFRA published the Biomass Energy Strategy: A Sustainable Path to Clean Cooking 2019-2030. In May 2020, the Government updated its Nationally Determined Contributions under the Paris Agreements which includes promoting the use of efficient cook stoves as a mitigation measure since cooking accounts for 14% of the GHG emissions from the energy sector.

Implementation of the Biomass Energy Strategy will require substantial grant resources made available to the sector to address the affordability and awareness gaps as well as the unproven nature of many new technological solutions in Rwanda. The Strategy estimates investment requirements of US$240-590 million (2018-2024) and US$200-365 million (20254-2030) to meet the targets. Besides the proposed EAQIP project, there are several development partners with plans to support various aspects of the Strategy such as Giz/EnDev, SNV, EU, Enabel, the Tony Blair Institute, Loughbough University, Clean Cooking Alliance, Global LPG Partnership and African Development Bank. An EU-funded program to be implemented by GiZ/Endev aims to increase the use of improved stoves through strengthening the value chains from production to usage. Development partners can also play a role in capacity building, facilitating an exchange of knowledge, support in developing standards, quality assurance and testing procedures that suit the local conditions.

Cash expenditure on cooking fuels remains rare in Rwanda outside the richest 10 percent of households as 97 percent of households use either firewood or charcoal, which means that the market for clean cooking solutions will require partial subsidies to become commercially viable. Nationwide, households rely on firewood to meet their cooking needs (more than 90% in Quintile 1, 2 and 3), this is especially true for low income households in the bottom two consumption quintiles. Even higher income households rely on firewood (85% in Quintile 4 and 45% in Quintile 5) but also use charcoal (14% in Quintile 4 and about 50% in Quintile 5) as their primary fuel. Only households in the highest quintile use LPG or electricity for cooking.

Component 3b will set up a clean cooking RBF window to partially subsidize purchases of clean and efficient cooking solutions by eligible households. The design and implementation structure

of the clean cooking RBF window will be aligned with Component 3a. The key principles and features of the cooking RBF window are outlined below. More detailed information is provided in Annex 5.

The clean cooking RBF window will initially support Tier 2+ solutions, with the objective to gradually increase the minimum performance level requirements as affordable Tier 3+ solutions become widely available. The cooking RBF window will use both International Organization for Standardization (ISO) Voluntary Performance Targets (VPTs) (ISO/TR 19867-3:2018) and MTF for cooking as the key reference documents for determining eligible cooking technologies but will also be flexible to incorporate Rwanda's specific cooking culture and practice. Based on the MTF survey, about 70% of households rely on three-stone (equivalent to tier 0) or traditional stoves (equivalent to tier 1) for cooking. To enable a practical transition toward improved and modern cooking solutions, the cooking RBF window will support technologies that meet at least Tier 2 performance level during the initial phase while providing technical assistance to local producers to improve their products performance level, and will lift the minimum requirement to tier 3 performance level once sufficiently affordable Tier 3+ cooking technologies and products are available to meet the project targets.

The RBF window will support both urban and rural households. In urban areas, the focus of the clean cooking RBF will be to reduce and eventually phase out charcoal as a cooking fuel and replace it with Tier 3+ clean cooking solutions. In rural areas, the focus will be on reducing the reliance on firewood as a cooking fuel, by gradually introducing more efficient (Tier 2+) and clean cooking (Tier 3+) solutions. The two focus areas will contribute to the objectives of (i) phasing out charcoal use in urban areas; and (ii) reducing the reliance on firewood.

The performance of eligible cooking technologies will need to be demonstrated through laboratory testing and/or field-based data. PIU will make public announcement on a rolling basis to invite stoves manufacturers and cookstove makers to submit their applications and products for eligibility review. Rwanda Standards Board (RSB) is currently setting up a Stove Testing Laboratory which will be responsible for conducting stove testing and evaluation and issue recommendation whether the cooking technologies are qualified under the cooking RBF

window. Technical assistance will be provided to RSB to build its cookstove testing and evaluation capacity and improve the national cookstove standards.

RBF incentives amount will be linked to the verified output, outcome, and impact level results; differentiated by cooking technology performance levels and consumer income categories (Ubudehe categories); and reviewed and adjusted periodically. The RBF incentives levels and triggers will be reviewed periodically and adjusted in response to the market conditions. In doing so, the project will take an adaptive and flexible approach to periodically review market conditions, actively seek feedbacks from key stakeholders, and adjust accordingly. The project will continue to coordinate and collaborate with key stakeholders such as EU, GIZ/EnDev, SNV, Enabel, the Tony Blair Institute, Loughbough University, Clean Cooking Alliance, Global LPG Partnership, and African Development Bank as well as World Bank's energy, environment, climate, health, social protection, behavior change groups to align the efforts of on-going and potential projects in the cooking sector.

Component 3b will be co-financed by the Clean Cooking Fund (CCF) of the World Bank's Energy Sector Management Assistance Program (ESMAP). The Clean Cooking Fund is set up to accelerate progress toward universal access to clean cooking by 2030. The Fund will incentivize public and private investments in the clean cooking sector to catalyse technology and business innovations and linking incentives with verified results, also known as results-based financing (RBF). The Fund provides grant resources to co-finance with the World Bank Group or other Multilateral Development Banks investment projects and requires at least 1:1 leverage. The Fund is also expected to have at least 1:1 leverage for private-sector investments. The Fund grant resources will be used both for component 3b and component 4 to support clean cooking TA activities.

Under Component 4 (see below), technical assistance and training will be provided to local producers to improve the local product design and quality production. Innovation grants will be available (through a competitive process) to encourage innovative technological, business, and financing approaches with focus on meeting the poor households' cooking need and encouraging female entrepreneurs in the cooking sector. Awareness raising and behaviour change campaign

will be conducted to stimulate demand and support sustainable adoption. The OM will also detail the processes for RBF grant revoke and reimbursement in case of non-performance.

Component 4: Technical Assistance, Institutional Capacity Building and Implementation Support

This component will support project implementation, capacity building, technical assistance, impact evaluation studies and advisory services. Recognizing that the PCU resources may be constrained by the large volume of activities required of the project, the project will support additional staff in EDCL, staff in the PCU, supervision consultants to assist in effective and efficient project delivery, and sector consultants to continue to support sector management and coordination. This sub-component will therefore directly support payment of supervision consultants to help EDCL in project oversight; key functions within the PCU and EDCL departments that are hired to support the implementation of the project; and the sector working group secretariat to support project implementation and sector management and coordination.

The sub-component will also support technical assistance where required. These will include sector studies aimed at improving the efficiency of sector performance, impact evaluation studies to help the sector make appropriate decisions during and after project/program implementation, feasibility studies, and policy and advisory notes required to inform sector decisions. The sub-component will support an impact evaluation to assess the economic and non-economic benefits of electrification and clean cooking sectors. The technical assistance will also cover gender-specific activities, such as monitoring of the gender inclusion in the modern energy and clean cooking access components, identify and analyse further gender gaps in the sector to provide tailored and targeted measures to close the gaps, providing gender mainstreaming trainings to the project staff, and conducting awareness-raising, behavioral change and entrepreneurship events to attract female participation in the project.

In addition, the sub-component will support capacity building across the electricity sector agencies. This is to ensure the sector continues to develop appropriate capacity for supervision of implementation of energy sector programs and efficient utilization of energy sector investments. Areas of possible capacity building areas include in the areas of energy sector planning, technical skills development, audit, compliance and gender.

Support an enabling environment for the cooking sector development. This sub-component will build institutional capacity and support an enabling environment for the cooking sector development. More specifically, the sub-component will support

a) *Awareness raising and behavior change campaign.* The project will work with health practitioners, women's groups, and educators on the issue of household air pollution and clean cooking options. Gender targeted messages will be developed, and influential champions (e.g. clean cooking ambassadors) will be identified. Mass media and social media as well as other more innovative marketing approaches will be used to raise awareness and demand for improved and modern cooking solutions.

b) *Market facilitation and policy/regulation review and improvement.* The sub-component will hire a market facilitator to reach out to the interested and promising cooking companies on the opportunities and provide targeted training to the cooking companies participated in the RBF operation on business development to help them to be more successful. The project will also provide technical assistance to review the related policies and regulations and identify areas for improvement.

c) *Stove testing and product development*. Technical assistance and capacity building will be provided to (i) the stove testing lab to increase its stove testing and evaluation capacity, (ii) the local producers to improve their product design and quality production with special focus to incorporate women needs as users, (iii) RSB to improve the testing protocol and the national standard to incorporate the local cooking culture and practice.

d) *Monitoring and verification for the RBF operation.* This sub-component will cover the costs related to monitoring and verification at the output level, outcome, and impact level results.

e) *Innovations.* This sub-component will provide innovation subgrant through a competitive process to support innovative technological, business, financing approaches and will give preferential support to female entrepreneurs.

f) *Appraisal of cooking companies loan proposals and development of cooking companies lending products.* This sub-component will support BRD to engage promising cooking companies and appraise loan proposals as well as develop targeted lending products that fit the clean cooking businesses. In particular, as BRD administrates the RBF fund, it may use future RBF payments to support its loan appraisal.

g) *Management and operating costs.* This sub-component will cover the management and operating costs for both EDCL and BRD.

Table 2: Details of Components and Donor Requirements

Area / Investment need	Details	Estimate (US$)
1. Increasing Access to Grid Electricity		
Grid access	Grid connections for households, commercial and industrial consumers, and public institutions. **WBG Districts:** Gicumbi, Musanze, Rulindo, Burera, Ngororero, Nyabihu, Rubavu	90,000,000
	AFD Districts: Karongi, Rusizi, Rutsiro, Nyamasheke	85,432,639
	OPEC Fund and SFD Districts: Gakenke, Muhanga, Kamonyi	40,000,000
	Subtotal:	US$ 215,432,639
2. Enhancing the Efficiency of Electricity Service		
Rehabilitation of the Ntaruka HPP	Ensure availability of low-cost renewable energy generation capacity in Rwanda, through the rehabilitation of the Ntaruka HPP.	11,000,000
Installation of AVR on 220kV, Installation of power system stabilizers and governing systems on main generators	To reduce voltage rises due to low loading on 220kV; Improve network responses to fluctuations and load loss; prepare EAPP regional interconnection.	8,500,000
Building of GiS system	Building of Rwanda's power system GiS.	6,000,000
Completing installation of smart metering for all	Identify and curb sources of commercial/technical losses and phase imbalances.	4,500,000

Area / Investment need	Details	Estimate (US$)
distribution transformers and medium/large customers		
	Subtotal:	**US$ 30,000,000**
3. Increasing Access to Off-grid Electricity and Clean Cooking Solutions		
Results-based financing for off-grid solar and cooking solutions.	Results-based financing for (a) off-grid solar connections to reach poorer and more remote areas and (b) clean cooking solutions, with business models and financing instruments yet to be determined.	25,000,000
RETF grant from Clean Cooking Fund	Matching grant for RBF and TA for clean cooking	7,000,000
	Subtotal:	**US$ 32,000,000**
4. Technical Assistance, Institutional Capacity Building and Implementation Support		
Technical Assistance	Address sector performance improvements; forward-looking options for sector development including clean cooking.	2,000,000
Capacity building	Planning, Skills development, Audit and Compliance (+ others to be identified).	1,000,000
Implementation Support	Support EDCL PCU functions (staff); Support the SWG secretariat staff.	2,000,000 + EUR 2,000,000
RETF grant from Clean Cooking Fund	Market development and technical assistance for the clean cooking sector	3,000,000

Area / Investment need	Details	Estimate (US$)
	Subtotal:	**US$ 10,190,100**
	Total:	**US$ 287,622,739**

III. ENVIRONMENT AND SOCIAL BASELINE OF THE PROJECT

This section describes the overall baseline conditions of Rwanda in terms of social and biophysical environment because the project will be implemented in different districts composing four provinces of Rwanda namely East, West, North and East the focus will be on construction of distribution network.

3.1. Location and Size

Rwanda is a small mountainous landlocked country, located in Central Africa, at latitude 2. 00 S and longitude 30. 00 E, bordered to its South by Burundi, Tanzania to its East, Uganda to its North and the Democratic Republic of Congo (DRC) to its West. Rwanda has a total surface area of 26, 338 km^2 of which the total land area is 24, 948 km^2 and 1, 390 sq. km is surface water.

Rwanda is often referred to as the country of a “thousand hills” (mille collines), because of its numerous highly dissected hills, often with flat peaks and convex slopes mainly in Northern and Western part, separated by relatively narrow valleys, with the lowest altitude of around 900 m at Bugarama and the highest altitude at Mount Karisimbi 4,507 m. The average altitude is 1,250m above sea level.

Rwanda can be divided into six topographical regions which are:

- From North-West to South -West are the narrow Congo Nile Ridge, which slopes sharply to Lake Kivu.
- The Volcanic Virunga Mountains, whose highest peak, Mount Karisimbi, towers over the high North-Western lava plains.

- The steep North-South rise of the Congo – Nile Basins divide, whose width averages 25 km.
- The ridge of the Congo – Nile Basins divide, with an average elevation of 2750 m above sea level.
- The central plateau East of the mountains, which are covered by rolling hills.
- The savannas and swamps of the Eastern and South Eastern border areas which cover one tenth of the nation's land area and include the Akagera National Park.
- Most of Rwanda is at least 900m above sea level; the central plains have an average elevation of 1932m, while South-Eastern Rwanda has a desert like terrain.

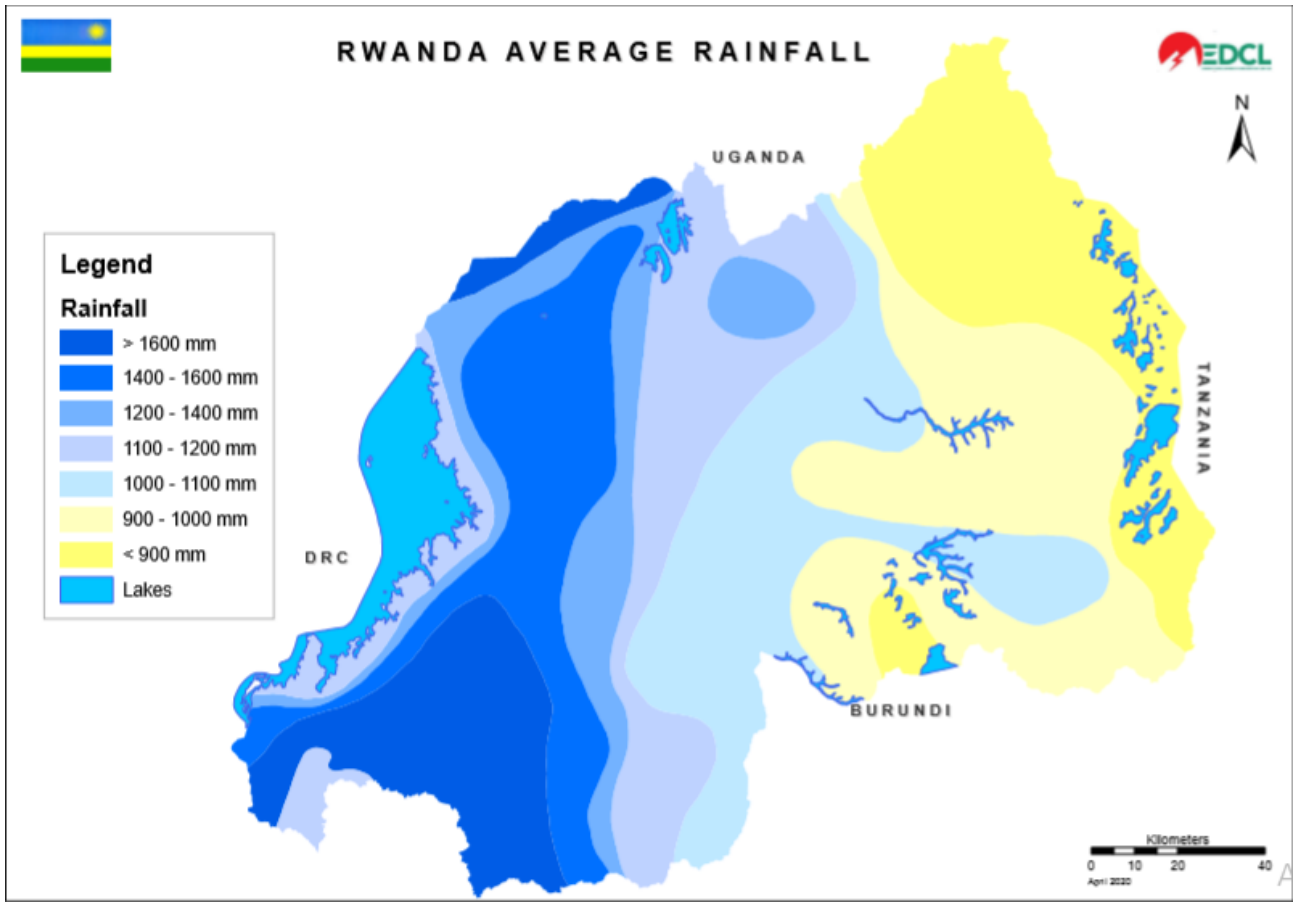
3.2. Physical Environment

3.2.1. Climate

Rwanda enjoys a tropical temperate climate due to its high altitude. The average annual temperature ranges between 16°C and 20°C, without significant variations. Rainfall is abundant although it has some irregularities. Winds are generally around 1-3 m/s. In the high regions of the Congo-Nile ridge, average temperatures range between 15 and 17°C and the rainfall is abundant. The volcanic region has much lower temperatures that can go below 0°C in some places. In areas with intermediary altitude, average temperatures vary between 19 and 21°C and the average rainfall is around 1000 mm /year. Rainfall is less irregular, and sometimes causes periods of drought. In the lowlands (East and Southeast), temperatures are higher, and the extreme can go beyond 30°C in February and July-August. The absolute temperature of 32.8°C was recorded in the Southeast by Karama-Plateau station on the 4th of September 1980. Thermic constraints are more considerable there than in the remaining part of the country. Rainfall is less abundant in that region (700 to 970 mm/year). Weather in Rwandan is determined by the rainfall patterns. Thus, the climate of the country is characterized by an alternation of four seasons of which two are wet and the other two are dry. However, one can notice that rainfall is generally well distributed throughout the year, despite some irregularities. Eastern and South-Eastern regions (Umutara, Kibungo, Bugesera, Mayaga) are more affected by prolonged droughts while the northern and western regions (Musanze, Rubavu, Nyamagabe and Gicumbi) experience abundant rainfall that usually causes erosion, flooding, and landslides.

The quantity of total annual rainfall varies between 800mm in the North-East of Rwanda (Eastern Umutara) and 1600 mm in the natural forest of Nyungwe and in the high lands of the North-West (Kinigi). The decrease in rainfall is observed in the region of Bugesera (900 mm) and in the Western part of Rubavu district (1200 mm). The increase of rainfall is observed in some regions like Kibungo (Gahororo, 1200 mm); in the South-West (Mibirizi, 1450 mm) and in the natural forest of Gishwati (1350 mm). The region that is characterized by the highest rainfalls (over the average isohyets of 1200 mm) is in the western half of the country, from Byumba to Kibeho and from Kinigi to Mibirizi including the region bordering Lake Kivu.

Figure 3: Annual average rainfall distribution



3.2.2. Relief

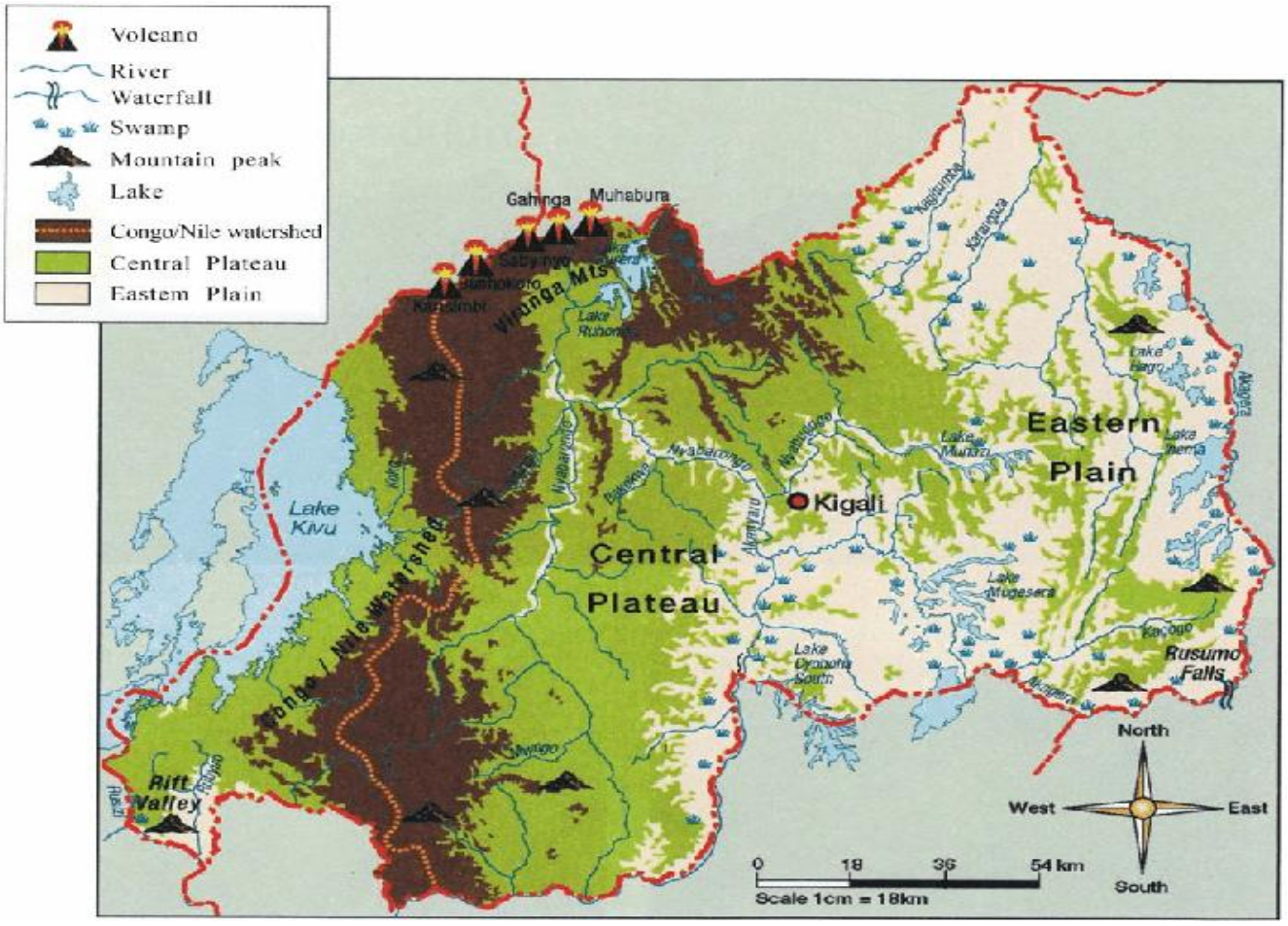
The Rwandan relief is hilly and mountainous with an altitude varying between 900 m and 4507 m. The components of that relief are:

Congo-Nil Ridge over laying Lake Kivu with an altitude between 2500 m and 3000 m. It is dominated in the North-West by the volcanic ranges consisting of five volcanic massifs of which the highest is Karisimbi with 4507 m. The central plateau presents a relief of hills with an altitude ranging between 1500 m and 2000 m. The lowlands of the East are dominated by a depression characterized by hills with more or less round top and 1000 to 1500 m in altitude. The lowlands of the South-West in Bugarama plain with an altitude of 900 m are part of the tectonic depression of the African Rift Valley.

3.2.3 Catchment and Hydrology

Rwanda has a relatively big quantity of water: rivers, lakes and marshes and occupy a surface area of 211000 ha or about 8% of the national territory (lakes: 128000 ha, rivers: 7260 ha and marshes: 77000 ha).

Figure 4: Rwanda Relief and climate



3.2.4 Surface water

Rwanda has a dense hydrographical network of ± 2 km/km² (length of the superficial flow network by km² of surface). The country is divided into two hydrographical basins with a separating line called Congo-Nile Ridge, moving from the North to the South and ± perpendicular to the volcanic chain, making natural obstacles exchange between the catchment's basins of the Northern Kivu and the Southwest of Uganda and those of Rwanda.

In the West of that line there is the Congolese basin (33% of the surface of the national territory) that drains 10% of water resources of the country. It comprises rivers Sebeya, Koko, Rusizi, Rubyiro, as affluent of Lake Kivu (around 1000 Km2 on the Rwandan side, 490 m of maximum depth), Ruhwa and many other small rivers (around 127 rivers).

In the East of the Congo Nile Ridge there is the Nile basin which covers 67% of the National territory and drains 90% of Rwandan waters by two main rivers namely Nyabarongo and Akagera. The latter is the main affluent of Lake Victoria with an average outflow of 256 m3 /s at Rusumo station and thus considered as the source of the Nile. The basin of the Nile in Rwanda comprises a lot of small lakes (Burera, Ruhondo, Cyohoha South, Mugesera, Muhazi, Rwampanga, Mihindi, Mirayi and many others). Those lakes are not very deep (5 to 7 m of depth) except for Lake Burera and Ruhondo which are 65 to 173 m deep.

3.2.5 Groundwater

The outflow of the ground renewable water resource is estimated at 66 m³/s. Out of this, the 22,000 known sources contribute an output of 9 m³/s. In general, little information is available on ground water resources.

3.2.6 Lakes

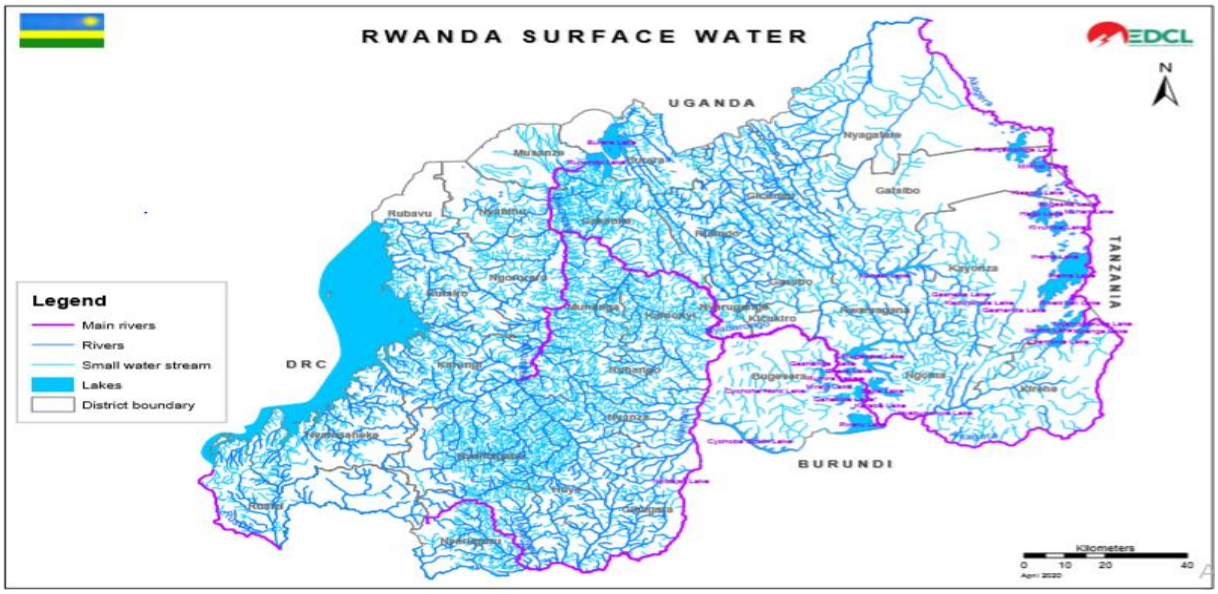
Rwanda has some 28 lakes of significant size. Six among the largest are entirely within the national territory: Ruhondo, Muhazi, Mugesera, Ihema, Rwanyakizinga and Burera. Three others, Rweru, Cyohoha and Kivu, are shared with neighboring countries. The largest and most spectacular is Lake Kivu, so large as to seem almost like a sea to the landlocked inhabitants.

Lake Kivu lies at 1, 460m above sea level and is 90 km long (north-south) and 49 km wide (eastwest). From an average depth of 240 m, it plunges to a maximum depth of 490 m. Lake kivu has a rough, jagged coast and contains numerous islands, including Nkombo and Iwawa. Lake Kivu lies on the border with Congo in Western Rwanda at the foot of the Virunga Volcanoes. Kivu's shores are densely populated and the principal town on the Rwandan side is Rubavu. Although it is supplied with fish, the lake is poor in fauna but rich in volcanic substance. Great volumes of dissolved methane gases ((~60 km3 STP) that may be developed as energy sources exist in its deep waters. Lake Kivu drains to the south into Lake Tanganyika by the swiftly descending Ruzizi River.

3.2.7 Quality of water

In Rwanda the quality of water is generally good with a pH ranging between 6 and 7.5. Surface water often carries sediments and in mining and volcanic regions, the water can contain arsenic, lead, mercury, fluoride, iodide and other toxic metalloids and heavy metals. The physio-chemical pollution of water is not frequent due to the small level of industrialization and use of agricultural chemical inputs. The microbiological pollution is often observed, and it comes from various domestic wastes and debris carried by rainwater towards the natural environment. The pollution of water courses and lakes by the water hyacinth and other harmful aquatic plants is a phenomenon that is very recent and alarming in Rwanda.

Figure 5: Surface water



3.2.8 Wetlands

Wetlands cover a total area of 164,000 ha or about 6% of the territory. The wetlands include a variety of ecosystems, ranging from large, permanently flooded swampy peatlands to smaller, seasonally flooded wetlands with a more mineral soil. The main swamps are Akanyaru (30,000 ha) on the border with Burundi, Mugesera Rugwero in the southeast, Kagera swamps along the Tanzania border in the east, Nyabarongo (10,000 ha) and the Rugezi wetlands (5,000 ha) in the north.

The wetlands serve as troughs for sediment particles and play an important role in the national water balances by acting as a buffer, thus reducing the maximal flow rates during the rainy season and maintaining a relatively high flow rate during the dry season.

Currently, an estimated 94,000 ha have been brought under agriculture, the large majority of this being spontaneous agriculture with maize, sweet potatoes and beans. In addition, the wetlands are used for a variety of traditional activities including the collection of leaves to make handicrafts, extensive grazing and making of bricks. Wetlands also provide a spawning habitat for fish and are of great significance for biodiversity conservation. The wetlands are composed of marshes, lakes, rivers and brooks representing around 14.9% of the national territory of which 6.3% consist of marshes and 8.6% of lakes, water courses and pools of permanent or seasonal fresh water.

In the highlands of the North-West, there are: lakes Burera and Ruhondo as well as the marshes of Rugezi. In the Central and the East of the country, wide marshes are those of Nyabarongo, Akanyaru and Akagera rivers. Many cuvette lakes connect with rivers and most of them are located in the Akagera National Park. From the Southeast to the North-West, there are lakes like Cyohoha in the South, Mugesera, Rweru, Sake, Cyambwe, Ihema, Milindi, Rwanyakizinga, Kivumba, etc.

Given the importance that the Government of Rwanda attaches to wetlands, in 2003 Rwanda ratified the Ramsar Convention or convention on wetlands and has already registered on the Ramsar list the site of Rugezi and identified other potential sites that will be registered in the future, like the complex of Mugesera-Rweru, Kamiranzuvu marshes and the wet zones of the Akagera National Park. In addition, an action plan for the implementation of the Ramsar Convention was developed in June 2004. The wetlands ensure several functions and provide numerous services to people. For instance, they ensure control of floods and the recharge of underground waters. They play the role of alleviating

the erosive force of water and thus facilitate the deposit of sediments in suspension that could block water courses downstream.

3.3 Geology and soils

3.3.1 Soils

According to the Geological Map of Rwanda, the regional geology consists of pelitic rocks and Quartz Phyllites (Cyurugeyu Superformation), Granites to Granite-Gneisses, Quarzites and Mica-Schists, Amphibolites and Mylonites (Huye Complex) as well as Quartz-Phyllites and Meta-Volcanics (Nyungwe Formation). The greater part of the geological structure is occupied by such lithological varieties of Rocks. Rwanda shows well developed drainage pattern that belongs to dendritic and trellis types. Metamorphic rocks form the major part of the rock mass and some magmatic rocks are also present. Major rock types observed in the area are granitic gneiss, quartzite, schists and amphibolites. The dominant soils are the result of alteration of the granite and the gneiss. Disruption of drainage due to tectonic movements of the Pleistocene caused the formation of alluvial valleys. They consist of alluvium and colluvium in the basin as result of the erosion. They have generally colluvial and alluvial in the valleys around the rivers. The soils of the top of the mountains are products of granite and gneiss and have resisted erosion.

Soils derived from schistose, sandstone and quartzite formations found in the Congo-Nile Ridge and Soils derived from old volcanic materials found in the plateau of the south west of the country. Over the EAQIP subproject area, most of the valley slopes extending from riverbanks to the top of the ridges are cleared for cultivation of various crops of a seasonal nature. As a result, soil cover is well exposed for potential erosion. A few patches of new forest plantations of eucalyptus and pines can also be seen on the valley slopes.

3.3.2 Use of soils

The exploitation of land employs around 70% of the active population. Land resources are thus limited and coveted resulting in overexploitation and inappropriate use of lands with disastrous consequences on land resources and on environment in general. In mountainous area, steep slope lands are deforested and used for staple crops under high rainfall precipitation, with often accelerated land degradation through water erosion, poorer soil fertility, increased floods and landslides, and

overall, food insecurity and poverty. Appropriate land uses combined with soil and water conservation measures then become a must; in some sites, active erosion mainly caused landslide hazards which increase sediments in rivers. Other than that, erosion has also formed gully bodies through the slopes of mountainous area.

Land use activities including infrastructure development may increase the potential of occurrence of landslides and erosion in various ways, which include destabilization of rock masses by cuts in slopes, improper stockpiling of materials, destruction of vegetative cover during site clearing and uncontrolled surface run-off during storms may increase the erosion rate. Riverbanks are composed of alluvial and proluvial loose-fragmental soils. Thus, the activities may increase erosion and landslides rates at various points along the banks of rivers and in some lateral ravines.

Intensive cultivation occurs along the steep slopes predominant in the area without proper soil conservation techniques hence accelerating soil erosion. However, it is worth mentioning that terracing as a measure for soil erosion control is practiced in some parts of the project area. Extensive deforestation to meet energy demands has further reduced the soils 'ability to withstand the scouring effects of rain in the upland watersheds has had serious downstream implications. When viewed against that background, therefore, it is easy to appreciate that the project would have negligible incremental impact on the rates and overall patterns of erosion. Nevertheless, erosion is of relevance to slope stability, which is in turn relevant to the design of the project and the conduct of operations such as excavation and borrowing. The specific measures will be taken to address these considerations.

3.3.3 Highland soils

The highland soils are particularly prone to erosion and landslides especially regions of the Congo-Nile ridge, valleys and lowlands (peat lands) as well as highland meadows. Soils of foothills of the Congo-Nile Ridge and of other transition regions between the central plateau and highlands are fertile but, due to deforestation and inappropriate agricultural practices, they are vulnerable to erosion.

3.3.4 Soils of the central plateau

The central plateau covers the regions of South and South-East. The soil types are hill Ferro soils and valley histosoils. The slopes of hills are exposed to erosion notably in the case of clay-sandy or gravely soils.

3.3.5 Soils of the lowlands

They cover the Eastern and South-eastern regions and are Ferro soils with savannah vegetation. Similar to the region of Bugesera, the river-lake complex along Nyabarongo and Akanyaru rivers underwent serious leaching. In addition, the geological structure of soils in those regions allows rain waters to infiltrate deeply into soils, and that can partly explain the lack of runoff waters and shallow brooks.

3.3.6 Soils of valleys

These are soils of histosoil and peat soil types that constitute potential agricultural and energy wealth (case of intermountain basins of Kamiranzovu and Rugezi). In the wide water surfaces of eastern regions like Umutara and Bugesera, as well as the Rusizi region (Bugarama), the valleys are of vertisoil and alluvial types are fertile. The slope slight as they may be, are threatened by erosion due to the weak permeability of soils. The exploitation of peat for fuel production purposes would require a preliminary development plan for swampy areas. In fact, any extraction of peat is associated with drainage and exudation, two factors likely to impact negatively on the crucial role of wet ecosystems and swamps in regulating the hydrology. Moreover, the exploitation of mines and quarries spoils the landscape and more often constitutes a source of soil erosion, water pollution and pose a danger to human health. A good number of queries are not rehabilitated and always left open.

3.3.7 Biological Environment

Rwanda is covered with diverse ecosystems that include mountains, ombrophile forests, gallery forests, savannahs, wet and aquatic zones, wood and agro ecosystems. All these ecosystems have a rich flora and fauna.

3.3.8 Protected areas

The fauna and the flora can be better preserved and protected thanks to the establishment of a system made of protected areas like national parks and forest reserves to which the best management is applied. However, through time and due to human activities, these conservation areas have been reduced considerably.

3.4. Forests

Rwanda's remaining natural forests, the Nyungwe Forest, the Gishwati Forest and the Mukara Forest, are highland forests around the volcanoes, have a high degree of biological diversity and rare animal species, such as mountain gorillas, Ruwenzori colobus monkeys and golden chimpanzees. It is estimated that there are 2150 plant species to be found in Rwanda, with around 700 species of these acknowledged to have medicinal value. Towards the east of the country lies the Akagera National Park, the Mutara game reserve forests galleries and wooded savannahs. Population pressures have already drastically reduced the land area of the natural forests of Rwanda from about 30% to presently fewer than 10% in less than a century. The deforestation of Rwanda's remaining forests is also the result of high fuel wood consumption. Heavily populated and cultivated areas adjacent to the natural forest, as well as the recent wars, have resulted in massive deforestation and loss of genetic diversity within Rwanda's natural forest.

Clearance for farming and pastureland has also contributed to the reduction in forest cover, as well as harvesting for fuel wood and timber for housing and small-scale mining. Production of export crops is also a factor in forest destruction: half the forests around the volcanoes in the North were cleared for pyrethrum plantations in the 1960's, and areas around the Nyungwe in southern and western province were cleared for tea plantations. Preliminary estimates indicate that the protected areas and forest reserves were seriously damaged as a result of recent wars. From an estimated pre-1994 total surface area of 417,000 ha, it is thought that they have been reduced to approximately 226,000 ha. Specifically, the Akagera National Park was reduced to less than one-third of its original size when the Umutara prefecture was created in 1996 for the resettlement of returning refugees. The Gishwati Forest has all but disappeared (from a pre-war estimate of 37,000 ha, only about 2,000 ha now remain.

3.4.1. National Parks/Forest Reserves at a Glance

Rwanda has four national parks. They are all protected wildlife reserves and ecosystems and include the Akagera National Park, Nyungwe National Park, Gishwati-Mukura National Park and the Volcanoes National Park. Gishwati-Mukura was created in 2015 and is hence the youngest national park created. The Rwanda Development Board (RDB) is responsible for the overall management of all the national parks, related infrastructure and promoting tourism. The RDB is assisted by other government agencies and ministries. In some cases, like that of the Akagera and Gishwati-Mukura National Park, the government entered into long term agreements with private partners to help run some park activities

These areas are exclusively reserved for the protection of flora and fauna, eco-tourism, biodiversity conservation, and for geological formations of scientific and aesthetic value. The geographical distribution of those parks on the national territory is a guarantee of the conservation of biological diversity representative of the fauna and flora of the country.

3.4.2. Volcanoes National Park

Spanning on a 160 Km^2 area in the Northern part of Rwanda, Volcanoes national park is the oldest national park in Africa, created in 1925. It was initially a small area around Karisimbi, Mikeno and Visoke volcanoes which was gazetted to protect the Mountain gorillas which were facing the threat of extinction as a result of poaching. In 1929, the park was extended into Rwanda and the then Belgian Congo and was named Albert national park managed and run by the Belgian Colonial Authorities. During early 1960s, the park was divided as Rwanda and Congo gained their independence and by the end of that decade, the park was almost half of its original size (340 Km^2 to 160 Km^2. Volcanoes National Park is home to Mountain Gorilla (Gorilla beringei beringei); golden monkeys (Cercopithecus mitis kandti), Spotted Hyena (Crocuta crocuta), buffaloes (Syncerus caffer), elephants, black-fronted duiker (Cephalophus niger), and bushbuck (Tragelaphus scriptus). The park also harbors 178 bird species including at least 29 endemics to Rwenzori mountains and the Virungas. The Volcano National Park -VNP also host 245 species of plants of which 17 are predominant, including 13 orchids internationally protected, 115 species of mammals, 27 species of reptiles and amphibians and 33 species of arthropods. Some of these species are endemic while others are internationally protected.

Nyungwe National Park Located in the South West corner of Rwanda, Nyungwe National Park is an untouched natural rainforest that is filled with exciting biodiversity. Nyungwe National Park was established in 2004 and covers an area of approximately 1000 km² of rainforest, bamboo, grassland, swamps, and bogs. The nearest town is Rusizi, 54 km to the west. Mount Bigugu is located within the park borders. Nyungwe is surely one of the world's most beautiful and pristine mountain rainforests. It's believed to be one of Africa's oldest forests, staying green even through the Ice Age, which explains its diversity. The Nyungwe forest has a wide diversity of animal species, making it a priority for conservation in Africa. The forest is situated in a region in which several large-scale biogeographical zones meet, and the variety of terrestrial biomes provides a great span of microhabitats for many different species of plants and animals. The park contains 13 different primate species (25% of Africa's total) with habituated chimpanzees and 12 other primates species (including a 400-strong troop of habituated Ruwenzori Black & White Colobus), 85 mammal species, 275 species of birds of which 26 are endemic in the Albertin Rift and 3 are on the red list of the IUCN (Bradypterus graueri, Crypto spiza shelleyi and Apdis argentea), 32 amphibian and 38 reptile species and 1068 plant species of which 140 species of orchids, 260 species of ligneous and herbaceous plants, 24 species of trees. Many of these animals are restricted-range species that are only found in the Albertine Rift montane forests ecoregion in Africa. In fact, the number of endemic species found here is greater than in any other forest in the Albertine Rift Mountains that has been surveyed. The forest, which reaches its maximum altitude of 3000 metres above sea level, is of particular interest for the presence of colonies of chimpanzees (Pantroglodytes - Blumenbach, 1775) and Angola colobus (Colobus angolensis - Sclater 1860).

3.4.3. Akagera National Park

The savannah in the North Eastern Rwanda is used as the Akagera National Park; it covers 900km² situated between 1300-1825 m of altitude. This park was created in 1934 to protect animals in three ecoregions: savannah, mountain and swamp. Conserving biodiversity in this ecosystem has been challenging due to increasing pressures, potential loss of habitat and species or lack of up-todate data, etc.

This park has a set of compounds that define its high importancy, the Akagera major components are: Forest fringed lakes, papyrus swamps, savannah plains and rolling highlands. Akagera has exceptional levels of biodiversity, partly due to its position at the confluence of different vegetation

zones. The extensive systems of freshwater lakes and associated papyrus swamps form the largest protected wetland in central Africa. Its biodiversity has a double origin; both native and introduced species make the Akagera fauna and flora diversity. The wildlife in the Akagera National Park comprises 90 species of mammals of which 47 species of big mammals, 530 bird species, 35 fish species, 9 species of amphibians and 23 species of reptiles. Four animal species are protected by the CITES (Convention on International Trade of Endangered Species) namely Loxodonta Africana, Sincerus caffer, Panthera leo and Tragelaphus oryx. The flora of the Akagera National Park is diverse and 6 species of orchids are recorded. The ANP is dominated by the grass savannah and different species of acacia trees; the most found in the forest savannah.

Introduced 'Masai' giraffe, black rhino, elephant, buffalo, zebra and duikers are major herbivorous of the Akagera National Park. Whereas for the large predators only leopard (Panthera pardus) and hyaena (Crocuta crocuta) can still be found in the park. Although lion once occurred throughout Akagera, the population has been wiped out mostly through poisonings by cattle herders seeking to protect their livestock. A reduction in the prey-base due to heavy poaching would also have contributed to their demise. Smaller predators are still well represented with healthy populations of several mongoose species, viverrid species, serval (Leptailurus serval) and side-striped jackal (Canis adustus).

3.4.4. Gishwati-Mukura National Park

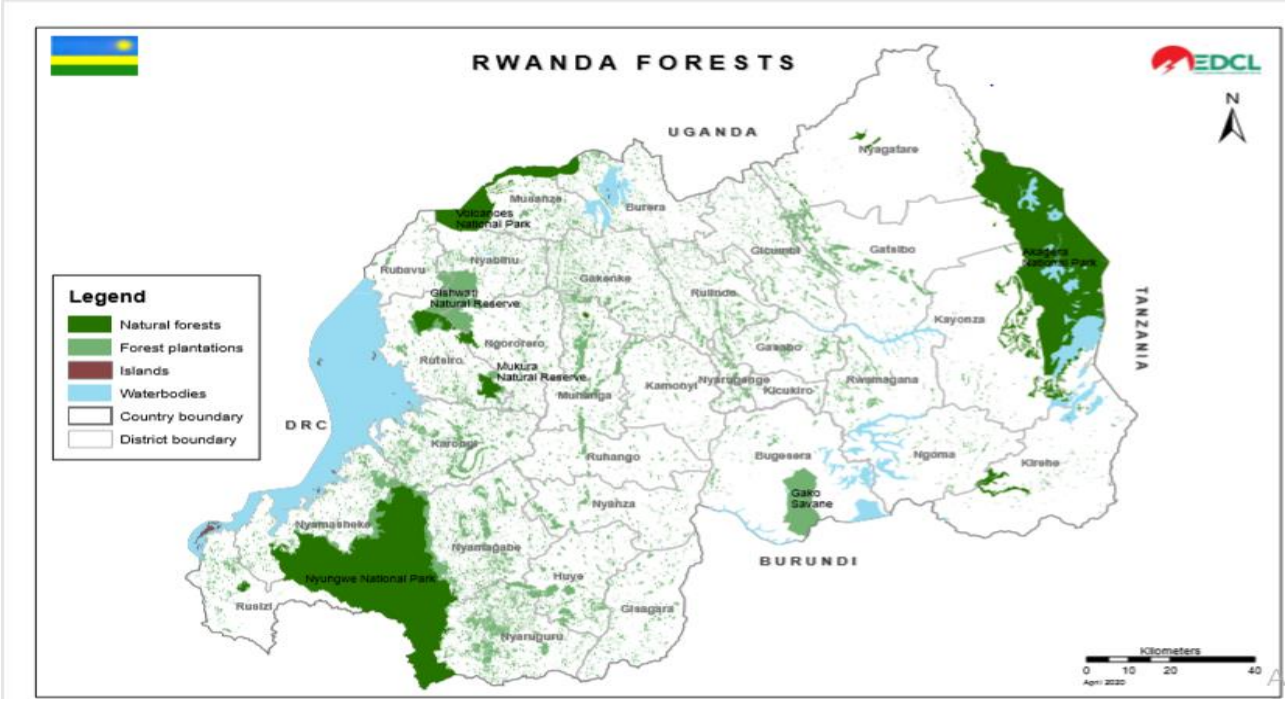
Presently, Gishwati-Mukura forest reserve is known for a wide range of fauna, including four species of primates: the eastern chimpanzee, the golden monkey, the blue monkey, and the l'hoest's monkey (also known as mountain monkey); more than a dozen species of East African chimpanzees; mammals such as red river hog, the black-fronted duiker, the southern tree hyrax, among others. Conservationists have also reported seeing the black and white colobus, another species of primates. The forest reserve also boasts about 60 species of trees, including indigenous hardwoods and bamboo. Gishwati and Mukura natural forests were originally earmarked as forest conservation zones in 1933. According to the draft law of October 15, 2014, the Gishwati-Mukura National Park will cover a total surface area of 3,427.46 hectares with Gishwati forest (1,439.72 hectares) and Mukura forest (1,987.74 hectares). The government has also dedicated an area covering 992.48 hectares to a subsequent buffer zone to deter human encroachment. Over the past decades, the Gishwati-Mukura

area was nearly depleted largely due to resettlement, livestock farming and smallholder farms in the aftermath of the 1994 Genocide against the Tutsi.

Relic forests and gallery forests The Gishwati forest that covered 21.000 ha before 1981, consisted of only 600 ha in 2002. The natural forest of Mukura that stretches on 3.000 ha in 1960 covered only 800 ha in 2002. Regarding tree species and altitude, it is similar to that of Gishwati (2000~3000 m). Relict forests and savannahs in the East are located around the Akagera Park and have a variety of endemic and rare species whose majority is used in traditional medicine. Gallery forests accommodate an important biodiversity with endemic and rare species. That is for instance the case of the Blighia unijugata, Grewia forbese, Rhus vulgaris, Pterygota mildbraedii and Ficus sp.

In general, for a period of about 40 years, the surface area of the natural forests of Rwanda underwent a decrease of about 65% between 1960 and 2002. The search for arable lands, extensive farming, illegal felling of forests for firewood, production of wood for charcoal and poles for building in urban areas, as well as a land mismanagement have drastically contributed to the reduction of the surface area of forests.

Figure 6: Forests in the project area



3.5. Biodiversity of wetlands

The ecosystems of the Rwandan wetlands inhabit a rich biological diversity in terms of vegetation and animal species (more than 104 plant species have been identified), except for Lake Kivu, Bulera and Ruhondo that have some liminologic problems. The Lake Kivu contains a very poor aquatic flora and the density of the phytoplankton is relatively low due to the lack of mixture of layers with a biozone limited at 60 m to 70 m (the nutrients are found at the bottom of the lake). The ichthyologic fauna is also poor with 31 fish species due the volcanic origin of the lake. Most lakes of the Akagera National Park are very rich in biodiversity with phytoplankton, fish species and ornithological fauna. The flora is dominated by the Cyperus, Phragmithes, Phinix, etc. The Water Hyacinth (Eichornia crassipes) is present and has started spreading covering more important surfaces of the lakes, thus posing a threat to their biological diversity. Some lakes like Cyambwe, Rwampanga and Rweru are particularly rich in hippopotamuses and crocodiles. One can also find many other lakes such as Nasho, lakes of Gisaka and Bugesera that contains phytoplankton that is very rich in biodiversity and flora that is mainly dominated by papyrus with Cyperus papyrus mixed with Miscandium violaceum and Nymphea nouchallii. All these lakes are associated with gallery forests onshore or on small islands. Concerning the Northern lakes (Bulera and Ruhondo), the aquatic flora and fauna are poor due to the physico-chemical situation unfavourable to their development and the isolation of the two lakes. The concentration of the plankton is less important in Lake Bulera than in Ruhondo. They have 48 species grouped in 4 families (chlorophyceous, Cyanophyceous, pyraphytes and bacillariophyceous). Lake Muhazi is land locked, isolated, and its ichthyologic fauna is very limited. One can find three endemic species and other nine introduced from outside. The lake is very rich in phytoplankton.

The macroflora of the marshes is mostly composed of wide spaces of papyrus with some zones of Miscanthidium. The low layer is covered with Cyclosorus stratus. The fauna of big rivers and associated marshes comprises ungulates, carnivores, primates, rodents, lagomorphous, insectivorous and birds.

3.5.1 Biodiversity in agricultural systems

Demographic pressure and intensive agricultural practices in combination with diversified agropastoral practices; deforestation, bush fires and urbanization have disrupted the ecosystem

functions. These changes caused secondary formation consisting essentially of graminaceous plants, numerous seasonal or perennial species alternating with crops. Agricultural arable land presently covers around 52% of the total surface area of the country and is permanently cultivated (RNRA 2012). The time between two growing seasons is the only period of respite. These areas have various crops that play an essential role in the national economy. These crops are usually grouped in two categories: subsistence and cash crops. Some of the food crops include; sorghum, beans (Phaseolus vulgaris), eleusine (Eleusine corocana), Colocases (Colocasia antignorum), maize (Zea mays), rice (Oryza sativa), wheat (Triticum sp), barley (Hordeum vulgare), peas (Pisumsativum), soja bean (Soja hispada), peanut (Arachis hypogea), sweet potato (Ipomea durcis), potato, cassava (manihot esculanta) and banana (Musa). The importance of each crop varies according to regions. Some crops, like bananas, potatoes, different varieties of wheat, sorghums and beans are subject to high commercial trade. Potatoes, beans, cassava and bananas are present everywhere for the daily diet of the people. The cash crops are very few. They are limited to coffee, tea and pyrethrum.

3.6. Pastoral zones

In Rwanda, the essential part of animal husbandry is limited to the family and a small number of animals per household. As agriculture occupies the biggest portion of land, the cows graze in paddock, some parts of marginal lands and limited pasturelands mainly Gishwati national reserve and Umutara. This obliges farmers to adopt the semi-permanent farming and grow fodder crops such as Tripsacum laxum, Setaria spp, Desmodeum spp, Pennisetum purpureum, Mucuna pruriensis, Cajanus cajan, Calliandra calothyrsis, Leucaena diverifolia, Sesbania sesban, etc. However, we can notice the development of ranching in Umutara and Gishwati. Other pastoral land is very limited and distributed all over the country. These areas are prone to bush fires, trampling and sometimes overgrazing. The latter is the main cause of reduction of the biological diversity as it exterminates the most precious species along with pyrophyle species with small bromatologic value such as Eragrostis spp, Sporobalus spp and Digitaria spp.

3.7. Woodlands

Tree planting in Rwanda was limited to some plants around households such as Ficus thoningii, Euphorbia tirucalli, Erythrina abyssinica, Vernonia amygdalena, Dracaena afromontana, etc., but the cultivation of woody perennials for timber, energy generation or other services was not part of the

customs. That resulted in a massive exploitation that quickly proved its limits. The first forest plantations were created in 1920 and 1948 and only consisted of Eucalyptus. Later on, other species were introduced. These were namely Pinus spp, Callistris spp, Grevillea robusta, Cedrella spp, Cupressus. The Arboretum of Ruhande (RAB Station) has 206 species among which 146 feuillus, 56 resinous and a species of bamboo. Those species proved to be dangerous for the biological patrimony because they used to drain and acidify places that are already acid, what caused the reduction or even the extermination of the undergrowth. Thus, planting those species would lead to erosion. The covered surface area was estimated at 256,300 hectares in 1998. Despite efforts of diversifying tree species, we estimate that 99% of trees consisted of Eucalyptus spp.

3.8. Socio-economic and environment

3.8.1. Population and demographic characteristics

3.8.1.1. Gender distribution of the population per administrative District

In a bid to promote a sustainable and equitable development as a subsequent impact of any development projects, gender needs to be mainstreamed into the day to day development initiatives. This is important for the design and implementation of projects that are responsive to the practical needs of women, households, and to those of communities in general.

Table 3: Gender thematic distribution in 27 administrative Districts of East, West, North and Southern Provinces of Rwanda

#	Administrative District	Number of females per 100 males	Sex of the Household-heads: Male-Headed	Sex of the Household-heads: Female-Headed	Sex of the Household-heads: De facto Female-Headed
1	Nyanza	108	67	28.1	4.9
2	Gisagara	114	60.1	33.5	6.4
3	Nyaruguru	116	68.3	25.3	6.4
4	Huye	110	59.7	31.6	8.8
5	Nyamagabe	104	69.5	25.3	5.2
6	Ruhango	108	63.9	28.2	8

#	Administrative District	Number of females per 100 males	Sex of the Household-heads: Male-Headed	Sex of the Household-heads: Female-Headed	Sex of the Household-heads: De facto Female-Headed
7	Muhanga	110	65.9	26.9	7.2
8	Kamonyi	105	68.7	24.6	6.6
9	Karongi	104	68.4	23.7	7.9
10	Rutsiro	109	75.5	20.7	3.8
11	Rubavu	108	70.1	23.1	6.8
12	Nyabihu	109	66.5	26.7	6.8
13	Ngororero	120	60.7	27.5	11.9
14	Rusizi	102	72.1	22.7	5.1
15	Nyamasheke	115	67	28.7	4.3
16	Rulindo	105	68.1	27.6	4.3
17	Gakenke	107	67.7	23.9	8.3
18	Musanze	120	70	20.5	9.4
19	Burera	114	61.8	26.3	11.9
20	Gicumbi	111	73.9	22.5	3.6
21	Rwamagana	103	66.4	27.4	6.2
22	Nyagatare	110	71.1	24.1	4.9
23	Gatsibo	106	71.6	25.1	3.3
24	Kayonza	110	62.6	26.2	11.2
25	Kirehe	110	68.5	25.3	6.2
26	Ngoma	116	66.2	27.8	6
27	Bugesera	112	70.6	23.7	5.7

Source: EICV5

The table above shows that in all administrative districts, the female population in all thematic is greater than the male population which shows that female will have to play the big role in this project implementation and therefore contribute to the development and increment of household income which increase also the role of the woman in the society. As one of the gender mainstreaming

strategies, the project has prepared the gender action plan (GAP) which should be implemented to make sure that the woman is not left behind by the project but ensures their full involvement in the project activities as shown that they represent a big number in the population.

3.8.1.2. Education

It has been observed almost everywhere that education can help lift someone out of poverty when well educated. It is also the case that children from poor households tend to get less education than their more-affluent peers. Both effects appear to hold true in Rwanda (EICV5).

While 13% of household heads have a secondary education or higher, the figure is 18% for the non-poor and just 2% for the poor; and while 57% of the non-poor have no school diploma or certificate, the figure is 79% for the heads of poor households. Between 2014 and 2017 the proportion of those with a Hight school certificate, or bachelor's degree or higher, rose from 6% to 8%, while the fraction of those without a certificate fell by just over two percentage points.

Table 4. Education of the population by district, gender and age

Administrative District	Population aged 6 and above who have ever attended school	Percentage of the population aged between 6 and 30 who have attended school	Net Attendance Rate (NAR) at primary school Male	Net Attendance Rate (NAR) at primary school Female	Net Attendance Rates (NARs) in secondary school Male	Net Attendance Rates (NARs) in secondary school Female	Literacy rate of the population aged between 15 and 24	Literacy rate of the population aged 15 above	Computer literacy rate of the population aged between 15 and 24	Computer literacy rate of the population aged 15 and above	Population aged between 16 and 30 who attended tertiary education
Nyanza	86.8	64.2	88.6	88.4	20.5	25.1	91.6	72.1	8.8	5.7	2.1
Gisagara	83.5	51.8	79.5	86.8	7.5	16.3	79.7	64.5	6.7	5.0	1.8
Nyaruguru	82.3	63.5	86.0	86.9	15.4	23.2	82.0	63.5	6.6	5.8	3.1
Huye	86.9	56.7	83.7	84.6	17.0	23.5	85.1	68.0	4.9	5.3	2.4
Nyamagabe	85.3	62.6	90.8	91.3	17.1	19.6	86.1	70.4	4.3	3.9	1.0
Ruhango	89.7	65.8	89.2	94.7	20.8	21.1	81.3	70.5	15.4	7.5	3.5
Muhanga	88.4	58.6	89.8	95.4	19.6	24.8	79.5	72.5	11.1	9.4	4.1
Kamonyi	90.5	61.6	88.1	90.5	20.6	25.0	92.3	76.7	5.6	5.2	2.1
Karongi	86.3	64.9	90.5	92.2	18.8	23.4	90.0	71.5	9.2	6.8	2.6
Rutsiro	81.4	58.7	85.5	86.9	22.0	21.5	88.2	64.0	3.6	2.7	0.7

Administrative District	Population aged 6 and above who have ever attended school	Percentage of the population aged between 6 and 30 who have attended school	Net Attendance Rate (NAR) at primary school Male	Net Attendance Rate (NAR) at primary school Female	Net Attendance Rates (NARs) in secondary school Male	Net Attendance Rates (NARs) in secondary school Female	Literacy rate of the population aged between 15 and 24	Literacy rate of the population aged 15 above	Computer literacy rate of the population aged between 15 and 24	Computer literacy rate of the population aged 15 and above	Population aged between 16 and 30 who attended tertiary education
Rubavu	84.1	57.8	88.0	84.2	26.2	25.5	84.7	70.9	13.2	13.1	4.8
Nyabihu	86.5	59.8	87.2	84.8	21.8	24.1	84.6	67.2	7.5	5.1	1.9
Ngororero	84.0	58.6	88.7	89.4	10.9	12.5	87.3	66.2	3.8	2.8	0.4
Rusizi	88.5	59.9	87.6	89.2	21.6	24.6	81.3	67.4	7.1	4.9	0.7
Nyamasheke	87.4	65.7	89.9	91.3	19.8	28.0	92.0	74.7	10.6	6.4	1.8
Rulindo	87.5	57.2	92.1	86.3	20.9	33.6	89.4	74.4	6.9	6.5	2.8
Gakenke	87.2	60.9	90.4	89.4	19.3	24.8	85.2	70.1	9.5	6.2	1.5
Musanze	88.6	59.6	90.5	93.6	24.2	36.9	87.3	74.2	13.2	11.5	3.6
Burera	84.4	58.2	93.3	94.2	20.8	21.1	89.2	68.5	8.3	6.4	1.1
Gicumbi	85.6	59.6	90.1	91.0	20.6	24.9	90.3	72.5	6.4	5.4	2.3
Rwamagana	88.2	55.8	84.9	91.3	22.7	26.4	91.3	78.1	10.3	8.1	1.5

Administrative District	Population aged 6 and above who have ever attended school	Percentage of the population aged between 6 and 30 who have attended school	Net Attendance Rate (NAR) at primary school Male	Net Attendance Rate (NAR) at primary school Female	Net Attendance Rates (NARs) in secondary school Male	Net Attendance Rates (NARs) in secondary school Female	Literacy rate of the population aged between 15 and 24	Literacy rate of the population aged 15 above	Computer literacy rate of the population aged between 15 and 24	Computer literacy rate of the population aged 15 and above	Population aged between 16 and 30 who attended tertiary education
Nyagatare	84.9	55.5	76.9	79.7	15.9	22.6	84.4	71.4	6.1	4.2	1.5
Gatsibo	84.9	59.6	86.4	86.7	11.0	20.8	84.7	67.0	5.4	4.2	1.8
Kayonza	85.8	58.6	79.2	81.6	14.0	22.9	82.4	70.4	7.0	5.4	0.4
Kirehe	87.5	60.9	82.9	87.9	17.3	18.9	82.3	70.2	3.9	2.7	0.9
Ngoma	85.9	60.4	87.1	88.5	21.2	24.1	85.5	71.5	11.7	7.7	4.1
Bugesera	84.8	57.0	85.9	82.0	16.2	16.9	85.7	72.4	8.0	6.7	2.1

Source: EICV5

As the table above shows, the literacy rates decrease as the ages increases, which shows the efforts of the Government of Rwanda among the population and all children benefiting the free education and fighting children drop out. However the computer literacy is still low and even very low in very rural areas like Rutsiro and Kirehe administrative districts whereas in urban like districts like Rubavu, Musanze and Muhanga administrative districts the rate is a bit high exception done by Ruhango with higher rate though rural administrative district and Huye with low rate though it is the urban administrative district. This exception may be coming from chances in the samples.

3.8.2. Poverty distribution per administrative District

According to EICV5 report, the main poverty line is set at RWF 159,375 per adult equivalent per year in the prices of January 2014. This is the same poverty line that was used to measure poverty in 2014 using the EICV4 data, and a detailed discussion of how the line was chosen may be found in the EICV4 poverty profile report. Extreme poverty is measured using a poverty line of RWF 105,064 per adult equivalent per year, again in the prices of January 2014. This is the cost of buying enough food to provide an adequate number of calories, with a diet that reflects the observed behavior of poor households, but it does not make any allowance for non-food spending. The key finding from the EICV5 survey is that the headcount poverty rate – which measures the percentage of people who are poor – was 38.2% in 2017. This is slightly lower than the poverty rate of 39.1% observed in 2014, however, the difference between the poverty rates of 2014 and 2017 is statistically insignificant.

The table below shows the poverty and extreme poverty distribution in the project area

Table 5: Poverty and extreme poverty distribution in 27 Administrative Districts of East, West, North and Southern Provinces of Rwanda

#	Administrative District	EICV5 Poverty	EICV5 Extreme Poverty
1	Nyanza	46.5	16.0
2	Gisagara	55.6	25.6
3	Nyaruguru	52.4	28.1
4	Huye	40.2	12.9
5	Nyamagabe	48.6	17.7
6	Ruhango	38.0	15.0

#	Administrative District	EICV5 Poverty	EICV5 Extreme Poverty
7	Muhanga	32.6	13.8
8	Kamonyi	22.3	8.7
9	Karongi	52.7	21.3
10	Rutsiro	49.5	24.4
11	Rubavu	35.7	14.6
12	Nyabihu	46.8	18.0
13	Ngororero	47.7	20.8
14	Rusizi	33.5	12.8
15	Nyamasheke	69.3	41.5
16	Rulindo	54.2	23.2
17	Gakenke	34.2	13.1
18	Musanze	40.7	18.1
19	Burera	49.8	19.9
20	Gicumbi	34.7	13.4
21	Rwamagana	18.9	4.8
22	Nyagatare	44.8	20.1
23	Gatsibo	42.1	18.8
24	Kayonza	26.7	8.5
25	Kirehe	44.6	18.5
26	Ngoma	37.8	14.0
27	Bugesera	40.3	17.8

Source: EICV5

The low poverty rates in the city of Rwamagana district are evident, as are the relatively high poverty rates in Nyamasheke administrative district of Western Province and Nyaruguru as well as in Gisagara administrative districts of Southern Province respectively.

According to EICV 5 Poverty rates and the distribution of the poor are very important for targeting purposes. A government intervention that helps the rural population would help 93% of the poor; on the other hand, 57% of the benefits would go to the non-poor, since the rural poverty rate is 43%. The

national poverty rate of 38.2%, just 2.8 percentage points are attributable to urban poverty, while the remaining 35.4 percentage points are due to rural poverty, which strengthen the need of Rural Electrification as a way to alleviate poverty among the population.

3.8.3. Energy sources of Households

Energy is the essential in the community lives and is taken as a measure of environmentally friendly the community is becoming through the use of energy sources with less CO_2 emissions and environmental degradation. The table below summarizes the source of fuel in project area and give a clear picture of which effort is needed for climate resiliency and poverty alleviation in the Rwandan community.

Table 6: Energy sources distribution in 27 administrative Districts of East, West, North and Southern Provinces of Rwanda

Administrative District	Primary fuel used for lighting: Electricity distributor	Primary fuel used for lighting: Oil Lamp	Primary fuel used for lighting: Firewood	Primary fuel used for lighting: Candle	Primary fuel used for lighting: Lantern	Primary fuel used for lighting: Solar panel	Primary fuel used for lighting: Batteries	Others	Primary fuel for cooking: Firewood	Primary fuel for cooking: Charcoal	Primary fuel for cooking: Crop waste	Others
Nyanza	14	0	2	2	5	63	14	0	94	6	0	1
Gisagara	10	0	12	3	2	65	7	1	96	3	0	1
Nyaruguru	9	0	13	5	1	63	7	1	96	4	0	1
Huye	14	2	6	7	5	54	12	1	88	11	0	0
Nyamagabe	9	1	10	5	0	66	10	0	96	3	0	0
Ruhango	20	2	2	3	5	65	3	0	95	3	1	1
Muhanga	20	2	3	4	4	61	7	0	89	10	0	0
Kamonyi	18	4	1	8	5	58	6	1	89	10	1	0
Karongi	14	1	5	2	1	56	21	0	92	7	0	0
Rutsiro	11	2	8	5	0	59	14	1	97	3	0	0
Rubavu	41	2	7	14	3	32	0	1	59	40	0	1

Administrative District	Primary fuel used for lighting: Electricity distributor	Primary fuel used for lighting: Oil Lamp	Primary fuel used for lighting: Firewood	Primary fuel used for lighting: Candle	Primary fuel used for lighting: Lantern	Primary fuel used for lighting: Solar panel	Primary fuel used for lighting: Batteries	Others	Primary fuel for cooking: Firewood	Primary fuel for cooking: Charcoal	Primary fuel for cooking: Crop waste	Others
Nyabihu	17	1	7	9	3	60	2	2	88	12	0	0
Ngororero	7	1	13	2	2	67	8	1	97	3	0	0
Rusizi	32	3	4	5	1	43	11	1	86	12	0	1
Nyamasheke	22	4	6	5	2	46	15	1	98	2	0	0
Rulindo	15	1	2	7	0	61	10	4	94	6	0	1
Gakenke	12	1	3	1	2	75	5	1	97	2	0	1
Musanze	32	1	8	13	1	43	2	0	81	19	0	0
Burera	18	1	4	3	3	66	6	0	92	6	2	0
Gicumbi	12	1	2	10	1	71	2	1	96	3	0	0
Rwamagana	28	3	0	8	4	46	9	1	77	18	4	1
Nyagatare	15	0	0	5	1	67	11	0	90	6	2	2
Gatsibo	14	1	1	4	1	62	17	0	92	5	3	0

Administrative District	Primary fuel used for lighting: Electricity distributor	Primary fuel used for lighting: Oil Lamp	Primary fuel used for lighting: Firewood	Primary fuel used for lighting: Candle	Primary fuel used for lighting: Lantern	Primary fuel used for lighting: Solar panel	Primary fuel used for lighting: Batteries	Others	Primary fuel for cooking: Firewood	Primary fuel for cooking: Charcoal	Primary fuel for cooking: Crop waste	Others
Kayonza	19	4	1	5	12	48	11	1	92	8	0	0
Kirehe	16	1	1	1	17	57	6	0	95	4	0	1
Ngoma	18	3	2	2	27	39	8	2	86	8	5	1
Bugesera	19	0	1	5	0	70	4	0	91	8	0	1

Source: EICV5

According to the table above, it is clear that the project area community still relies on the forest felling to cook and this is an indicator of what happens inside their homes. The much depending on firewood increases the risk of indoor air pollution which is source of many respiratory diseases in the community without forgetting the CO_2 emissions from this burning. The charcoal is also used by many populations in urban like districts mostly secondary cities like Rubavu, Musanze, Huye, Muhanga and Kamonyi with a high rate use of charcoal with Rwamagana also among the big users of charcoal. All these energy sources/fuels are the main cause of deforestation and emit a great deal of CO_2 emissions, hence the need to promote the fuel which is environmentally friendly and make it affordable to the community members. Against this need the clean cooking solutions and LPG constitutes a response to this environmental issue.

3.8.4. Human settlements

The Rwandan settlement pattern has been scattered since time immemorial. It has for long been characterized by the traditional use of land associated with the ancestral lifestyle, but which does not correspond any more to the present environmental and economic constraints. It is in that perspective that the present policy of the Government of Rwanda regarding settlement consists of encouraging a clustered habitat commonly known as «IMIDUGUDU».

In most urban areas, Rwanda has not yet developed city master plans. There are only plans of different towns of which some have expired and need updating. Urban centers developed spontaneously without taking environmental aspects into consideration. Sanitary facilities are insufficient and sometimes inadequate in city centers. In suburban zones known as spontaneous quarters, solid wastes are piled in disorder, drinking water is rare, and rainwater draining gutters are insufficient. Thus, diseases are frequent in those areas, the degradation of environment is more pronounced and living conditions are poor.

City development should normally be based on urban planning documents like the “Urban management master plan (SDAU)”. Presently, only two centers have got that kind of document and the SDAU of Kigali and Rwamagana are under development. The policy of city development which is under finalization is aimed at supporting districts in their efforts to quickly get urban planning documents integrating environmental aspects.

3.8.5. Cultural Heritage

As per ESS8, the objective of the Cultural Heritage is to protect it from the adverse impacts of project activities and support its preservation, to address cultural heritage as an integral aspect of sustainable development, to promote meaningful consultation with stakeholders regarding cultural heritage and finally promote the equitable sharing of benefits from the use of cultural heritage. The cultural heritage encompasses tangible and intangible heritage, which may be recognized and valued at a local, regional, national or global level, as follows: Tangible cultural heritage, which includes movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Tangible cultural heritage may be located in urban or rural settings, and may be above or below land or under the water; Intangible cultural heritage, which includes practices, representations, expressions, knowledge, skills as well as the instruments, objects, artifacts and cultural spaces associated therewith that communities and groups recognize as part of their cultural heritage, as transmitted from generation to generation and constantly recreated by them in response to their environment, their interaction with nature and their history.

Rwanda's cultural heritage, seen from a general perspective, is rich and diversified. But it has, for long, been regarded as being a sector of minor importance, and, because of such consideration, failed to play its basic role of developing the nation.

However, there is no doubt cultural heritage is one of the main pillars for sustainable development. Rwanda's cultural heritage is rich and diversified; it contains Sacred hills, forests and trees with legendary history, traditional huts and royal palace countrywide, churches and other colonial buildings and structures, caves and rocks with bas-reliefs marking the legendary or historical events that have occurred on the site, thermal springs and wells used for ritual purposes, genocide against Tutsi memorial sites and designated burial sites which are located in different administrative districts where the project activities will be implemented.

The environmental and social assessment also takes into consideration the significance of intangible cultural heritage that may be materially affected or put at risk as a result of the project. For example, project activities may require cutting of trees or the movement of boulders that are used for cultural or religious practices and are considered sacred. If potential risks and impacts are identified, measures

and actions to avoid, mitigate, and/or manage them are put into place. For example, it may be possible to arrange for protection in place, or for scheduled visitations, or community-sanctioned movement of such sacred items. Protection and preservation of national cultural heritage consolidate national unity, social cohesion, cultural freedom and recognition of community identity.

Therefore, Government of Rwanda and its partners have the obligation to preserve and perpetuate this cultural heritage for present and future generations because, on the one hand, it brings in a lot of money as do agriculture, industry, gold or oil and, on the other, it maintains harmony and social balance between peoples. A chance finds procedure is a project-specific procedure which will be followed if previously unknown cultural heritage is encountered during project activities. It will be included in all contracts relating to construction of the project, including excavations, demolition, movement of earth, flooding or other changes in the physical environment. The chance finds procedure will set out how chance finds associated with the project will be managed. The procedure will include a requirement to notify relevant authorities of found objects or sites by cultural heritage experts; to fence-off the area of finds or sites to avoid further disturbance; to conduct an assessment of found objects or sites by cultural heritage experts; to identify and implement actions consistent with the requirements of this ESS and national law; and to train project personnel and project workers on chance find procedures, this have been detailed in Environmental and Social Commitment Plan (ESCP) developed under this EAQIP, a sample of the chance find procedure is attached to this ESMF.

3.8.6. Agriculture

The agriculture production system in all 27 district and is based on small family exploitations whose production is consumed by the owners at more than 80 %. The systems of crops are complex, based on the diversification of productions and the association of crops. Seven main crops, namely banana, bean, sweet potato, cassava, sorghum and potatoes, of which the first five are present in 90 % of production units and constitute the common basis for all the regions of Rwanda.

Great investments in modern agriculture and research-based agriculture using fertilizers and improved seeds on consolidated lands, pumping irrigation on hillsides, etc., have allowed great productions of maize, soya beans, voluble beans, wheat, Irish potatoes and rice. This achievement results in Ministry of Agriculture (MINAGRI)’s decision of putting in place specialized centers for policy implementation and research under Rwanda Agriculture and Animal Resources Development

Board (RAB). The recent survey has proved that the agriculture is the most important sector of the Rwandan economy and contributes considerably to poverty reduction. For instance, from 2011 to 2013 the total production of vegetables increased by 9% and their exports while fruits production increased by 18%. Their exports counted an increase from 15.4 (‘000 Tons) in 2012 which generated 5,013,260 USD to 31.9 (‘000 Tons) which generated 9,494,442 USD (Rwanda Statistical Yearbook, 2014).

However, the extensive agriculture practiced by the majority of Rwandan population contributes to the degradation of environment. Moreover, the agricultural intensification at the level of projects was often realized without taking into account environmental drawbacks accrued from inputs like (mineral fertilizers, pesticides, herbicides and used techniques).

3.8.7. Animal husbandry

The pastures consisted mainly of family fallows and marginal lands considered as inappropriate to agriculture such as the undergrowth. The limited subsisting pastoral areas were badly used because farmers did not master the management of pastures. That was showed by the overgrazing and overexploitation caused by trampling, degradation and disappearance of vegetation cover. The MINAGRI policy of keeping cattle in shed known as “zero grazing” program has significantly limited environmental degradation and crops damage, which was also a source conflicts between neighbors but this program also helps the people to have sufficient fertilizer household-based and many of the farmers are mobilized to make and use organic compost from their cows and other natural vegetation.

Moreover, the demographic pressure has progressively led to the semi intensification or intensification of fodder resources used to feed animals. Hence, animal husbandry, essentially made of cattle, was progressively transformed. This resulted in considerable increase of milk production from 257,450 in 2008 to 628,266 tons in 2013 and beef meat production increased from 24,889 to 29,807 tons in 2013 (Rwanda Statistical Yearbook, 2014).

Animal husbandry has also contributed to poverty reduction through a RAB-MINAGRI program called “One Cow per Every Poor household in Rwanda”. This program has decreased the number of malnourished children countrywide and has considerably contributed to poor household food security and assisted the poor household to increase the agriculture production due to the availability of the organic manure.

Table 7: Economic activities of the population in 27 Administrative Districts of East, West, North and Southern Provinces of Rwanda

District	Total number of jobs carried out and job status: Wage farm	Total number of jobs carried out and job status: Wage non-farm	Total number of jobs carried out and job status: Independent farmers	Total number of jobs carried out and job status: Independent Non-farm	Total number of jobs carried out and job status: Unpaid non-farm and other	Distribution of workers and broad economic activity: Agriculture	Distribution of workers and broad economic activity: Industry	Distribution of workers and broad economic activity: Services
Nyanza	63	56	146	28	3	213	32	51
Gisagara	86	47	157	27	4	244	23	54
Nyaruguru	60	44	131	30	4	192	26	51
Huye	73	65	141	32	1	216	29	66
Nyamagabe	88	68	167	48	8	259	40	79
Ruhango	57	43	130	23	1	190	28	36
Muhanga	53	65	146	29	4	204	30	62
Kamonyi	72	69	168	26	4	243	42	54
Karongi	75	62	149	34	4	228	39	59
Rutsiro	72	37	154	25	2	229	23	37
Rubavu	73	78	108	64	8	185	36	110

District	Total number of jobs carried out and job status: Wage farm	Total number of jobs carried out and job status: Wage non-farm	Total number of jobs carried out and job status: Independent farmers	Total number of jobs carried out and job status: Independent Non-farm	Total number of jobs carried out and job status: Unpaid non-farm and other	Distribution of workers and broad economic activity: Agriculture	Distribution of workers and broad economic activity: Industry	Distribution of workers and broad economic activity: Services
Nyabihu	81	39	121	26	3	205	23	41
Ngororero	77	68	176	40	8	260	45	65
Rusizi	92	95	199	55	11	297	56	100
Nyamasheke	66	69	168	29	3	243	38	52
Rulindo	68	60	153	27	3	221	41	49
Gakenke	92	66	183	38	2	280	49	51
Musanze	75	71	140	38	4	218	37	73
Burera	80	48	153	43	4	236	26	66
Gicumbi	74	41	185	25	3	264	19	46
Rwamagana	66	85	163	43	9	235	45	85
Nyagatare	159	86	258	59	12	423	41	110
Gatsibo	110	63	207	44	5	320	38	72
Kayonza	77	52	156	37	4	235	23	68

District	Total number of jobs carried out and job status: Wage farm	Total number of jobs carried out and job status: Wage non-farm	Total number of jobs carried out and job status: Independent farmers	Total number of jobs carried out and job status: Independent Non-farm	Total number of jobs carried out and job status: Unpaid non-farm and other	Distribution of workers and broad economic activity: Agriculture	Distribution of workers and broad economic activity: Industry	Distribution of workers and broad economic activity: Services
Kirehe	99	42	169	33	4	269	32	46
Ngoma	72	37	151	27	4	228	18	47
Bugesera	88	68	169	41	4	260	48	62

Source: EICV5

From the above table we clearly see that the main activity in the project area is predominantly agriculture which means that most of the rural population in Rwanda depend on farming and the findings from the table above show that the industry sector is still under exploited. People need to shift from agriculture to industry and get more income from non-farm services. Th electricity access is anticipated to boost the development where many households are ready to use it to develop the other off farming activities including using mills, hair cutting saloon, welding, carpentry with machine among many other services. NST1 recognizes access to electricity as one of the main factors which will help in its achievement.

IV. REVIEW OF NATIONAL, INSTITUTIONAL POLICIES AND REGULATORY FRAMEWORK

4.1. Legal Framework

Rwanda is just revising and enacting new institutional, policy and legislative framework in all its sectors and sub sectors after operating with colonial framework until after 1994. Most of the government ministries have already developed the 36 respective sector policies and strategic plans most of which are based on poverty reduction strategy and national strategy for transformation one.

4.1.1. The constitution of the Republic of Rwanda of 2003 revised in 2015

Article 21 all Rwandans have the right to good health. Article 22 specifies that everyone has the right to live in a clean and healthy environment, while Article 53 specifies that everyone has the duty to protect, safeguard and promote the environment. The constitution gives ways to many laws, policies and strategies for protecting, safeguarding and promoting the environment and social wellbeing.

Article 34 determines the rights to private properties and stipulates that every person has right to hold a private property whether individually or collectively owned. The private property, individual or collective is inviolable. The right to private property shall not be encroached upon except in public interest and in accordance with the provisions of law.

Article 35 specifies the right to private ownership of land and other rights that are related to land are granted by the State. A law determines the modalities of concession transfer and use of land. All

PAPs will be compensated for the asset to be damaged and will still have the right to cultivate the land after the construction works with some restrictions.

4.1.2. Environmental Law No 48/2018 of 13/08/2018

The most relevant legislation for this study is the Environmental law. This is the law that regulates the protection of environment in Rwanda. The law sets out the general legal framework for environment protection and management in Rwanda. It also constitutes environment as a one of the priority concerns of the Government of Rwanda. The fundamental principle on national environmental protection policy develops national strategies, plans and programs, aiming at ensuring the conservation and use of sustainable environmental resources.

The law gives right to every natural or legal person in Rwanda to live in a healthy and balanced environment. They also have the obligation to contribute individually or collectively to safeguard country's natural, historical and socio-cultural heritage. The framework of the law on the protection and management of natural resources centres on avoiding and reducing the disastrous consequences on environment. It measures result from an environmental evaluation of policies, programs and projects, aimed at preventing the consequences of such activities. The principle of sustainability of environment and equity among generation emphasizes human beings at the core of sustainable development. Therefore, they have a right to a healthy and productive life in harmony with nature. They must so as to equitably meet the needs of the present and future generation. The protection and management of environment is currently registered in the environmental law that has been published in the official Rwanda Gazette in September 2018. MoE which is the ministry responsible for the environment under the article 65 puts in place Rwanda Environment Management Authority (REMA) which is the institution now charged with the responsibility of ensuring environmental protection by demanding for ESIA studies to be undertaken before projects are executed. The present organic law has the following objectives.

- To protect human and natural environment.
- To establish fundamental principles of management and protection of environment against all forms of degradation so as to develop natural resources and to fight all kinds of pollutions and nuisances;

- To improve the living conditions of the population while preserving ecosystems and available resources;
- To ensure sustainable environment and resources as well as rational and sustainable use of resources, taking into account the equality between the present and future generations;
- To guarantee to all Rwandans an economically viable, ecologically rational and socially acceptable development;
- To establish the precaution principle in order to reduce the negative effects on Environment and ensure the rehabilitation of degraded areas.

In chapter 5 of Environmental law, Article 30 clearly calls for the need to subject projects to mandatory Environmental Impact Assessment. Article 3: States that every person has the duty to protect safeguard and promote environment. The State shall protect, conserve and manage the environment.

Article 33 states that the review and approval of environmental impact assessments, environmental audit, and strategic environmental assessment must be approved by the Authority or another state organ authorised in writing to do so by the Authority. If the approval is done by an authorised, such organ does so on behalf of the Authority which also responsible for its audit. With regards to the costs of conducting Environmental Assessments, Article 34 stipulates that consultancy cost for environmental audit and environmental Assessment are borne by the program initiator. This program will trigger this law because it will involve negative impacts to the environment through tree felling and bush clearance for right of way, air pollution, noise pollution and soil degradation among others. However, all of these will be mitigated to minimize to the extent possible their effect on the environment.

4.1.3. Environmental Impact Assessment regulations

REMA has now developed the ESIA regulations which provide a guideline and requirements for ESIA in Rwanda. Projects with identified adverse impacts on environment call for a full ESIA process for mitigation measures and thus the Ministerial Order No 001/ 2019 of 15/04/2019 establishing the list of projects that must undergo environmental impact assessment, instructions, requirements and procedures to conduct environmental impact assessment. The order specifies the works, activities and projects that have to undertake an environmental impact assessment. The list of works, activities and

projects that must undergo a full environmental impact assessment before being granted authorisation for their implementation is found in Annex I of the Order. The No 12 of this Annex 1 put the construction of hydro-dams, hydropower plants and electrical lines of high and medium voltage in the projects that must undergo full environmental Impact Assessment.

The list of works, activities and projects that must undergo a partial environmental impact assessment before being granted authorisation for their implementation is found in Annex II of the Order. The construction of micro hydroelectric power plants is in the project works, activities and projects that have to undertake a partial environmental impact assessment. The detailed list of these is found on the annex 2 of this order.

Projects, works and activities which are not listed on the Annex I and II to the Order are not subject to the environmental impact assessment. However, when it is evident that work, activity or project not listed on the Annex I and II to this Order has a negative and irreversible impact on the environment and is similar in nature to the work, activity or project listed in Annex I and II of this Order, the Authority or authorized organ may request the developer to conduct an environmental impact assessment.

The project activities will involve construction of new MV lines, rehabilitation of existing NTARUKA Hydro Power Plant, Solar Home Systems provision and provision of materials for clean cooking solutions. The construction of MV lines will be subject to full Environmental Impacts Assessment while the components of clean cooking solutions and the part of solar home system, the focus will be much on waste management from end users after they are used and become waste.

4.1.4. Law No 43/ 2013 of 16/06/2013 governing the land in Rwanda

This law determines the terms of use and management of land in Rwanda. It also fixes the principles to be applied to the recognized rights on the whole lands located along the national territory together with anything connected to it and which is incorporated to it, either naturally or artificially. The Article 3, precise that the land is involved (included) within the common inheritance of all the Rwandan people; the ancestors, the presents and future generations. Notwithstanding the rights recognized to people, only the government (state) holds the distinguished related to the land's management along the national territory that it uses in the general interest of all in order to assure the rational economic and social development in a way defined by the law. Related to this issue, only the

government has power to grant the rights of occupation and use of the land, it also has the right to order the expropriation due to a public cause of public necessity, housing conditions and development (fixing up) of the national territory in the way defined by law against a fair and previous compensation. The Article 4 mentions that any kind of discrimination, in particular the one focused on gender and to the use of land's rights shall be prohibited. The man and woman have the same rights related to the land's property.

4.1.5. Law no 32/2015 of 11/06/2015 relating to expropriation in the public interests

The Expropriation Law provides for public dissemination on the importance of the project to be established and the need for expropriation. Article 11 of the Expropriation Law stipulates that the relevant organ, after receiving the request for expropriation, shall examine the basis of that project proposal. In case it approves the basis of the project proposal, the relevant Land Committee shall request, in writing, the District Council concerned to convene a consultative meeting of the population where the land is located, at least within a period of thirty (30) days after receipt of the application for expropriation, and indicating the date, time and the venue where the meeting is to be held. The relevant competent authority shall take a decision within a period of at least fifteen (15) days after the consultative meeting with the population.

Article 9 stipulates that it is only the Government that shall order expropriation in the public interest and must be done with prior and fair compensation. The law also bars anybody from interfering of stopping expropriation "on pretext of self-centred interests". Accordingly, Article 3 provides for any underground or surface activity carried out with in public interest on any land but with due and fair compensation to the landowner. Article 4 requires that any project, at any level, which intends to carry out acts of expropriation in the public interest, must budget and provide funding for valuation of the property of the person to be expropriated and for fair compensation.

It is important that the expropriation of properties and lands be based on the WB Environmental and Social Standard 5 (Land Acquisition, Restrictions on Land Use and Involuntary Resettlement), and, National expropriation procedures. In case of mismatch between the national law and the World Bank's Environmental and Social Safeguards Standards, the World Bank's Environmental and Social Safeguards Standards will prevail. All assets that will be damaged will be compensated in compliance with this law.

4.1.6. Ministerial order Nº2 of 17/05/2012 determining conditions for occupational and health safety

This order aims to improve health, safety, and general wellbeing of workers and workplaces by promoting occupational health and safe practices in order to eliminate occupational accidents and diseases, hence achieve better productivity in the workplaces. In addition, it provides for the protection of persons other than those at work against hazards to health and safety arising out of or in connection with activities of persons at work. Environmental and health risks, article 29 which related to the control of air pollution, noise and vibration stipulates that when there is any dust, fume or other impurity which are harmful to persons employed, protected measure shall be taken to protect employee against inhalation of dusts or fume or its accumulation on the work place. For noise and vibration, the article indicates that all practicable protective measures shall be taken by the employer to protect the safety of workers and against the noise by reducing elimination or control of such sound or protecting them against the vibration. All project workers will be safeguarded and occupational health and safety of the employees will be kept at high standard; all workers will be trained regarding the concept of hazard avoidance, accident investigation/risk assessment and prevention, worker man compensation law, PPE usage and first Aid, the detail are available in Labor Management Procedure prepared under this Project.

4.1.7. Law n° 66/2018 of 30/08/2018 regulating labor in Rwanda

(i) Individual labor disputes: Article 102 of law n° 66/2018 of 30/08/2018 regulating labor in Rwanda

Workers will elect representatives who will form a committee that will act as the Workers Grievance Redress Committee. As mandated by article 102 of the law regulating labor in Rwanda, the employees' representatives amicably settle individual labor disputes between employers and employees. If employees' representatives fail to settle the disputes amicably, the concerned party refers the matter to the labor inspector of the area where the enterprise is located. In the case of this program, it will be the District where activities are being carried out. If the Labor Inspector of the District fails to settle the dispute due to the nature of the case or conflict of interests, he/she refers the dispute to the Labor Inspector at the national level stating grounds to refer such a dispute. If amicable settlement fails at the national level, the case is referred to the competent court.

In any case, the PIU will be informed from the beginning of any workers grievances and provide insight and mediation if possible. The matter will be referred to the labor inspector only if the PIU fails to do the mediation.

(ii) Collective labor disputes: LAW N° 66/2018 OF 30/08/2018 regulating labor in Rwanda

The law requires that collective labour disputes be directly notified to the labor inspector of the area by the workers representatives. Within this framework, any collective labor disputes that will arise under the program, will be addressed to labor inspector at District level for assessment and settlement. In case of escalation, the matter will be referred to the national level.

Before escalating the collective labor dispute, the PIU though the Environmental and Social Specialists will be alerted. Necessary investigations will be conducted, and the contractor will be duly approached. The matter will be referred to the labor inspector only if the PIU and workers representatives fail at amicable settlement.

4.1.8. Regulations No 002 of 26/04/2018 governing e-waste management in Rwanda

The project is expected to have an environmental impact related to waste management in all its three components (1,2,3). The management of waste will follow the regulations in Rwanda to make sure the produced waste does not cause harm to the environment and human health. Referring to the regulations on E-waste in Rwanda in its Article 10: Any person who wishes to recycle e-waste shall: Have an Environmental Impact Assessment (EIA) undertaken before establishing e-waste facility; An environmental Audit (AU) for existing facilities; Have the state of the art facility complying with all the environmental standards in terms of emissions, effluents, noise e-waste treatment and disposal. Article 20: any collector and transporter of e-waste shall ensure that e-waste collected is stored in proper and secured manner till is sent to the licensed dismantler or recycler; Ensure that no damage is caused to the environment and human health, during storage and transportation of e-waste Article 22: Any recycler shall; Ensure that the facility and recycling processes are in accordance with the standards published by the national standard body; Ensure that the recycling processes do not have any adverse effect on human health and environment; Ensure that the residues generated thereof are disposed off in a hazardous waste treatment storage facility for disposal. Article 24: any producer shall be responsible to: provide information to the regulatory authority on the subsequent year's

projected imports of any electrical and electronic equipment products; Provide information to recyclers on how to dismantle their product at the end of life and the location of any hazardous substances or items within the product. Article 25: The consumer of electrical and electronic equipment shall: Ensure that e-waste is segregated from other forms of waste and is taken to licensed refurbishes, collection centres, dismantler or recyclers; Ensure that e-waste is not resold or auctioned or exchanged; maintain records of e-waste generated and make such records available for scrutiny by the Regulatory Authority. As this project is expected to produce e-waste especially in its component 3 concerning the off-grid part, stakeholders should bear in mind their harmfulness and the way to eliminate them from environment. The existing Enviro Serve functioning in Bugesera industrial park will be the platform of all electronic waste from used panel and batteries whereas districts, Solar home companies and other relevant stakeholders should make sure that this waste is removed and transported safely from households to this official recycling facility.

4.1.9. Guidelines on the management of waste disposal site/dumpsites (landfill)

Waste disposed of on the Site must be compacted and covered on a monthly basis with a minimum of 150 millimetres of soil. Burning of waste on the Site will only be allowed under the permission of the Regulatory Agency confirming that it does not have a detrimental impact on the environment and operation of the Site. Disposal of dead animals, rejected carcasses, parts of dead animals, contaminated food, food rests or any edible material must be immediately carried out when brought onto the Site by burying it in trench and covered with at least 500 millimetres soil. The registered person must take steps to ensure that the Site is operated in a manner that will prevent the creation of nuisance conditions or health hazards. The registered person must apply sufficient dust control measures to prevent windblown dust from causing nuisance conditions or health hazards. Wind-blown litter leaving the Site must be collected on a daily basis. The waste which will be produced by the project activities except electronic waste produced by solar panels and batteries and other hazardous waste which should be managed in a special way, all remaining concerning municipal solid waste will be taken to the district dumpsites. The districts dumpsites were installed and complied to these guidelines. The electronic waste will be managed by respecting the regulations on e-waste as discussed above.

4.2. Policy Framework

4.2.1. The Rwanda National Strategy for Transformation (NST1)

The National Strategy for Transformation (NST1) which is also the Seven Year Government Programme (7YGP) comes at a unique moment in the country's development trajectory which will see the crossover from Vision2020 towards Vision 2050. This strategy is expected to lay the foundation for decades of sustained growth and transformation that will accelerate the move towards achieving high standards of living for all Rwandans.

The NST1 aims to lay the foundation for achieving upper-middle-income country status by 2035 and high-income status by 2050. It is guided by the Sustainable Development Goals (SDGs), the Africa Union Agenda 2063 and its First 10-Year Implementation Plan 2014–2023, and the East African Community (EAC) Vision 2050. The strategy lays out targets under the three pillars of economic transformation, social transformation, and transformational governance, and several cross-cutting areas. Under the social transformation pillar, NST1 aims to achieve universal electricity access by the end of the seven-year period (2024).

The Rwanda national strategy for transformation (NST1) considers environment and climate change as key strategic areas. With regard to environmental management, the focus is on improving cross sectoral coordination to ensure smooth implementation of environmental policies and regulations. In this regard, critical sectors identified for strengthening include agriculture, urbanization, infrastructure and land use management. Additional emphasis will be put on strengthening monitoring and evaluation. High impact areas selected include implementation of: Environmental and social Impact Assessments, biodiversity and ecosystem management, pollution and waste management.

4.2.2. National wetland conservation program

Though not a policy as such, the wetland convention implementation office in Rwanda has formulated a National Wetland Conservation Program for 2002-2030 jointly working with the National Commission for Development and Reform, the Ministries of Finance, Education Scientific Research and Technology, Environment, Lands, Water and Natural Resources and Agriculture. The program aims at engaging the various government ministries in wetland conservation and ensure a holistic approach to wetland management. All authorities concerned will have proper coordination of activities concerning wetland management, a factor which leads to efficiency implementation of policies. To avoid further exploitation of the resources, Rwandan Government has established rules

governing wetlands in the country. This is done by subjecting any acts concerned with water and its resources like watering plants, the use of swamps to prior environmental impact assessment which is submitted for approved to REMA or any person given a written authorization by REMA. During the project site selection, the proponent will make sure that no project should be located in the wetland.

4.2.3. RURA Guidelines for Right of Way in Rwanda

The construction of medium voltage lines requires a Right of Way (RoW) for both construction and operational phases. During the construction, the right of way is cleared for visibility and construction activities while during operational Phase the RoW is used under restriction conditions. Due to the impacts associated with the acquisition of rights-of-way, the projects will follow procedures in conformance with the Rwanda Utilities Regulatory Agency (RURA) guidelines No 01/GL/EL-EWS/RURA/2015 on the right-of way for Power Lines in Rwanda. In accordance to the guidelines No 01/GL/EL-EWS/RURA/2015 on the right-of way for Power Lines in Rwanda the information given below will govern the use of the right of Way.

- **General requirements on the use of the Right of Way/ Restrictions:**

- It is forbidden for any person to construct any building or structure or carry out cultivation, farming or any other activity within the Right-of-Way prior to the consent of the Licensee;
- to drill, mine or excavate or carry on any similar operation within the Right-of-Way;
- to place any combustible material inside the Right-of-Way;
- to cause any fire to burn within Sixty (60) meters of the transmission line Right-of-Way;
- to climb on to, attach to or hang any object on or from any tower/pole or transmission/distribution line;
- to cause anything to come into contact with the power line;
- to place, drive, tow, pull or carry any crane, jig, or any object, under, over or near the transmission line except with the prior consent of the Licensee obtained in writing and subject to any condition that the Utility may impose in relation to such consent;
- to carry out any form of blasting within hundred (100) meters of any power line; and
- Permanent buildings, including foundations and overhangs, pools, septic tanks, dumps, junkyards, wells, fuelling or fuel storage facilities, garbage, recycling receptacles and other non-compatible uses shall not be permitted on the Right-of-Way.

- **General derogations on the use of the Right of Way**

As long as minimum clearances from poles and conductors are maintained and with a prior written consent of the Licensee, the Right-of-Way can be used for certain activities such as yards, gardens, pastures and farming, recreational fields, streets, roads, driveways, parking lots, lakes, fences, drainage ditches, grading or any other activity that may not interfere with the line operation. Temporary buildings or structures that are small and easily movable may be acceptable in the Right-of-Way with prior approval of the Licensee, provided that:

- they are located away from the Licensee' works and access roads and not directly beneath overhead conductors;
- they are not habitable;
- they are not used for the purpose of storing flammable, explosive or toxic materials that could create a fire hazard;
- they do not have electrical or water service;
- they are of non-metallic construction or are grounded to the utilities' satisfaction.
- they do not adversely affect safety of customers, utility personnel and the general public.

- **General Licensee's Obligations**

In constructing and maintaining power lines on the property covered by the easement, the Licensee shall:

- Maintain the Right-of-Way as it requires, both within the Wire Zone and the Border Zone;
- Remove vegetation that could pose danger to a power line or pole inside the Right-of-Way and outside the Right-of-Way if it could come too close to power lines or poles;
- If excavation is necessary, ensure that the topsoil is stripped, piled and replaced upon completion of the operation;
- Restore to its original condition any strip of land which has been disturbed by the construction or maintenance;
- Clear all debris and remove all stones and rocks resulting from construction activity upon completion of construction;
- Pay for any damage caused by such construction or maintenance or satisfactorily repair any damage caused by such construction or maintenance to its original condition;
- Control vegetation and weeds around its power lines and facilities, and decide the appropriate method to adopt to ensure that the clearance space remains free of vegetation that could pose

danger to a power line taking account of the potential risk to the public, conservation and other values;

- Ensure that the pruning or clearing is done responsibly; and determine the regrowth space, hazard space and the pruning and clearing cycle;
- Notify the landowner before carrying out any pruning and clearing. In emergency situations, the Licensee may remove vegetation which poses an immediate risk without notification, but the Licensee should notify the owner or occupiers as soon as practicable after the removal of the vegetation;
- Ensure that pruning or clearing activities near power lines are undertaken safely. This may require the Licensee to de-energize the power lines or install necessary grounding to landowner's fence or equipment to enable the clearance of vegetation safely; and
- Ensure that any of his employees undertaking operations in the vicinity of his power lines, and any contractors he engages to carry out such works are appropriately trained and competent for that task, especially on safe working practices near power lines.

It's worth to note that in addition to the compensation of crops and tree affected during right of way clearing, the implementing agency will pay 5% of disturbance allowances to cover impacts caused by restriction use of land in the RoW as a requirement stated in the nation expropriation law.

- Right of Way Dimensions

As per the above said RURA guidelines the horizontal right of way for then 15KV-30KV is 12 meters, for 1120KV is 25m, for 220 KV the right of way is 30m while for 400KV the right of way width becomes 50m.

4.2.4. Clean cooking solution under EAQIP

The component 3 of the project relates to catalysing private investment in off-grid electricity access and clean cooking, the clean cooking crisis is particularly acute in sub-Sahara Africa where approximately 86% of the population lives without clean fuels and better cooking technologies thus many people die each year of smoke-related diseases.

Increasing use of clean cooking technologies for households in Africa offers huge promise to advance Sustainable Development Goals (SDGs) on good health and well-being (SDG3), gender equality (SDG5) and affordable and clean energy (SDG7). Rwanda has already set a goal to reduce the number of households using wood and other biomass fuels from 79.9 percent to 42 percent by 2024. It hopes to achieve universal clean cooking access by 2030, in line with sustainable universal energy access goals under the Sustainable Development Goal 7.

The energy use is a key indicator to measure people's standard of living globally, the choice of which cooking fuel is suitable for a household that has a direct bearing on the welfare of the respective families especially women and children because they are more concerned to collect firewood.

The firewood collection and charcoal production are worldwide significant factors to forest degradation and to deforestation respectively. Moreover, the carbon emission from the wood fires is responsible for an estimated 18% of the global warming process, moreover agriculture residues used as cooking fuel are not anymore going back to soil for fertility, leading to soil degradation with difficult to reverse. Households in Rwanda spend up to 6 hours per day collecting firewood and up to a third of their income for their energy needs, exacerbating the cycle of poverty. Nationwide, about 79.9% of households use firewood as their primary cooking fuel, and most of them likely to collect it for free, hence spending one hour acquiring and preparing fuel collection and preparation. Affordable, reliable and clean energy for cooking is essential not only for reducing health and environmental impacts but also helping women to work productively and develop the rural economy as demonstrated in biomass energy strategy, a sustainable path to clean cooking solution developed by MININFRA to be used in a period from 2019-2030.

The traditional cook stoves lead to household air pollution and cause the death from different diseases due to the carbon monoxide and particulates from the fires and generate significant disease such as severe respiratory (upper or lower) diseases, perinatal mortality, low weight birth, cancer, eyes illness, cardiovascular diseases, etc.

Against the above statements, the ESMF of Rwanda Energy Access and Quality Improvement Project proposes the summary of potential positive Environmental and social impacts (Table 13), and Environmental and Social Management Plan (table 14) where negative impacts have been identified and mitigated based on the different activities which will be undertaken under the same component.

4.3 Institutional framework for environmental management

The responsibility for formulation and implementation of environmental matters fall under the Ministry of Environment (MoE) as the key institutions with this mandate. The other aspects of environmental management related to different projects are dealt with several other institutions, among which the most prominent are the Rwanda Environment Management Authority (REMA); Rwanda Development Board (RDB); Rwanda Land Use and Management Authority (RLMUA), Rwanda Water and Forest Authority (RWFA) Rwanda Natural Resources Authority) among others. In case of any technically or circumstantially perceived environmental risk or threat, the proprietor is obliged to request from REMA the opinion of the need and, if necessary, the conditions for undertaking ESIA. Depending upon the assessment of potential significance of environmental impacts, REMA can decide if there is a need to apply partial or full ESIA procedure for the relevant projects.

4.3.1. The Ministry of Environment (MoE)

The MoE has the responsibility for developing land utilization policies (including surveying, land classification, land laws and land tenure); the development of environmental policies and procedures (including impact assessments), protection of natural resources (water, land, flora, and fauna), environmental legislation, biodiversity, and other environmental aspects informed by the Environment Law among others. Chapter IV of the Organic Law Article 65 clearly calls for the need to subject projects to mandatory Environmental Impact Assessment.

Article 65: Further specifies that every project shall be subjected to environmental impact assessment prior to its commencement. It shall be the same for programs, plans and policies likely to affect the environment. Specific details of projects referred to in this Article shall be spelt out by the order of the Minister in charge of environment. Article 66 states that Environmental Impact Assessment (ESIA) shall include at least the following:

- A brief description of the project and its variants.
- Analysis of direct and indirect foreseeable consequences on the environment.
- Analysis of the initial state of the environment.
- Measures envisaged reducing, preventing or compensating for the Consequence
- Reasons for the choice.

A summary of requisitions from clause1 to 5 of this articles;

- A definition of the evaluation and monitoring methods used regularly and environmental indicators before (initial state), during and after implementation of the project or, as the case may be, at the final evaluation stage of the project;
- A financial evaluation of measures recommended preventing, reducing or compensating for the negative effects of the project on the environment and measures for regular monitoring and control of relevant environmental indicators.

4.3.2. Rwanda Environmental Management Authority

The overall responsibility of the management of the bio-physical environment lies with the Rwanda Environment Management Authority as stipulated by its establishing law of 2003, promulgated by the Government of Rwanda. The functions of REMA include:

- To advise the Government on legislative and other measures for the management of the environment or the implementation of relevant international conventions, treaties and agreements in the field of environment, as the case may deem necessary;
- To take stock and conduct comprehensive environmental audits and investigations, to prepare and publish biannual reports on the state of natural resources in Rwanda;
- To undertake research, investigations, surveys and such other relevant studies in the field of environment and disseminate the findings;
- To ensure monitoring and evaluation of development programs in order to control observance of proper safeguards in the planning and execution of all development projects, including those already in existence, that have or are likely to have significant impact on the environment;
- To participate in the setup of procedures and safeguards for the prevention of accidents and phenomena which may cause environmental degradation and propose remedial measures where accidents and those phenomena occur;
- To render advice and technical support, where possible, to entities engaged in natural resource management and environmental protection;
- To provide awards and grants aimed at facilitating research and capacity building in matters of environmental protection.

4.3.3. Rwanda Development Board (RDB)

This is a one stop institution bringing together several government bodies in Rwanda focussed on promoting investment in Rwanda. RDB has a department responsible for ESIA processes including

reviewing all projects ESIA reports before approval of the implementation of the projects, a duty that was previously undertaken by REMA.

4.3.4. BRD's Social and Environmental Safeguards Policies

BRD's environmental objectives are to preserve, protect and improve the quality of the environment; protect human health, in relation to the environment; ensure the prudent and rational utilization of natural resources and to conserve nature; and, promote measures to deal with regional or worldwide environmental problems, notably climate change and access to potable water and sanitation.

BRD is implementing a robust social and environmental policy prepared in 2013 and an Environmental and Social Management System, which is compliant with Rwandan regulatory framework that pertains to the environment, land use, labor health and safety issues, vulnerable and marginalized groups and cultural artifacts. BRD is well equipped with professionals who over the years have received training in environmental and social risk management and therefore should be up to the task under the proposed Project. However, BRD may have to hire additional staff and dedicate them to the proposed Project. BRD will appoint Social Safeguards and Environmental Safeguards officers who will be responsible for supervising the implementation of safeguards instruments and ensure that activities comply with ESMF/RPF and, if necessary, an Environmental Management Plan/Resettlement Action Plan are developed as appropriate.

In order to implement the terms of this social and environmental policy, BRD has developed a Social and Environmental Management System (SEMS). The purpose of the SEMS is to proactively identify and evaluate the social and environmental risks of projects before a decision is made to finance them and to monitor ongoing social and environmental performance after disbursement. BRD recognizes that the SEMS will periodically have to be reviewed and revised to reflect changes in the regulatory framework as well as best practice guidelines, and to better suit the needs of its mission and clients. The procedures of the SEMS are integrated with BRD's existing financial risk management procedure, and as a result, BRD will ensure that all activities considered for financing will be subject to:

- Screening against a list of excluded activities, which BRD will not finance;
- Identification of social and environmental risks during project appraisal;

- Social and environmental due diligence, including compliance with applicable national laws, and the applicable requirements of external stakeholders commensurate with the level of risk and type of project, and proposed corrective actions to mitigate potential social and environmental impacts;
- Monitoring and reporting on the social, environmental and financial performance of projects after disbursement; and,
- Continuous improvement in the social and environmental performance of projects financed by BRD.

For effective implementation of the SEMS and to ensure that the risk review process is conducted in an efficient and timely manner, BRD has developed guidelines to help relevant staff (staff and senior management) improve their ability to identify social and environmental issues and assess risks. BRD also ensures that staff has the necessary resources to perform their duties under the SEMS and receive training, as necessary. To ensure compliance with the SEMS, BRD hires consultants, as deemed necessary, to make site visits and conduct social and environmental due diligence.

4.4. World Bank Environmental and Social Framework (ESF)

The Environmental and Social Framework (ESF) sets out the World Bank's commitment to sustainable development, through a Bank Policy and a set of Environmental and Social Standards (ESSs) that are designed to support Borrowers' projects, with the aim of ending extreme poverty and promoting shared prosperity. The ESSs set out the requirements for Borrowers relating to the identification and assessment of environmental and social risks and impacts associated with projects supported by the Bank through Investment Project Financing. Therefore, this ESMF has been prepared to ensure compliance with the World Bank ESF and ESSs. All the project components will have direct and/or indirect environmental and social risks and impacts. Thus, the project has triggered the World Bank ESSs except (a) ESS7 (Indigenous Peoples/ Sub-Saharan African Historically Underserved Traditional Local Communities) because there are no local communities that meet the requirements of this standard in the project proposed areas; and (b) ESS9 (Financial Intermediaries). Overall, this ESMF demonstrates how the project will comply with these Bank standards triggered by the project. Those standards are:

- Environmental and Social Standard 1: Assessment and Management of Environmental and Social Risks and Impacts;

- Environmental and Social Standard 2: Labour and Working Conditions
- Environmental and Social Standard 3: Resource Efficiency and Pollution Prevention and Management
- Environmental and Social Standard 4: Community Health and Safety
- Environmental and Social Standard 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement
- Environmental and Social Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
- Environmental and Social Standard 8: Cultural Heritage
- Environmental and Social Standard 10: Stakeholder Engagement and Information Disclosure.

4.4.1. Environmental and Social Standard 1: Assessment and Management of Environmental and Social Risks and Impacts

The activities of component one (Increasing access to grid electricity) will involve compensation for affected trees, crops and minimum restrictions on land under distribution lines and hence the need to prepare appropriate environment and social risk management tool as part of the design. The activities of Component two (Improving grid stability and enhancing operational efficiency) pose significant OHS issues such as management of oils and lubricants for turbines, transformers and support infrastructures, management of lead/acid batteries and materials; and hence the need to have proportionate risk mitigation measures integrated in the project design. The draft Environmental and social audit of Ntaruka HPP is not yet completed, and its completion, approval and disclosure of the draft audit will be a disbursement condition for the sub-component. The Bank will provide detailed comments on draft ES Audit to the client for finalization and resubmission. See subsections 4.4.3-4.4.6 and 4.4.8 regarding the main findings of the draft audit.

There are no associated facilities related to the four components of this project. Under component 2, the substation rehabilitation related to Ntaruka HPP is part of the main project scope and there are no upgrades to associated transmission line planned as part of this project or any other facilities or

activities that meet the criteria of associated facilities. The related facilities for component 1 are substations/transformers, which will be financed by the OPEC Fund and the Saudi Fund for Development. Both DPs are co-financing the project and have agreed to use the WB ESF instruments. The potential environmental and social impacts of these related facilities include permanent land acquisition, possible relocation when the substations are to be placed in the residential place, changes in land scape, land use restriction and the electromagnetic effect. The upgrading of the existing substations will not require generally land acquisition (unless there is a relocation) as they are located/built on the existing REG land. The line routes will be designed to avoid sensitive ecosystem and residential places and the project will not imply permanent land acquisition as the land which will be used for RoW is the agricultural land, and PAPs are allowed to use it for agricultural purposes with condition that the grown trees/crops should not exceed 3m of height for power line and community health and security/safety matters. The compensation will be done at full replacement cost based on market price for all asset located in the Right of Way.

The third component of the project is related to catalyzing private sector investment in off-grid energy and clean cooking. There are positive environmental contributions of the project activities under this component, for instance, by supporting electrification through solar off-grid solutions the project will help reduce greenhouse gas emissions if equivalent electricity were sourced from fossil fuel-based utility-scale power plants or emergency diesel power plants. Despite these beneficial impacts, the solar system will have waste management issues, including disposal of used batteries containing hazardous waste. The clean cooking solutions will be very helpful for reducing deforestation and forest degradation, and thus contribute to climate change goals of the country. Component four will involve technical assistance such as sector performance improvements and forward-looking options for sector development; capacity building in planning, skills development, audit and compliance; and policy and regulatory improvement and entrepreneurship development, including targeted training for women entrepreneurs (under clean cooking solutions). The policy and regulatory development/improvement part will comprise improving fuel/stove regulations, quality standards, testing capacity, and tax/tariff policies to support clean cooking market development.

The project has prepared ESF instruments (ESMF, RPF, SEP, LMP, draft Environmental and Social Audit for Ntaruka HPP Rehabilitation and ESCP) to manage these risks and impacts in manner consistent with the ESSs and satisfactory to the World Bank. The instruments, particularly the ESMF

and the ESCP, have been updated based on the findings of the draft environmental and social audit for Ntaruka HPP rehabilitation. Also, during the project implementation, site specific environmental and social standards instruments such as environmental and social impact assessments, environmental and social management plans, and/or resettlement action plans will be prepared as required, and implemented and monitored accordingly.

Table 8: Project Classification according to levels of impacts

Category	Definition
High Risk	Projects encompassing sub-project or activities with potential significant adverse environmental or social risks/ impacts that are diverse, irreversible or unprecedented. Examples of these activities includes project affecting highly sensitive ecosystems services, project with large resettlements components, projects with serious occupational and health risks, projects which poses serious socio-economic concerns
Substantial Risk	The Project may not be as complex as High-Risk Projects, its environmental and social scale and impact may be smaller (large to medium) and the location may not be in such a highly sensitive area, and some risks and impacts may be significant. Potential risks and impacts are likely to be mostly temporary, predictable and/or reversible. Adverse social impacts of the Project, and the associated mitigation measures, may give rise to a limited degree of social conflict, harm or risks to human security. Mitigatory and/or compensatory measures may be designed more readily and be more reliable than those of High-Risk Projects. There is medium to low probability of serious adverse effects to human health and/or the environment (e.g., due to accidents, toxic waste disposal, etc.), and there are known and reliable mechanisms available to prevent or minimize such incidents.
Moderate risk	The potential adverse risks and impacts on human populations and/or the environment are not likely to be significant. This is because the Project is not complex and/or large, does not involve activities that have a high potential for harming people or the environment, and is located away from environmentally or socially sensitive areas. Potential risks and impacts and issues are predictable and expected to be temporary and/or reversible; low in magnitude; site specific, without likelihood of impacts beyond the actual footprint of the Project; low probability of serious adverse effects

Category	Definition
	to human health and/or the environment ; and reversible and readily addressed through mitigation measures. Examples of these projects include small scale agricultural initiative, school's construction, forest management activities, low emission energy project.
Low risks	Projects with activities with minimal/negligible or no adverse environmental and social risks and or/ impacts. Example of these projects or activities include education and training, public broad casting, health and family planning, monitoring programmes, and advisory services projects. These Projects, with few or no adverse risks and impacts and issues, do not require further ES assessment following the initial screening.

Based on the above classification, the environmental risk rating of this project remains substantial considering the anticipated risks and impacts associated with construction of (medium-voltage) power distributions lines (component 1), rehabilitation of the old Ntaruka HPP (part of component 2, based on the findings of the audit (see subsections 4.4.3-4.4.6 and 4.4.8 for further information)), and distribution of solar system (part of component 3). It also considers technical assistance that involves sector performance improvements and forward-looking options for sector development; capacity building in planning, skills development, audit and compliance; and policy and regulatory improvement and entrepreneurship development, including targeted training for women entrepreneurs under clean cooking solutions (part of component 4), among others. Distribution of solar system will have potential environmental and social risks and impacts related to the storage and final disposal of used batteries containing hazardous waste; and disposal/recycling of solar panels. In addition to disposal and recycling issues, solar batteries may cause environmental, social and safety risks during transportation, installation, and operation (e.g. fire and explosion risks). Overall, the project will also have potential occupational health and safety risks and impacts. The project has prepared ESF instruments, including the ESMF, to manage all potential environmental and social risks and impacts of the project through setting up proper mitigation measures prior to the project implementation. Also, during the project implementation, site specific ESSs plan will be prepared prior to construction stages to make sure that all site related risks and impacts are specifically

addressed. ESF instruments like ESMP (including EHSP) will be mandatory to contractors who will work on components 1 and 2 while the companies which will be hired on the component 3 (Increasing access for off-grid electricity and clean cooking solutions) will have to submit the waste management plan to ensure that the plan to offset all hazardous waste related to solar home system will be removed safely from the environment after the end of use life..

Social Risk Rating: The social risk rating at this stage is moderate due to the risks related to the investments proposed in component one of the projects. The investment in grid connections for households, commercial and industrial consumers, and public institutions is likely to involve compensation requirements for affected assets such as crops and trees. All crops and trees to be affected will be compensated in compliance with the National Expropriation law No 32/2015 of 11/06/2015 in public interest and WB ESS5 (land acquisition, restrictions on land use and involuntary resettlement). The project design and the ESF instruments (ESMF, ESCP, SEP and LMP) have integrated proportionate social risk management measures to avoid similar occurrences under this new operation. Proportionate mitigation measures for other potential risks such as exclusion of the vulnerable and GBV risk have been included in the ESF instruments as well. The social risk rating will be revised once staffing and implementation arrangements for social risk management are mainstreamed to better serve this project.

4.4.2. Environmental and Social Standard 2: Labor and Working Conditions

The ESF and its ESS2 covers different compliance aspects related fair treatment of workers and provision of safe and healthy working condition. The first aspect aims at improving working conditions and management of workers relationships by providing workers with information and documentation that is clear and understandable on terms and conditions of employment on aspects related to rights under national labour and employment law with regard to rights related to working hours, compensation, wage and benefits. The second aspect is related to protecting the workforce by avoiding the child labour by setting up the minimum age and setting conditions that they employability of people below or above minimum working age is not hazardous and interfere with children education or is not harmful to the child health, mental or physical social development. It also prohibits forced labour. The third aspect is related to the creation of grievance mechanism for the employee in order to promptly address workers concerns but without impeding their access to judicial

or administrative remedies that are provided by the law to address workers grievances. The fourth aspect aims to set up and apply occupational health and safety measures to the working place.

Anticipated key labor risks and impacts are mainly associated with the planned construction works, and investments related to improving grid stability and operation efficiency, including Ntaruka HPP rehabilitation. There may be risks of child labor associated with the use of local labor. The project must provide appropriate measures for the protection of vulnerable project workers such as women and people with disabilities and care will be given to both categories to ensure inclusion. Among skilled workers, the majority of those involved will be existing government civil servants. As such, these employees will remain subject to the terms and conditions of their existing public-sector employment. Majority of the unskilled workers will be sourced from the community members in the project site and a few required skilled workers from outside of the project area. Due to the discrete nature of these activities labor camps and influx are not anticipated. These individuals will however be subject to the requirement of ESS2 in relation to labor and working conditions including occupational health and safety and worker specific grievance redress mechanisms. Likewise, any technical consultants contracted by the project will also need to adhere to such standards. To ensure health and safety of workers during the construction, improving grid stability and operation efficiency, and operational phases of the project, a Health, Safety and Environmental (HSE) plan in line with Good International Industry Practice (GIIP) and EHS Guideline for Electric Power Transmission and Distribution will be prepared as part of the CESMPs, based on site-specific ESMPs/ESIAs for subprojects, with general guidance provided as part of ESMF. The plan will include procedures on incident investigation and reporting, recording and reporting of non-conformity, emergency preparedness and response procedures and continuous training and awareness to workers. In addition, the project has developed written labor management procedures (LMP) that has set out the way in which project workers will be managed including a code of conduct to mitigate GBV related risks which will be used during the project implementation.

4.4.3. Environmental and Social Standard 3: Resource Efficiency and Pollution Prevention and Management

This standard aims at efficient use of resources, pollution preventions and greenhouse gases emission avoidance and adoption of mitigation technologies and practices which are achievable. In this regard, the project, through its four components, is expected to improve access to energy and efficiency of energy services delivery in the country, largely in the rural areas. The project's proposed investments,

including off-grid solar power and clean cooking, will also contribute to Rwanda's priority mitigation actions under its National Determined Contributions (NDC). The off-grid solar power and clean cooking solutions will also contribute to the reduction of deforestation and forest degradation and indoor air pollution. Thus, in addition to improving resource/energy-efficient practices, the project will have positive environmental contribution through ***reducing greenhouse gas emissions***[2]. However, the project will have risks and impacts of pollution in relation to management of oils and lubricants for turbines, transformers and support infrastructures; solar batteries and panels; and construction/rehabilitation activities, among others. The project may also have environmental damage due to improper management of construction/ rehabilitation material (such as extraction of excess sands and gravels), waste, and domestic waste which may cause expansion of project 's environmental footprint. The findings of the draft environmental and social audit for Ntaruka HPP show that: (i) No historic contamination of land in and around the HPP; (ii) the extent of land contamination/pollution from the HPP is low; and (iii) REG has a formal procedure & plans for housekeeping and equipment maintenance issues, but requires improvements with a focus on waste management plan, including lubricants and turbine oil management, monitoring and documentation. The TA part of the project, including the policy and regulatory development/improvement activity may have impact on resource efficiency and pollution management. The management of impacts/risks of the above issues are addressed in the project design and in this ESMF (including solar batteries and panels management guidelines, and application of WBG EHS Guidelines for Electric Power Transmission and Distribution) and other ESS instruments, and further detailed in site specific ESIAs/ESMPs for subprojects during the project implementation stage. Moreover, in relation to components one and two, the contractor shall develop C-ESMP (comprising EHSP, waste management plan, and restoration plan for borrow and quarry sites as required in the site specific ESMP/ESIA, and ensure their implementation accordingly

4.4.4. Environmental and Social Standard 4: Community Health and Safety

Majority of the unskilled workers will be sourced from the community members in the project site and a few required skilled workers from outside of the project area. The project is not anticipated to

[2] The GHG emission reductions associated with the nationwide uptake of cleaner technologies for lighting, cooking and other domestic energy needs including off-grid solar home systems and improved and clean cookstoves, will be purchased by Ci-Dev upon certification by the Standardized Crediting Framework (SCF) (https://www.ci-dev.org/SCF-Rwanda). In particular, Ci-Dev will purchase an approximate amount of 680,000 tCO_2e carbon credits from component 3 for the period 2021-2024.

contribute to significant labor influx in the project sites. However, potential community health and safety risks in the project sites are related to increase in crime, prostitution, gender-based violence (GBV) and other related social risks. Also, the project could contribute to potential structural safety risks such as electric shocks during connections, increase in road accidents due to increased number of vehicles during construction phase especially in formal settlement where we have a large number of people in a project site. The other potential community health risk relates to the potential for spread of communicable diseases due to the influx of people in search of work in the project sites. The project does not anticipate any use of security personnel. Also, there will be potential risks and impacts to community health and safety related to generation of wastes, noise, and dust; transportation of construction and HPP (Ntaruka) rehabilitation materials, and possibility of unauthorized entrance to construction and rehabilitation sites; and restoration of borrow and quarry sites. There will be risks related to transportation, installation, and operation of solar batteries (e.g. fire and explosion risks); and collection, storage and disposal of used solar batteries containing hazardous waste as well. Regarding Ntaruka HHP rehabilitation, there will be potential community health and safety risks depending on dam size and type of rehabilitation. The findings of the draft environmental and social audit for Ntaruka HPP rehabilitation show that: (i) It is a low risk dam because its failure or mis-operation can result in no probable loss of human life and low economic and/or environmental losses, however, warning and prohibiting signs should be installed to inform health and safety risks and prohibit bathing to the public; (ii) It has also operation & maintenance plan, but no emergency preparedness or response plan and instrumentation plan, which need to be developed and integrated into the Environmental and social action plan; (iii) no safety issues and cases historically recorded that were associated to the dam operation and the HPP; and (iv) the body and foundation of the Ntaruka intake dam is in good structural condition and can be used for many more years to come with minor maintenance work; (and (v) the rehab works should have a rehabilitation supervision quality assurance plan. The TA component of the project, including the policy and regulatory development/improvement may have impact on community health and safety. All these potential community health and safety risks, along with mitigation measures, are addressed in this ESMF (comprising generic ESMPs, guidelines for management of solar batteries and panels, and application of WBG EHS Guidelines for Electric Power, Transmission and Distribution, and electromagnetic interference and electrocution, among others) and other relevant ESSs instruments, including E&S audit of the Ntaruka, and further detailed in the site specific ESIAs/ ESMPs for subprojects during

the project implementation stage as required. Except the above risks and impacts (which will be managed through preparing and implementing site specific ESIAs/ESMPs for subprojects, and Ntaruka's draft environmental and social audit), the project is generally expected to result in positive community health impacts specifically for those households who will benefit from grid connection, off-grid solar connection and clean cooking solutions.

4.4.5. Environmental and Social Standard 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement

The project will involve civil works in on-grid connection for a portion of the currently unelectrified households across different parts of the Country. These activities will involve expropriation, temporally restriction on land use and expropriation. Resettlement impacts are mainly expected to be temporary and largely economical. No voluntary land donation anticipated under this project. The project has prepared a Resettlement Policy Framework (RPF) that will give guidance to the implementing agencies during project implementation on how to deal with resettlement and expropriation issues in compliance with National Expropriation law and the Bank requirements, this will help also to prepare a RAP based on prepared RPF. In addition to RPF, the client prepared SEP and ESCP (comprising specific gendered social assessment) through a consultative process. The draft Environmental and Social Audit for Ntaruka HPP Rehabilitation evidenced that the Dam was built in 1959 on uninhabited site. The land owned by the GoR and managed by REG on behalf of GoR for power generation. The HPP did not induce any expropriation or displacement, from the time of the project development till now and no past claims or grievance recorded. The planned rehabilitation will be carried out within the existing footprint and no resettlement or displacement is envisaged. Therefore, there are no any legacy issues regarding land use patterns and arrangements.

4.4.6. Environmental and Social Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

The aim of standard is to support the protection and conservation of biodiversity and habitats. In this regard, mitigation hierarchy and precautionary approach will be applied in the design and implementation of project that could have risks and impacts on biodiversity.

Rwanda is known for its biodiversity and living natural resources and is a party to the Convention on Biological Diversity. Ntaruka being considered for old HPP rehabilitation will have potential impacts on aquatic biodiversity/living natural resources and ecological flows. Ntaruka HPP was built on the

Mukungwa River, one of the tributaries of the Nyabarongo River which drains to the Akagera River that, in turn, leads to Lake Victoria. The hydrological network of the project area is located in Nile basin and is composed by lakes Burera and Ruhondo and Rugezi wetlands. Before the construction of the power plant, lake Burera and Ruhondo were connected by the river Mukungwa river. The entire water of the river was taken, dammed and channeled into the head lace tunnel towards the surge tank before reaching the powerhouse via the penstock leading to the destruction of aquatic biodiversity. Water from the Rugezi Wetlands flows downstream first into Lake Burera supplying Ntaruka HPP nearly half of its inflow and then into Lake Ruhondo. The draft Environmental and Social Audit for Ntaruka HPP Rehabilitation recommends i) no need for ecological flow study, ii) prepare a more detail study on disturbed ecosystem and restoration of disturbed biodiversity due to the total deviation of river which connected the two twin lakes, as well as to maintain ecosystem of the Rugezi-Burera-Ruhondo catchment area, and iii) implement comprehensive waste management to prevent soils, surface, and ground water contamination from wastes generated from the rehabilitation and operation of the HPP.

Also, the clean cooking solutions may have impacts on forest and other resources if biomass sources and other supply chains (including local production of improved and clean cook stoves) are not properly identified and managed in a sustainable manner as per GoR's laws and WB ESSs. In this regard, there is a need to address sustainable management of primary production and harvesting of living natural resources using relevant mitigation measures.

The project will comply with this environmental and Social Standard requirement by avoiding constructing or passing through critical habitat such as national parks or wetland of international importance. The activity of bush clearing will respect the right of way (RoW) stipulated in the RURA guidelines (GUIDELINES N°01/GL/EL-EWS/RURA/2015 ON RIGHT-OF-WAY FOR POWER LINES) and whenever possible the project team will avoid the bush clearance where construction works allow. Also, impacts and risks of other project activities (such clean cooking solutions, Ntaruka HPP rehabilitation, and TA related to policy and regulatory improvement and entrepreneurship development, and forward-looking options for sector development) on biodiversity and living natural resources will be managed as per the GoR's policies and legal frameworks and WB ESSs requirements. All these have been reflected in this ESMF, including the environmental and social screening process for managing risks and impacts to biodiversity and natural resources. Consistent

with the Project's ESMF, ESS6 and site specific ESSs instruments (ESMPs/ESIAs), REG will require civil works contractor(s) to prepare C-ESMP(s) (satisfactory to the GoR and the WB) and implement it accordingly during construction/rehabilitation, and TA consultants to comply with the ESMF and other instruments.

4.4.7. Environmental and Social Standard 7: Indigenous Peoples/ Sub-Saharan African Historically Undeserved Traditional Community

This standard aims to avoid or minimize impact on indigenous peoples/ Sub-Saharan African Historically Undeserved Traditional Community who are defined as marginalized people with distinct characteristics such as self-identification, collective attachment to geographically distinct habitats or territory, customary, economic, social, or political institutions that are separate from those of the mainstream society or culture; or distinct language or dialect. This social standard is not applicable to this project as Rwanda does not have indigenous people, or historically underserved traditional community in the project proposed implementation areas.

4.4.8. Environmental and Social Standard 8: Cultural heritage

This standard seeks to protect cultural heritage from adverse impact of the project activities and support its preservation, address cultural heritage as integral aspect of sustainable development, promote meaningful consultation with stakeholders regarding cultural heritage and promote specifically the equitable sharing of benefits from the use of cultural heritage. The draft Environment and Social Audit for Ntaruka HPP Rehabilitation identified no cultural heritage site in or around the project site and possibility of any chance find related to cultural significance is low. However, mitigation measures shall be developed and duly reflected in site specific ESIAs/ESMPs for subprojects to protect cultural heritage from being relocated by construction or rehabilitation activities. Also, "chance finds procedure" (see Annex 10) has been incorporated in this ESMF if previously unknown cultural heritage is encountered during project implementation; and will be also included in the site specific ESIAs/ESMPs and in all contracts relating to construction or rehabilitation of subprojects.

4.4.9. Environmental and Social Standard 9: Financial Intermediary

ESS9 is not applicable to the project as there are no Financial Intermediaries that receive financial support from the Bank.

4.4.10. Environmental and Social Standard 10: Stakeholder Engagement and information disclosure

The objective of this ESS is to engage stakeholder effectively in order to improve environmental and social sustainability of the project, enhance acceptance, and make significant contribution to successful project design and implementation. For this purpose , the project supported by the Bank must identify stakeholders and construct and build good working relationships with them in order to avoid conflicts that may arise, assess the level of stakeholder interests, support and concerns, take stakeholders views, concerns into account during project implementation. In this identification, stakeholders included Project Affected People (PAPs), these are individuals or organisation whose properties (land, houses, infrastructures, business, cultural features) and other aspects that will be affected by the project and other who are related or may be interested in the project implementation. In addition, this ESS will aim at promoting and providing means for stakeholders' engagement in the whole project cycle, and inform stakeholders on the project objectives, environmental and social risks in appropriate manners.

The project has complied with this ESS through the development of the ESMF and the stakeholder engagement plan (SEP) and both will be disclosed prior to project appraisal. Major stakeholders such as director of one stop centres, Vice mayor in charge of economic development, District environmental officers, Executive secretary of the sectors, sector land managers different ministries and public agencies, local people from not connected centres, and institutions as shown in the Annex 7 have been consulted and their inputs were considered during ESMF and SEP preparation. During the preparation of site-specific RAPs, PAPs will be identified and consulted on different resettlement modalities as stipulated by the Law N° 32/2015 of 11/06/2015 relating to expropriation in the public interests. In addition, the ESMF and RPF have recommended the establishment of grievance redress Committees from project site level and their composition to the district and implementing entity levels.

Table 9: World Bank Environmental and Social Standard Triggered by EAQIP

Standard triggered by the project	Yes	No
ESS 1: Assessment and Management of Environmental and Social Risks and Impacts	X	
ESS2: Labour and Working Conditions	X	
ESS3: Resource Efficiency and Pollution Prevention and Management	X	
ESS4: Community Health and Safety	X	
ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	X	
ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	X	
ESS 7: Indigenous Peoples/Sub-Saharan African Historically Undeserved Traditional Community.		X
ESS 8: Cultural heritage	X	
ESS9: Financial Intermediary		X
ESS10: Stakeholder Engagement and information disclosure	X	

4.5. OP 7.50. Projects on International Waterways

OP 7.50 of the World Bank's operational policy covering projects affecting international waterways is applicable to this project because the project includes the rehabilitation of the Ntaruka HPP under Component 2, involving the use of the Lake Burera and Lake Ruhondo in Rwanda. The rehabilitation activities will be conducted on the Ntaruka HPP, which connects Lake Burera with Lake Ruhondo. Lake Ruhondo is connected to international waterways through a series of domestic rivers. Lake Ruhondo is the source of the Mukungwa River. The Mukungwa River merges with the Nyabarongo

River, which empties in the Lake Rweru, shared between Rwanda and Burundi, and the Akagera River, which flows along the borders between Burundi-Rwanda, Rwanda-Tanzania, and Tanzania-Uganda, before emptying into Lake Victoria, which is part of the Nile River system.

The Project falls under an exception to the riparian notification requirement under paragraph 7(a) of the policy. Paragraph 7 of the policy specifies three exceptions to the requirement that the other riparian states be notified of the project. The exception under paragraph 7(a) applies: "For any ongoing schemes, projects involving additions or alterations that require rehabilitation, construction, or other changes that in the judgment of the Bank (i) will not adversely change the quality or quantity of water flows to the other riparians; and (ii) will not be adversely affected by the other riparians' possible water use. This exception applies only to minor additions or alterations to the ongoing scheme; it does not cover works and activities that would exceed the original scheme, change its nature, or so alter or expand its scope and extent as to make it appear a new or different scheme." The rehabilitation of the Ntaruka HPP will involve (a) minor civil repair works to improve dam safety and (b) repair and replacement of mechanical and electromechanical components to modernize the power plant and restore the capacity to original design capacity. There will be no additional use of water and no change in water quality. Therefore, the works to be funded under the project will neither (a) adversely change the quality or quantity of water flows to the other riparians nor (b) be adversely affected by the other riparians' possible water use. Rather, the project will lead to more efficient use of water and may improve water quality (due to reduced oil leakage from replaced electromechanical equipment) and enhance dam safety without any adverse impact on the quality and quantity of international waters.

Other relevant international agreements. Rwanda is a signatory of the 2003 Protocol for Sustainable Development of Lake Victoria of the East African Community. This protocol, which is also signed by Burundi, Kenya, Tanzania, and Uganda does require notification only for planned measures which may have adverse effects on other countries. Activities financed by this project do not trigger the notification obligation of the protocol.

4.6. World Bank Group Environmental, Health and Safety Guidelines

4.6.1. Environmental, Health, and Safety General Guidelines

The Environmental, Health, and Safety (EHS) Guidelines[3] are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP) that WB funded project should apply. These General EHS Guidelines are designed to be used together with the relevant Industry Sector EHS Guidelines which provide guidance to users on EHS issues in specific industry sectors. The EAQIP will apply EHS Guidelines for Electric Power Transmission and Distribution. The applicability of the EHS Guidelines should be tailored to the hazards and risks established for each project on the basis of the results of an environmental assessment in which site-specific variables, such as host country context, assimilative capacity of the environment, and other project factors, are taken into account. When host country regulations differ from the levels and measures presented in the EHS Guidelines, projects are expected to achieve whichever is more stringent. If less stringent levels or measures than those provided in these EHS Guidelines are appropriate, in view of specific project circumstances, a full and detailed justification for any proposed alternatives is needed as part of the site-specific environmental assessment. This justification should demonstrate that the choice for any alternate performance levels is protective of human health and the environment.

General Approach to the Management of EHS Issues at the Facility or Project Level: Effective management of environmental, health, and safety (EHS) issues entails the inclusion of EHS considerations into corporate-and facility-level business processes in an organized, hierarchical approach that includes the following steps:

- Identifying EHS project hazards and associated risks as early as possible in the facility development or project cycle, including the incorporation of EHS considerations into the site selection process, product design process, engineering planning process for capital requests, engineering work orders, facility modification authorizations, or layout and process change plans.
- Involving EHS professionals, who have the experience, competence, and training necessary to assess and manage EHS impacts and risks and carry out specialized environmental

[3] http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/our+approach/risk+management/ehsguidelines

management functions including the preparation of project or activity-specific plans and procedures that incorporate the technical recommendations that are relevant to the project.

- Understanding the likelihood and magnitude of EHS risks, based on: The nature of the project activities, such as whether the project will generate significant quantities of emissions or effluents, or involve hazardous materials or processes; The potential consequences to workers, communities, or the environment if hazards are not adequately managed, which may depend on the proximity of project activities to people or to the environmental resources on which they depend.
- Prioritizing risk management strategies with the objective of achieving an overall reduction of risk to human health and the environment, focusing on the prevention of irreversible and/or significant impacts.
- Favouring strategies that eliminate the cause of the hazard at its source, for example, by selecting less hazardous materials or processes that avoid the need for EHS controls.
- When impact avoidance is not feasible, incorporating engineering and management controls to reduce or minimize the possibility and magnitude of undesired consequences, for example, with the application of pollution controls to reduce the levels of emitted contaminants to workers or environments.
- Preparing workers and nearby communities to respond to accidents, including providing technical and financial resources to effectively and safely control such events, and restoring workplace and community environments to a safe and healthy condition.
- Improving EHS performance through a combination of ongoing monitoring of facility performance and effective accountability.

Table 10: Environmental Health and Safety Guidelines:

Effect	Description	Management
Environment		
Greenhouse Gases (GHGs)	Energy is one of the sectors that can have potential significant emissions of greenhouse gases. GHGs may be generated from direct emissions. Green House gases are gases responsible for Global Warming and include carbon dioxide (C02); methane (CH4); nitrous oxide (N2O); hydrofluorocarbons (HFCs); perfluorocarbons (PFCs); and sulfur hexafluoride (SF6).	Promote, develop and increase use of renewable forms of energy which include hydroelectric power and solar energy which means that the impact of EAQIP is positive to the environment as it contributes to GHGs emissions reduction.
Hazardous Materials	Hazmats can be classified according to the hazard as explosives; compressed gases, including toxic or flammable gases; flammable liquids; flammable solids; oxidizing substances; toxic materials; radioactive material; and corrosive substances.	- The overall objective of hazardous materials management is to avoid or, when avoidance is not feasible, minimize uncontrolled releases of hazardous materials or accidents (including explosion and fire) during their production, handling, storage and use. - Where practicable, avoiding or minimizing the use of hazardous materials. For example, non-hazardous materials have been found to substitute asbestos in building materials, PCBs in electrical equipment, persistent organic pollutants

Effect	Description	Management
		(POPs) in pesticides formulations, and ozone depleting substances in refrigeration systems; - Preventing uncontrolled releases of hazardous materials to the environment or uncontrolled reactions that might result in fire or explosion; - Using engineering controls (containment, automatic alarms, and shut-off systems) commensurate with the nature of hazard; - Implementing management controls (procedures, inspections, communications, training, and drills) to address residual risks that have not been prevented or controlled through engineering measures. - Job safety analysis to identify specific potential occupational hazards and industrial hygiene surveys, as appropriate, to monitor and verify chemical exposure levels, and compare with applicable occupational exposure standards; - Hazard communication and training programs to prepare workers to recognize and respond to workplace chemical hazards.
	Reactive, flammable, and explosive materials should also be managed to avoid uncontrolled reactions or conditions resulting in fire or explosion.	- Storage of incompatible materials (acids, bases, flammables, oxidizers, reactive chemicals) in separate areas, and with containment facilities separating material storage areas; - Provision of material-specific storage for extremely hazardous or reactive materials; - Use of flame arresting devices on vents from flammable storage containers;

Effect	Description	Management
		- Provision of grounding and lightning protection for tank farms, transfer stations, and other equipment that handles flammable materials; - Selection of materials of construction compatible with products stored for all parts of storage and delivery systems, and avoiding reuse of tanks for different products without checking material compatibility;
Waste	Any solid, liquid, or contained gaseous material that is being discarded by disposal, recycling, burning or incineration. It can be byproduct of a manufacturing process or an obsolete commercial product that can no longer be used for intended purpose and requires disposal.	- Establishing waste management priorities at the outset of activities based on an understanding of potential Environmental, Health, and Safety (EHS) risks and impacts and considering waste generation and its consequences - Establishing a waste management hierarchy that considers prevention, reduction, reuse, recovery, recycling, removal and finally disposal of wastes. - Avoiding or minimizing the generation waste materials, as far as practicable - Where waste generation cannot be avoided but has been minimized, recovering and reusing waste; - Where waste cannot be recovered or reused, treating, destroying, and disposing of it in an environmentally sound manner
Occupational Health and Safety (OHS)		
Approach	Employers and supervisors are obliged to implement all reasonable precautions to protect the health and safety of workers. Companies should hire contractors that have the technical capability to manage the occupational health and	- Eliminating the hazard by removing the activity from the work process. Examples include substitution with less hazardous chemicals, using different manufacturing processes, etc.

Effect	Description	Management
	safety issues of their employees, extending the application of the hazard management activities through formal procurement agreements.	- Controlling the hazard at its source through use of engineering controls. Examples include local exhaust ventilation, isolation rooms, machine guarding, acoustic insulating, etc. - Minimizing the hazard through design of safe work systems and administrative or institutional control measures. Examples include job rotation, training safe work procedures, lock-out and tag-out, workplace monitoring, limiting exposure or work duration, etc. - Providing appropriate personal protective equipment (PPE) in conjunction with training, use, and maintenance of the PPE. - The application of prevention and control measures to occupational hazards should be based on comprehensive job safety or job hazard analyses. The results of these analyses should be prioritized as part of an action plan based on the likelihood and severity of the consequence of exposure to the identified hazards.

Effect	Description	Management
The workplace and Exit		- The space provided for each worker, and in total, should be adequate for safe execution of all activities, including transport and interim storage of materials and products. - Passages to emergency exits should be unobstructed at all times. Exits should be clearly marked to be visible in total darkness. The number and capacity of emergency exits should be sufficient for safe and orderly evacuation of the greatest number of people present at any time, and there should be a minimum two exits from any work area. - The workplace should be designed to prevent the start of fires through the implementation of fire codes applicable to industrial settings. - The employer should ensure that qualified first-aid can be provided at all times. Appropriately equipped first-aid stations should be easily accessible throughout the place of work. - Training about OHS should be provided to all workers and should consist of basic hazard awareness, site-specific hazards, safe work practices, and emergency procedures for fire, evacuation, and natural disaster, as appropriate. Any site-specific hazard or colour coding in use should be thoroughly reviewed as part of orientation training. - Vibration exposure levels should be checked based on daily exposure time and data provided by equipment manufacturers.

Effect	Description	Management
Fire and Explosions	Fires and or explosions resulting from ignition of flammable materials or gases can lead to loss of property as well as possible injury or fatalities to project workers.	- Storing flammables away from ignition sources and oxidizing materials. - Providing bonding and grounding of, and between, containers and additional mechanical floor level ventilation if materials are being, or could be, dispensed in the storage area - Where the flammable material is mainly comprised of dust, providing electrical grounding, spark detection, and, if needed, quenching systems - Defining and labelling fire hazards areas to warn of special rules (e.g. prohibition in use of smoking materials, cellular phones, or other potential spark generating equipment) - Providing specific worker training in handling of flammable materials, and in fire prevention or suppression
Electrical	Exposed or faulty electrical devices, such as circuit breakers, panels, cables, cords and hand tools, can pose a serious risk to workers. Overhead wires can be struck by metal devices, such as poles or ladders, and by vehicles with metal booms. Vehicles or grounded metal objects brought into proximity with overhead wires can result in arcing between the wires and the object, without actual contact.	- Marking all energized electrical devices and lines with warning signs; - Locking out (de-charging and leaving open with a controlled locking device) and tagging-out (warning sign placed on the lock) devices during service or maintenance; - Checking all electrical cords, cables, and hand power tools for frayed or exposed cords and following manufacturer recommendations for maximum permitted operating voltage of the portable hand tools; - Protecting power cords and extension cords against damage from traffic by shielding or suspending above traffic areas

Effect	Description	Management
		- Appropriate labelling of service rooms housing high voltage equipment (‘electrical hazard’) and where entry is controlled or prohibited; - Establishing “No Approach” zones around or under high voltage power lines; - Conducting detailed identification and marking of all buried electrical wiring prior to any excavation work.
Personal Protective Equipment	PPE is considered to be a last resort that is above and beyond the other facility controls and provides the worker with an extra level of personal protection.	- Active use of PPE if alternative technologies, work plans or procedures cannot eliminate, or sufficiently reduce, a hazard or exposure; - Identification and provision of appropriate PPE that offers adequate protection to the worker, co-workers, and occasional visitors, without incurring unnecessary inconvenience to the individual; - Proper maintenance of PPE, including cleaning when dirty and replacement when damaged or worn out. Proper use of PPE should be part of the recurrent training programs for employees; - Selection of PPE should be based on the hazard and risk ranking and selected according to criteria on performance and testing established by recognized organizations
Accidents and Diseases monitoring		- The employer should establish procedures and systems for reporting and recording: Occupational accidents and diseases; Dangerous occurrences and incidents These systems should enable workers to report immediately to their immediate supervisor any situation they believe presents a serious danger to life or health.

Effect	Description	Management
		- The systems and the employer should further enable and encourage workers to report to management all: Occupational injuries and near misses; Suspected cases of occupational disease; Dangerous occurrences and incidents - All reported occupational incident and diseases should be investigated with the assistance of a person knowledgeable/competent in occupational safety. The investigation should: Establish what happened; Determine the cause of what happened; Identify measures necessary to prevent a recurrence.
Community Health and Safety		
Communicable and Vector borne Diseases	Health hazards typically associated with large development projects are those relating to poor sanitation and living conditions, sexual transmission and vector-borne infections. Communicable diseases of most concern during the construction phase due to labor mobility are sexually transmitted diseases (STDs), such as HIV/AIDS.	- Providing surveillance and active screening and treatment of workers; - Preventing illness among workers in local communities by: Undertaking healtl awareness and education initiatives, for example, by implementing ar information strategy to reinforce person-to-person counselling addressing systemic factors that can influence individual behavior as well as promoting individual protection, and protecting others from infection, by encouraging condom use. - Vector borne diseases should be addressed by: - Prevention of larval and adult propagation through sanitary improvements and elimination of breeding habitats close to human settlements; - Elimination of unusable impounded water;

Effect	Description	Management
		- Promoting use of repellents, clothing, netting, and other barriers to prevent insec bites; Use of chemoprophylaxis drugs by non-immune workers and collaborating with public health officials to help eradicate disease reservoirs; - Monitoring and treatment of circulating and migrating populations to preven disease reservoir spread; - Collaboration and exchange of in-kind services with other control programs i the project area to maximize beneficial effects; - Educating project personnel and area residents on risks, prevention, and availabl treatment.

4.6.2. Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution

The EHS Guidelines for Electric Power Transmission and Distribution include information relevant to power transmission between a generation facility and a substation located within an electricity grid, in addition to power distribution from a substation to consumers located in residential, commercial, and industrial areas.

4.6.2.1. Specific Impacts and management

The following section provides a summary of EHS issues associated with electric power transmission and distribution that occur during the construction and operation phases of a facility, along with recommendations for their management

Table 11: Summary of EHS Guidelines for Electric Power Transmission and Distribution

Effect	Description	Management
Environmental Impacts: Terrestrial habitat alteration; Aquatic habitat alteration; Electric and magnetic fields and hazardous materials.		
Terrestrial habitat alteration **Right-of-way**	**construction activities may transform habitats**, depending on the characteristics of existing vegetation, topographic features, and installed height of the transmission lines.	RoW (Right of Way) construction - Site transmission and distribution rights-of-way, access roads, lines, towers, and substations to avoid critical habitat through use of existing utility and transport corridors for transmission and distribution, and existing roads and tracks for access roads, whenever possible; - Installation of transmission lines above existing vegetation to avoid land clearing; - Avoidance of construction activities during the breeding season and other sensitive seasons or times of day; - Revegetation of disturbed areas with native plant species; - Removal of invasive plant species during routine vegetation maintenance (see right-of-way maintenance section below). Right of way maintenance: - Unchecked growth of tall trees and accumulation of vegetation within rights-of-way may result in a number of impacts, including power outages through contact of branches and trees with transmission lines and towers; ignition of forest and brush fires; corrosion of steel equipment; blocking of equipment access; and interference with critical grounding equipment. - Implement an integrated vegetation management approach (IVM). The selective removal of tall-growing tree species and the encouragement of low-growing grasses and shrubs.

Effect	Description	Management
		Observing manufacturer machinery and equipment guidelines, procedures with regard to noise, and oil spill prevention and emergency response; - Avoiding clearing in riparian areas; Avoiding use of machinery in the vicinity of watercourses.
Forest Fires	If underlying growth is left unchecked, or slash from routine maintenance is left to accumulate within right-of-way boundaries, enough fuel can accumulate that may promote forest fires.	- Monitoring right-of-way vegetation according to fire risk; - Removing blowdown and other high-hazard fuel accumulations; - Time thinning, slashing, and other maintenance activities to avoid forest fire seasons; - Planting and managing fire resistant species (e.g. hardwoods) within, and adjacent to, rights-of-way; - Establishing a network of fuel breaks of less flammable materials or cleared land to slow progress of fires and allow firefighting access.
Avian and Bat Collisions and Electrocutions	Avian collisions with power lines can occur in large numbers if located within daily flyways or migration corridors, or if groups are traveling at night or during low light conditions (e.g. dense fog). In addition, bird and bat collisions with power lines may result in power outages and fires.	- Aligning transmission corridors to avoid critical habitats; - Maintaining1.5 meter (60-inch) spacing between energized components and grounded hardware or, where spacing is not feasible, covering energized parts and hardware; - Considering the installation of underground transmission and distribution lines in sensitive areas (e.g. critical natural habitats).\ - Considering the installation of underground transmission and distribution lines in sensitive areas (e.g. critical natural habitats); - Installing visibility enhancement objects such as marker balls, bird deterrents, or diverters

Effect	Description	Management
Aquatic Habitat Alteration	Power transmission and distribution lines, and associated access roads and facilities, may require construction of corridors crossing aquatic habitats that may disrupt watercourses and wetlands, and require the removal of riparian vegetation.	- To prevent and control impacts to aquatic habitats include: Site power transmission towers and substations to avoid critical aquatic habitat (e.g. watercourses, wetlands, and riparian areas; - Minimizing clearing and disruption to riparian vegetation.
Electric and Magnetic Fields	Although there is public and scientific concern over the potential health effects associated with exposure to EMF (Electro Magnetic Field) (not only high-voltage power lines and substations, but also from everyday household uses of electricity), there is no empirical data demonstrating adverse health effects from exposure to typical EMF levels from power transmissions lines and equipment. However, while the evidence of	- Evaluating potential exposure to the public against the reference levels developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). Average and peak exposure levels should remain below the ICNIRP recommendation for General Public Exposure; - Considering siting new facilities so as to avoid or minimize exposure to the public. Installation of transmission lines or other high voltage equipment above or adjacent to residential properties or other locations intended for highly frequent human occupancy, (e.g. schools or offices), should be avoided; - If EMF levels are confirmed or expected to be above the recommended exposure limits, application of engineering techniques should be considered to reduce the EMF produced by power lines, substations, or transformers. Examples of these techniques include: Shielding with specific metal alloys; Burying transmission lines; Increasing height of transmission towers; Modifications to size, spacing, and configuration of conductors

Effect	Description	Management
	adverse health risks is weak, it is still sufficient to warrant limited concern.	
Hazardous Materials	They include insulating oils / gases (e.g. Polychlorinated Biphenyls [PCB] and sulfur hexafluoride [SF6], and fuels, in addition to chemicals or products for wood preservation for poles and associated wood construction material. The use of SF6 should be avoided due to its potential GHGs potential effect.	- Replacing existing transformers and other electrical equipment containing PCB, and ensuring appropriate storage, decontamination, and disposal of contaminated units; - Prior to final disposal, retired transformers and equipment containing PCB should be stored on a concrete pad with curbs sufficient to contain the liquid contents of these containers should they be spilled or leaked. - The storage area should also have a roof to prevent precipitation from collecting in the storage area. - Disposal should involve facilities capable of safely transporting and disposing of hazardous waste containing PCB.
Wood Preservatives	The majority of wooden utility poles are treated with pesticide preservatives to protect against insects, bacteria, and fungi, and to prevent rot. The preservatives most commonly used for power poles are oil-based pesticides such as creosote, pentachlorophenol	- Poles should be pre-treated at an appropriate facility to ensure chemical fixation and prevent leaching, and to impede the formation of surface residues at the right-of-way. - Evaluating the cost and benefit of using alternative pole materials (e.g. steel, concrete, and fiberglass); - Consider use of alternative preservatives (e.g. copper azote); - Undertake appropriate disposal of used poles. Landfill facilities should be capable of handling wastes that may have chemical leaching properties.

Effect	Description	Management
	(PCP), and chromated copper arsenate (CCA).	
Projects Located in Degraded Airsheds or Ecologically Sensitive Areas	Eg: National Parks, Protected wetlands and any protected area	- Ensure that any increase in pollution levels is as small as feasible and amounts to a fraction of the applicable short-term and annual average air quality guidelines or standards as established in the project-specific environmental assessment. - Relocation of significant sources of emissions outside the airshed in question, use of cleaner fuels or technologies, application of comprehensive pollution control measures, offset activities at installations controlled by the project sponsor or other facilities within the same airshed, and buy-down of emissions within the same airshed.
Occupational Health and Safety: Mainly discussed in the general guidelines		
Live Power lines	Workers may be exposed to occupational hazards from contact with live power lines during construction, maintenance, and operation activities.	- Only allowing trained and certified workers to install, maintain, or repair electrical equipment; - Deactivating and properly grounding live power distribution lines before work is performed on, or in close proximity, to the lines; - Ensuring that live-wire work is conducted by trained workers with strict adherence to specific safety and insulation standards; - Workers should not approach an exposed energized or conductive part even if properly trained unless: The worker is properly insulated from the energized part with gloves or other approved insulation or the energized part is properly insulated from the worker and

Effect	Description	Management
		any other conductive object or the worker is properly isolated and insulated from any other conductive object (live-line work); - Where maintenance and operation are required within minimum setback distances, specific training, safety measures, personal safety devices, and other precautions should be defined in a health and safety plan; - Workers not directly associated with power transmission and distribution activities who are operating around power lines or power substations should adhere to local legislation, standards, and guidelines relating to minimum approach distances for excavations, tools, vehicles, pruning, and other activities; - Minimum hot stick distances may only be reduced provided that the distance remaining is greater than the distance between the energized part and a grounded surface.
Working at height on poles and structures	Workers may be exposed to occupational hazards when working at elevation during construction, maintenance, and operation activities.	- Testing structures for integrity prior to undertaking work; - Implementation of a fall protection program that includes training in climbing techniques and use of fall protection measures, inspection, maintenance, and replacement of fall protection equipment and rescue of fall-arrested workers, among others; - Establishment of criteria for use of 100 percent fall protection (typically when working over 2 meters above the working surface, but sometimes extended to 7meters, depending on the activity). The fall protection system should be appropriate for the tower structure and necessary movements, including ascent, descent, and moving from point to point; Installation of fixtures on tower components to facilitate the use of fall protection systems;

Effect	Description	Management
		- Provision of an adequate work-positioning device system for workers; Connectors on positioning systems should be compatible with the tower components to which they are attached; Hoisting equipment should be properly rated and maintained and hoist operators properly trained; - Safety belts should be of not less than 16millimeters (mm)(5/8 inch) two-in-one nylon or material of equivalent strength. Rope safety belts should be replaced before signs of aging or fraying of fibers become evident; When operating power tools at height, workers should use a second (backup) safety strap; - Signs and other obstructions should be removed from poles or structures prior to undertaking work; - An approved tool bag should be used for raising or lowering tools or materials to workers on structures.
Electric and magnetic fields Electric and magnetic fields (EMF)	Electric utility workers typically have a higher exposure to EMF than the general public due to working in proximity to electric power lines	- Identification of potential exposure levels in the workplace, including surveys of exposure levels in new projects and the use of personal monitors during working activities; - Training of workers in the identification of occupational EMF levels and hazards; - Establishment and identification of safety zones to differentiate between work areas with expected elevated EMF levels compared to those acceptable for public exposure, limiting access to properly trained workers; - Implementation of action plans to address potential or confirmed exposure levels that exceed reference occupational exposure levels developed by international organizations such as the (ICNIRP), and the Institute of Electrical and Electronics Engineers (IEEE).

Effect	Description	Management
		Action plans to address occupational exposure may include limiting exposure time through work rotation, increasing the distance between the source and the worker, when feasible, or the use of shielding materials.
Exposure to chemicals	They include handling of pesticides (herbicides) used for right–of-way maintenance, and exposure to PCB in transformers and other electrical components	- Train personnel to apply pesticides and ensure that personnel have received the necessary certifications, or equivalent training where such certifications are not required; - Respect post-treatment intervals to avoid operator exposure during reentry to crops with residues of pesticides; - Ensure hygiene practices are followed to avoid exposure of family members to pesticides residues.
Community Health and Safety		
Electrocution	Hazards resulting from direct contact with high-voltage electricity or from contact with tools/device in contact high voltage electricity.	- Use of signs, barriers (e.g. locks on doors, use of gates, use of steel posts surrounding transmission towers, particularly in urban areas), and education / public outreach to prevent public contact with potentially dangerous equipment; - Grounding conducting objects (e.g. fences or other metallic structures) installed near power lines, to prevent shock.
Noise and Ozone	**Noise** in the form of buzzing or humming can often be heard around transformers or high voltage power lines producing corona. Ozone, a colourless gas with a pungent odor, may also be produced. Neither the	- The management include to mitigate this impact during project planning stages to locate rights-of-way away from human receptors, to the extent possible and use of noise barriers or noise cancelling acoustic devices should be considered as necessary.

Effect	Description	Management
	noise nor ozone produced by power distribution lines and transformer carries any known health effect	

4.6.2.2. Performance Indicators and Monitoring

Environment: Environmental monitoring activities should be based on direct or indirect indicators of emissions, effluents, and resource use applicable to the project. Monitoring frequency should be enough to provide representative data for the parameter being monitored. Monitoring data should be analysed and reviewed at regular intervals and compared with the operating standards so that any necessary corrective actions can be taken.

Occupational Health and Safety: Projects should try to reduce the number of accidents among project workers (whether directly employed or subcontracted) to a rate of zero, especially accidents that could result in lost work time, different levels of disability, or even fatalities. Facility rates may be benchmarked against the performance of facilities in this sector in developed countries through consultation with published sources. Facilities should also maintain a record of occupational accidents and diseases and dangerous occurrences and accidents.

V. PROJECT ENVIRONMENTAL AND SOCIAL RISKS AND MITIGATION MEASURES

5.1. Beneficial social and environmental impacts

Rwanda Energy Access and Quality Improvement Project implementation will have both positive and negative impacts. The ultimate project beneficiaries will be households, businesses, and public institutions in Rwanda through the following channels: (a) a portion of the currently unelectrified households will get electricity connections (on-grid or off-grid); (b) the quality and reliability of electricity services will improve, enabling households and businesses to make better and productive use of electricity; (c) households using biomass for cooking are expected to get health and economic benefits by switching to cleaner cooking options and in particular women entrepreneurship will receive training from the component 4 on capacity building; and (d) a portion of currently unelectrified public institutions in Rwanda, including schools and health centres (all hospitals in Rwanda are electrified), will get electrified. Furthermore, by supporting electrification through solar off-grid solutions the project will help reduce greenhouse gas emissions if equivalent electricity were sourced from fossil fuel-based utility-scale power plants or emergency diesel power plants. REG will be a direct beneficiary of the project as it is expected to benefit from higher cost-recovery through improved operational efficiency (lower technical and commercial losses), and potentially higher revenues through increased electrification rate and improved quality of service. Finally, the GoR will benefit as improved cost-recovery for REG will ease the burden of fiscal transfers to REG, helping GoR to target other priority sectors, and a higher electrification rate and improved electricity services will help achieve the NST1 targets and consequently aid in economic growth. Only the component 4 as part of the Technical Assistance, extensive support will also be provided on the clean cooking component of the project, particularly on policy and regulatory improvement and entrepreneurship development, including targeted training for women entrepreneurs. The significance of these impacts would vary depending on the individual subproject, its size and location.

Table 12: Summary of potential positive environmental and social impacts

Component	Environmental Impacts	Social Impacts
Component 1 (Increasing access to grid electricity) Component 2 (Enhancing the efficiency of electricity service) Component 3 (Increasing access to off-grid electricity and clean cooking solutions)	- The project will increase access to electricity, promote energy efficiency, and substitute fossil fuels, and offset carbon emissions; hence ensuring a sustainable development. Therefore, the implementation of the project will reduce pressure on biomass use and reduce the emission of greenhouse gases, which would have otherwise been generated for power generation of similar capacity. - Furthermore, the project will lower the cost of economic infrastructure such as communication, transportation and distribution networks, financial institutions and markets and thus boosting development processes. The quality of life of the beneficiaries in the project area will be improved hence reducing the exploitation of natural resources. - The project is also expected to reduce the cost of fuel and the pressure on forests as energy source.	The EAQIP will bring various social benefits. Employment opportunities will be offered to skilled and non-skilled workers during construction and operation phases and other employment opportunities benefiting from electricity connection. Income generating activities are expected to be created hence contributing to poverty reduction and increasing revenues and sustaining social and economic development with women at the centers. In the long term, the successful implementation of this project will improve the quality of life including education, health and security. With transmission and distribution lines, there will be increased capacity and reliability of power supply. This additional capacity will have a positive impact by being able to meet the ever-rising power demand across the entire country.

Component 4 (Technical assistance, institutional capacity building, and implementation support)	- Sector performance improvements and forward-looking options for sector development; capacity building in planning, skills development, audit and compliance; and policy and regulatory improvement and entrepreneurship development, including targeted training for women entrepreneurs (under clean cooking solutions). - The policy and regulatory development/improvement part will comprise improving fuel/stove regulations, quality standards, testing capacity, and tax/tariff policies to support clean cooking market development. - Employment creation through promotion of clean cooking stove use by reducing taxes to make them affordable to the community; - CO2 emissions reduction through the taxation increment on charcoal used by mass community and shift to the LPG and clean cooking stove with lower emissions compared to charcoal. - Reduction of population who depend on the firewood thereby reducing the pressure to the national forest use.

Table 13: Summary of potential negative environmental and social impacts

Component	Activities	Potential impacts
Impacts during design and planning phase		
Component 1 (Increasing access to grid electricity Component 2 (Enhancing the efficiency of electricity service) Component 3 (Increasing access to off-grid electricity and clean cooking solution) (Refer to annex 12 referring to EHS guidelines for transmission and distribution lines; and annex 13 addressing guidelines for	Site selection, land acquisition, planning for civil, mechanical, engineering and electrical specifications, equipment and machineries to be procured, material storage and waste disposal measures; and specifications/designs of off-grid and clean cooking solutions, including waste management plans.	- Dispute and possible conflict over the land identified can arise owing to loss of crops, trees, absence of compensation and lack of dialogue with the Project Affected People (PAP). - Poor selection of project site for the transmission or distribution lines and associated substations/transformers can cause conflict over environmental degradation including the destruction of sensitive ecosystems or protected areas and physical displacement due to poor selection of tower location and substations associated to transmission lines. - Inadequate and poor designs and plans including storage of equipment and machinery and waste disposal can possibly cause environmental degradation. Unsafe storage of creosote treated poles is source of obnoxious odors for workers and general public. Polychlorobiphenils (PCBs) from transformers and capacitors at substations can cause soil and water pollution if used. - Inadequate and poor specifications/designs of off-grid and clean cooking solutions, including waste management plans for addressing the collection, storage, transportation and disposal of used solar panel and batteries.

Component	Activities	Potential impacts
management of solar panels and batteries including recycling/ safe disposal).		
Component 4: (Technical assistance, institutional capacity building, and implementation support) (Refer to subsection 5.2 and annex 5 r regarding detailed mitigation measures)	Technical assistance such as sector performance improvements and forward-looking options for sector development; capacity building in planning, skills development, audit and compliance; and policy and regulatory improvement and entrepreneurship development, including targeted training for women entrepreneurs (under clean cooking solutions), which will complement Component 3.	The policy and regulatory development/improvement part will comprise improving fuel/stove regulations, quality standards, testing capacity, and tax/tariff policies to support clean cooking market development. The adverse environmental and social impact foreseen: - Increasing CO2 emissions due to the promoted fuel type. - Increasing the pressure on the forest through increasing population depending on the firewood due to the increased and unaffordable prices. - Loss of employment for people who were working previously in the charcoal sector due to the increment in taxation on the charcoal.
Adverse Impacts during construction phase		
Component 1 (Increasing access to grid electricity	Rehabilitation of Hydropower plant and construction activities for poles, towers, transformers include	- Pose public health related issues such as HIV/AIDS, communicable and other sexually transmitted diseases (STDs) due to labor influx.

Component	Activities	Potential impacts
Component 2 (Enhancing the efficiency of electricity service) (Refer to annexes 11 and 12 for environmental and social management tools for addressing the potential impacts)	site earthworks which involve site preparation, clearing, stripping, grading, soil removal, backfilling, compacting, use of construction material sourcing areas (quarry and borrow pits), disposal of surplus, landscaping, shoring as required and final site cleanup.	- Noise pollution from construction machines and vehicles, accidents and hazards for both workers and general public from erection of steel poles, manual transportation of the wooden poles at long distance, cutting and concrete work. Injuries can result from trips and falls and other physical and mechanical hazards. - Particulate matter pollution during site clearance, excavation and spreading of topsoil during construction and exposure to diseases from construction materials can affect site workers and general public. - The excavation and construction activities may also affect physical cultural properties by displacement, damage or loss of structure from RoW location site. - Generation of solid waste such as packaging materials, plastics, scrap metal, timber remain demolition waste from Ntaruka HPP Rehabilitation and dumping around the site and in construction camps can pose threat to environment and public health. - Pollution of soil and water can also be generated from machinery fuel and lubricants contamination from accidental spills or unsound disposal or handling. In particular, transformers can experience a leak arising from a fault, poor handling and vandalism. These leaks may result in potential contamination of surface and groundwater as well as soil.

Component	Activities	Potential impacts
		- Clearing of indigenous vegetation and disturbance to biodiversity and disruption of ecosystem functions. - Excavation works for site preparation, access roads, and poles installation are likely to cause loss of soil cover. - Construction materials sourcing areas that include quarry and borrow pits sites are also likely to cause soil disturbance and soil erosion. - Traffic disruption due to the constructions site location when it is in the proximity of the main road, for the entry and exist of material supplying trucks. - Additional demand for water in addition to the existing demand due to different demanding activities. - Erosion due to the removal of vegetation cover for site preparation before cropping - labour camps may be a source of wastes including human ones posing the potential risk of poor sanitation - If not properly managed and disposed of, these types of wastes can create inconveniences; become breeding sites for water disease and their leachate pollute surface and ground water sources.

Component	Activities	Potential impacts
		- During construction activities, mainly on the component 2, subcomponent 1 of rehabilitating NTARUKA HPP will generate dust. - Transportation of materials to site will also generate dust. Decommissioning of existing structures can also create dust that is potentially hazardous. **Increase in soil water erosion and water contamination** - Sedimentation caused by Gravel/soil brought for any filling purposes and soil removed during site preparation which can be washed off to nearby streams, wetlands, rivers and low-lying areas. - Soil erosion may lead to sedimentation in rivers and wetland located downstream. Wastewater generated during construction and from labour camps can also contaminate drinking water sources. **Health risks and safety of workers and residents** - Accidental collisions with moving vehicles, strains from repeated movements or from lifting and heaving of heavy objects, slips and falls. - Accidental cuts from tools and machines are also safety risks. - Wet cement as an electronic material is corrosive on contact to with human skin. - Poor maintenance and hygiene in toilet may be sources of fly infestation and other pathogens that may cause water borne diseases such as diarrhoea, dysentery and typhoid fever.

Component	Activities	Potential impacts
Component 3 (Increasing access to off-grid electricity and clean cooking solutions) (Refer to annexes 12 and 13 for the environmental and social management tools for managing the potential impacts of component 3)	Off-grid solar connections to reach poorer more remote areas and clean cooking solutions	- Potential environmental, social and safety risks during transportation, installation, and operation (e.g. fire and explosion risks). - Deforestation due to the biomass used in clean cooking systems
Impacts during operation phase		
All components (Refer to annexes 11-13 for environmental and social management tools for addressing the potential impacts)	During operation phase, activities include maintenance of infrastructure such as transmission, distribution lines, solar home system and HPP.	- Bush/Vegetation clearance due to the maintenance of right of way. - Potential social adverse impacts include of electrocution, bite by snake or other insects, injury for workers and general public and risk of accidents to life property. - Water and soil pollution and risk on biodiversity due to the disposal of used creosote treated wooden poles.

Component	Activities	Potential impacts
		- Potential environmental and social risks from the distribution, storage and final disposal of used batteries containing hazardous waste; and disposal/recycling of solar panels. - Health and safety risks related to the maintenance of infrastructure from EMF, fire hazards, electrocution, falling from height, being cuts from sharp objects among others. - Leachates from transformers contain PCBs that are harmful to the environment. - Environmental and social impacts of Clean cooking solutions may results from resource use inefficiency related to local production and use of clean cookstove solutions and new regulations on taxes as part of TA and these include: Increasing CO2 emissions due to the promoted fuel type; Increasing the pressure on the forest through increasing population depending on the firewood due to the increased and unaffordable prices; Loss of employment for people who were working previously in the charcoal sector due to the increment in taxation on the charcoal; Unemployment due to the taxation increase on charcoal and decrease on the clean cooking stove due the promotion of environmental protection through energy efficiency. - Ntaruka HPP may have potential impacts and risks on aquatic biodiversity conservation and management of living natural resources, surrounding and

Component	Activities	Potential impacts
		downstream communities and ecological flow. It can also produce hazardous and non-hazardous wastes, and reservoir sedimentation.
Decommissioning phase		
Component 1, 2 and 3 (Refer to annexes 11-13 for the environmental and social management tools for managing the potential impacts of this phase)	Activities include dismantling of infrastructure of transmission lines, removal of storage facilities, disposal of spent batteries, CFLs and cookstoves	- Contamination of ground and surfaces water resources through unsound disposal of used CFLs which are hazardous to the soil and ground resources especially if disposed indiscriminately. - Dismantling of transformers is likely to cause noise and generate dust impacts and waste debris from equipment including oil spills and different hazardous materials.

5.2. Environmental and Social Management Plan (ESMP)

For the purposes of this Environmental and Social Management Plan (ESMP), the activities in the EAQIP that are likely to have adverse impacts are mainly expected to arise from the EAQIP components activities.

Mitigation measures involve avoiding of impact altogether, minimizing the impact, rectifying the impact and gradual elimination of impact over time. Depending on the nature, these measures will be implemented by all stakeholders and REG will oversee the overall coordination of its implementation

Mitigation measures are twofold: biophysical and socio-economic. Bio-physical measures relate to issues of project siting, re-vegetation and preventive measures like bush clearing, erosion, sedimentation and pollution control and good construction practices, proper waste management, Setting regulatory that promotes environmental preservation for component four which will involve new regulations and taxation policy, and application of Environmental Guidelines for Contractors. Socio-economic measures will include education and awareness, hygiene and sanitation training, rules and regulations and institutional support (including skills training and knowledge transfer) and avoiding to the extent possible the physical relocation of the Project affected People (PAPs), where not possible, PAPs should be fully compensated in compliance with World Bank ESS5, and National Expropriation Law 32/2015 of 11/06/2015 concerning the expropriation in public interest. The following table provides the generic Environmental and Social Management Plan (ESMP) and gives a link between the impacts of project activities and the mitigation measures put in place to minimize the adverse impacts and enhance the positive impacts during different project phases.

Table 14: Environmental and Social Management Plan

5.2.1. Planning and design phase

Project components/ Activities	Negative Impacts	Mitigation Measures	Responsibility	Cost Estimates (USD)
Temporally Land Acquisition/Permanent land acquisition, physical displacement and assets loss	Dispute and possible conflict over the land identified can arise owing absence of compensation and dialogue with the PAPs.	Ensure that the land identified for the project is acquired as per the requirements of the Government of Rwanda and World Bank guidelines in relation to land acquisition, resettlement and compensation Involve and meaningfully engage the PAPs, general public including administration, and local/traditional leaders in the transparent acquisition of the land. PAPs should be compensated prior to construction work and be given enough time to relocate where physical displacement is involved and this should be done in compliance with ESS5 of WB on Involuntary resettlement. Utilize the RPF document available and develop RAP to be used in temporary acquisition of the land and outline how the assets loss will be compensated.	EDCL EDCL-PCU, Contractors	Included in the contract
Site Selection	Poor selection of project site for the substation sites, RoW transmission and distribution lines and be an	Avoid construction sites in or near sensitive ecosystems where Possible. Any activity that is located within the sensitive ecosystem or protected area, should ensure that any increase in pollution	EDCL EDCL-PCU, BRD	Included in the contract

Project components/ Activities	Negative Impacts	Mitigation Measures	Responsibility	Cost Estimates (USD)
	environmental degradation threat that include the destruction of sensitive ecosystems such as wetlands or protected areas	levels is as small as feasible, and amounts to a fraction of the applicable short-term and annual average air quality guidelines or standards as established in the project-specific environmental assessment. Do not select land that contravenes the regulations of the Government of Rwanda in relation to natural resources and sensitive ecosystems Where there is no alternative for ROW in wetland ecosystems, ensure that existing water flow regimes and irrigation channels is maintained and/or re-established where they are disrupted due to works being carried out.		
Procurement (tendering, bidding and selection)	Poor recruitment of contractors without environmental and social consideration affect the implementation.	Solar companies should submit certificates of good working relationship with Enviro serve company which oversees e-waste management including recycling options in Rwanda. They should submit the waste management Plan for spent solar panels and batteries before being awarded contracts by the PIU.		
Plan Designs	Poor designs of plans, inadequate equipment and machinery specification Inadequate and poor designs	Ensure during planning and design to incorporate environmental sound design concepts as appropriate All designs, equipment and machineries including solar systems to be procured should include instructions on their environmental specifications and requirements		

Project components/ Activities	Negative Impacts	Mitigation Measures	Responsibility	Cost Estimates (USD)
	and plans including equipment and machinery can possibly cause environmental degradation and occupational hazards	All instructions or planning for civil, mechanical, engineering and electrical specifications including technical specifications must have stringent environmental obligations in accordance with the World Bank Group guidelines (such as WBG EHS guidelines), international or local guidelines whichever emerges as stringent in terms of environmental and social requirements. Documentation of availability of specific personal protective equipment and training needed to respond to an emergency. Job safety analysis to identify specific potential occupational hazards and industrial hygiene surveys, as appropriate, to monitor and verify chemical exposure levels, and compare with applicable occupational exposure standards. Design should be done by considering the line routes and project locations where the environmental and social impact is the lowest.		
	Poor planning of worksite waste management posing threat to environment and public health	Preliminary environmental and social assessment studies that include environmental impact assessment, planned mitigation measures, compensation measures as well as monitoring and follow up	Contractors	Included in the contract

Project components/ Activities	Negative Impacts	Mitigation Measures	Responsibility	Cost Estimates (USD)
		Programs		
Technical assistance, policy and regulatory improvement	Poor planning and setting the regulations without considering environmental and social impact of the regulations. Unemployment due to the taxation increase on charcoal and decrease on the clean cooking stove due the promotion of environmental protection through energy efficiency.	- Reviewing taxes of cook stoves equipment by putting in this sector the intensive that will make the cook stove affordable to the community. - The energy source/fuel to be used in the cook stove should be tested for the emissions and the biomass with lower emissions shall be used. - Reducing the tax of LPG (*Liquefied Petroleum Gas)* which will reduce the buying price to the community, which will help to reduce the pressure on the forest. - Increasing the tax on charcoal which is massively used by the community to reduce by the half the population who depends on firewood. - People who previously should be given the alternative and priority in the promoted fuel; e.g.: Clean cooking stove	REG RURA RSB MoE REMA	Included in Technical Assistance budget

5.2.2. Construction phase

Project components/ Activities	Negative Impacts	Mitigation Measures	Responsible	Cost Estimates (USD)
Construction of new access roads to or from existing road for transportation of the poles, transformers and other accessories	Loss of vegetation and potential soil erosion, siltation Fugitive dust may be emitted from construction works and stockpiles of materials including machinery as well as from truck traffic. This could cause health related impacts to the communities around and workers in the project site Stockpile and construction waste, increased water use, generation of wastewater Noise pollution from construction machines and	- Environmental guidelines as stipulated in the contract specifically: Implement soil erosion control measures such as protecting stockpiles through the use of silt fencing. Reduced slope angles should be used to minimize soil erosion during construction or to avoid surface run off and preventing siltation - Additional plantation and embankment using removed topsoil is recommended near sensitive locations - Conversion of access roads to new routes and roads - The dirt roads and exposed construction areas should be moisturized during the dry season to prevent or minimize the fugitive dust emissions. - Storage areas should be located outside of the habitation area Environmental and compliance monitoring by environmental officers Workers in	EDCL Construction Contractors, EDCL-PCU	Included in contract

Project components/ Activities	Negative Impacts	Mitigation Measures	Responsible	Cost Estimates (USD)
	vehicles,	the project site must be equipped with the necessary and required Personal Protective Equipment (PPE) prescribed by the construction industry		
	Accidents and hazards for both workers and general public from erection of steel poles concrete work. Injuries can result from trips and falls and other physical and mechanical hazards. Loss of livelihoods such as crop, trees	- Ensure safe design of the network structures - Provide provision to keep people away from the working site - Establish a Health and Safety construction plan covering all activities in compliance with the best Health and Safety Working practices/conditions. - Provide insurance to workers. - Provide adequate PPE for all workers and spare items for visitors.		

Project components/ Activities	Negative Impacts	Mitigation Measures	Responsible	Cost Estimates (USD)
		- Provide FIRST AID kits and have among the personnel persons having competencies in first aid assistance. - compensation of assets to be damaged including crops and trees.		
Noise	Noise and Vibrations from Equipment Operation Noise from construction activity may be significant.	- Transmission lines construction works will be carried out during daylight hours. If power outages are required, it may be necessary to carry out some works at night or weekends. In such cases, the local population will be informed sufficiently in advance through local media - All workers in the project site must be equipped with the necessary and required Personal Protective Equipment (PPE) prescribed by the construction industry but not limited to facilities to protect against noise impacts, safety helmets, boots, dust masks, gloves, overall, goggles etc.	EDCL Construction Contractors,	Included in the contract

Project components/ Activities	Negative Impacts	Mitigation Measures	Responsible	Cost Estimates (USD)
		- Reduce vehicle speeds (stick to recommended speeds) in populated areas - For workers noise levels shall be kept below 80 dB (A), wherever possible. In case of exceeding this value, hearing protections must be provided to workers and warning signs must be installed - Notify nearby residents and businesses at least 24 hours in advance if particularly noisy activities are anticipated.		

Project components/ Activities	Negative Impacts	Mitigation Measures	Responsible	Cost Estimates (USD)
Health and safety	Accidents at workplace during construction from operating of machineries and equipment by workers	- Development of an EHSP for the construction phase, in advance of construction activities - Development of EHSP for the construction phase (shall include Waste Management Plan), in advance of construction activities - Implementation of health and safety workshops for construction workers - Hire only experienced workers for specific jobs, such as working at heights, handling large equipment and machinery, handling hazardous material, which required highly specialized training. Train workers accordingly in regard to working at heights, electrical safety, vehicular safety, handling of hazardous materials, PPE, use of first aid and rescue techniques, emergency response, poisonous snakes etc.	EDCL, EUCL Construction Contractor	Included in construction costs

Project components/ Activities	Negative Impacts	Mitigation Measures	Responsible	Cost Estimates (USD)
		Provide first aid kits and fire extinguishers at all Project sites Forbid alcohol and other drugs at construction sites Limit occupational exposure to EMF (Electro Magnetic Field) by use of shielding materials, and train workers accordingly. The employer should ensure that qualified first-aid can be provided at all times. Appropriately equipped first-aid stations should be easily accessible throughout the place of work. All workers entering the construction site must be equipped with PPE including goggle, factory boots, overalls, gloves, dust masks, among others. The PPE should be those that meeting the international standards of PPE.		
	Community Health and Safety	- Ensure that traffic is not interfered by construction through proper traffic management		

Project components/ Activities	Negative Impacts	Mitigation Measures	Responsible	Cost Estimates (USD)
		- Notification of the public on upcoming construction, in advance of construction period - Public education and outreach efforts to provide information about hazard awareness, upcoming construction activities, safety measures, reporting unsafe conditions and environmental impacts, in advance of construction period - Inform population along public roads in advance in case of transporting heavy equipment - Provide adequate security measures to prevent accidents and injury (e.g. keeping speed limits on public roads, grounding objects) - Provide adequate security to prevent public access to the substations, work sites, hazardous materials and waste.		
Traffic.	Risks from Traffic Disruption, Congestion and/or Road Accidents	- Collaborate with local communities about traffic and pedestrian safety, in advance of construction period.	Construction Contractors, EAQIP, Coordination Unit.	Included in the contract

Project components/ Activities	Negative Impacts	Mitigation Measures	Responsible	Cost Estimates (USD)
Dust and Air Emission	Air Emissions and Ambient Air Quality)	- Reduction of speed and limited movement of vehicles - Use dust-suppressing water on unpaved roads, e.g. spraying of water with watering trucks in advance of transportation activities - Cover truck beds with tarps during material transport - Use dust-suppressing water spray during civil works, where necessary Store and handle material appropriately to limit dust (e.g. protect cement with tarpaulins) - Use equipment with dust suction devices in enclosed spaces during civil works, where necessary	EDCL Construction Contractors,	
Cultural heritage demolition, cemeteries	Establishment of distribution lines can lead to unearthing genocide sites hence cause	- Consultation should be undertaken with local authorities and communities to ensure that potential genocide memorial sites are avoided.	EDCL should make contacts with local authorities	

Project components/ Activities	Negative Impacts	Mitigation Measures	Responsible	Cost Estimates (USD)
	cultural strife.	- Accidental unearthing of such sites should be culturally handled in accordance with the cultural sites and requirements. - Avoid sitting infrastructure where people will be disturbed and where resettlement could be an issue. - Chance find procedures attached to this document on annex 10 will be followed in any archeological or culture heritage property is found.	and engage good collaborations.	
Excavation and construction may cause the damage and loss of culture properties.	Destruction of physical cultural property such as graves, found Archaeological Property among others	- All necessary and adequate care shall be taken to minimize impact on cultural properties which includes cultural sites and remains, places of worship including temples, mosques, churches and shrines, etc., graveyards, monuments and any other important structures as identified during design and all properties / sites / remains notified. No work shall spillover to these properties, premises and precincts. - The Contractor will be responsible for	EDCL should make contacts with local authorities and engage good collaborations.	Included in the project cost.

Project components/ Activities	Negative Impacts	Mitigation Measures	Responsible	Cost Estimates (USD)
		familiarizing themselves with the "Chance Finds Procedures" in case culturally valuable materials are uncovered during excavation or any project activities, including, annex 10. - Stop work immediately following the discovery of any materials with possible archeological, historical, paleontological, or other cultural value, announce findings to project manager and notify relevant authorities; - Protect artifacts as well as possible using plastic covers, and implement measures to stabilize the area, if necessary, to properly protect artifacts; - Prevent and penalize any unauthorized access to the artifacts; and - Restart construction works only upon the authorization of the relevant authorities. - The Chance Finds Procedures have been prepared to remedy such issues;		

Project components/ Activities	Negative Impacts	Mitigation Measures	Responsible	Cost Estimates (USD)
Destruction of existing infrastructures	Impact on existing infrastructures (water pipelines, existing power lines, telecommunications lines, fiber optic)	- Destruction of the existing infrastructures should be avoided - In case of transmission line or other infrastructures is damaged, the project will repair the damages and remove it in another appropriate site	EDCL Contractor	Included in the contract
Soil and Water pollution	Harmful and dangerous/Hazardous material	- Regular maintenance of all vehicles and machines at regular service stations, if possible - Maintenance and re-fueling of the construction equipment only on sealed and enclosed areas - Store all liquid materials (e.g. fuel, engine oil, etc.) and lubricants in locked tanks and on sealed and roofed areas - Store construction material as bags of cement etc. in containers in order to avoid rinsing out - Provide proper sanitation facilities - Design bunds around and oil collecting system beneath transformers to prevent contamination of soil and groundwater	EDCL Contractor	Included in contract

Project components/ Activities	Negative Impacts	Mitigation Measures	Responsible	Cost Estimates (USD)
		- Remove contaminated soil if spills occur and handle as hazardous waste - Collect contaminated spill materials and manage as hazardous waste - Prior to final disposal, retired transformers and equipment containing PCB should be stored on a concrete pad with curbs sufficient to contain the liquid contents of these containers should they be spilled or leaked. The storage area should also have a roof to prevent precipitation from collecting in the storage area. Disposal should involve facilities capable of safely transporting and disposing of hazardous waste containing PCB. - The NTARUKA HPP has Asbestos Containing Materials (ACM) and should be handled safely by: Training of staff who can potentially meet the material to avoid damage and prevent exposure. - The asbestos removal should comply with the Prime		

Project components/ Activities	Negative Impacts	Mitigation Measures	Responsible	Cost Estimates (USD)
		Minister's Instructions determining procedure for eradication of asbestos materials...52N° 002/03 of 05/05/2015.		
Risks from Waste	Non-hazardous waste generated at construction and decommissioning sites includes excess fill materials from grading and excavation activities, scrap wood and metals, and small concrete spills. Other non-hazardous solid wastes include office wastes. Hazardous waste includes contaminated soils, which could potentially be encountered on-site due to previous land use activities, or small amounts of machinery	- Construction contractor will have to clarify with local authorities, where different kind of wastes may be disposed of - Development of Waste Management Plan within the contractor's ESMP - Train workers in handling and disposal of recyclable, sanitary, solid, liquid and hazardous waste Segregate hazardous waste and store in suitable drums or containers in secure facilities (fitted with roofs, concreting, bunds etc.), and clearly identify hazardous waste - Dispose of oil-contaminated soil in adequate storage facilities - Store scrap metal (iron, steel, copper, etc.) onsite for later recycling including material already	EDCL Contractor.	Included in the contract

Project components/ Activities	Negative Impacts	Mitigation Measures	Responsible	Cost Estimates (USD)
	maintenance materials, such as oily rags, used oil filters, and used oil, as well as spill cleanup materials from oil and fuel spills.	stored onsite. - Establishing waste management priorities at the outset of activities based on an understanding of potential Environmental, Health, and Safety (EHS) risks and impacts and considering waste generation and its consequences - Establishing a waste management hierarchy that considers prevention, reduction, reuse, recovery, recycling, removal and finally disposal of wastes. - Avoiding or minimizing the generation waste materials, as far as practicable - Where waste generation cannot be avoided but has been minimized, recovering and reusing waste; - Where waste cannot be recovered or reused, treating, destroying, and disposing of it in an environmentally sound manner		

Project components/ Activities	Negative Impacts	Mitigation Measures	Responsible	Cost Estimates (USD)
Social Impacts		- Prioritize employment of local people for construction works (skilled and unskilled workers) - Improve recruitment of women for construction works - Health awareness workshops for workers by a health expert. Develop and implement a Grievance Redress Mechanism	EDCL Contractor.	Included in contract
	GBV (Gender based Violence) /SEA (Sexual Exploitation Abuse)/SH (Sexual Harassment)/VAC (violence against children)	- The contractor should attend and actively partake in training courses related to OHS, HIV/AIDS, GBV and VAC as requested by my employer. - Adhere to a zero-alcohol policy during work activities, and refrain from the use of illegal substances at all times. - Consent to a police background check. - Treat women, children (persons under the age of 18), and men with respect regardless of race, color, language, religion, political or other	EDCL Contractor; GBV Task force	Included in the contact

Project components/ Activities	Negative Impacts	Mitigation Measures	Responsible	Cost Estimates (USD)
		opinion, national, ethnic or social origin, property, disability, birth or other status. - Not use language or behavior towards women, children or men that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate. - Not participate in sexual contact or activity with children including grooming or contact through digital media. - Mistaken belief regarding the age of a child is not a defense. - Consent from the child is also not a defense or excuse. - Not engage in sexual harassment for instance, making unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct, of a sexual nature, including subtle acts of such behavior.		

Project components/ Activities	Negative Impacts	Mitigation Measures	Responsible	Cost Estimates (USD)
		- Consider reporting through the GRM (Grievance Redress Mechanism) or to my manager any suspected or actual GBV or VAC by a fellow worker, whether employed by my employer or not, or any breaches of this Code of Conduct.		

5.2.3. Operation phase

Components/ Activities	Negative Impacts	Mitigation Measures	Responsible Inst	Cost Estimates (USD)
Operation of maintenance	Employee and Public Health are at risk of fire	- Develop Environmental Health and Safety Plan (EHSP) and implement it conveniently. - Erect fire walls between or at new transformers foreseen in switchyard of s/s YTPC to prevent spreading of fire in case of an accident. - Storing flammables away from ignition sources and oxidizing materials. - Providing bonding and grounding of, and between, containers and additional mechanical floor level ventilation if materials are being, or could be, dispensed in the storage area - Where the flammable material is mainly comprised of dust, providing electrical grounding, spark detection, and, if needed, quenching systems	EUCL	Maintenance cost

Components/ Activities	Negative Impacts	Mitigation Measures	Responsible Inst	Cost Estimates (USD)
		- Defining and labelling fire hazards areas to warn of special rules (e.g. prohibition in use of smoking materials, cellular phones, or other potential spark generating equipment) - Providing specific worker training in handling of flammable materials, and in fire prevention or suppression		
Electric and magnetic fields	Electric and magnetic fields	- Shifts will be used to avoid long exposure to electromagnetic field during line and substations maintenance. - Evaluating potential exposure to the public against the reference levels developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). Average and peak exposure levels should remain below the ICNIRP recommendation for General Public Exposure; - Considering siting new facilities so as to avoid or minimize exposure to the public. Installation of transmission lines or other high voltage equipment above or adjacent to residential properties or other locations intended for highly frequent human occupancy, (e.g. schools or offices), should be avoided; - If EMF levels are confirmed or expected to be above the recommended exposure limits, application of engineering techniques should be considered to reduce the EMF produced by power lines and substations. Examples of these techniques include: Shielding with specific metal alloys; Burying transmission lines; Increasing height of transmission	EUCL	Maintenance cost

Components/ Activities	Negative Impacts	Mitigation Measures	Responsible Inst	Cost Estimates (USD)
		towers; Modifications to size, spacing, and configuration of conductors		
Solid waste	Little if any solid waste will be generated which includes conductor and tree cuttings	- All left over conductor cuttings to be disposed appropriately or be returned to the store for proper disposal. - Proper budgeting of materials to reduce wastage practice 3 Rs of waste management: reduce, reuse, recycle of materials - Properly Manage storage, transfer, and disposal of transformer oils according to industry standards	EUCL	Maintenance cost

Components/ Activities	Negative Impacts	Mitigation Measures	Responsible Inst	Cost Estimates (USD)
Ntaruka HPP operation.	Reservoir sedimentation; Changes to hydrological flow, Downstream community may be affected, sedimentation may affect biodiversity and production of Hazardous and non-hazardous wastes	- Carry out of watershed management in the reservoir area to minimize erosion and sedimentation in the Ntaruka reservoir; and Maximize useful life of the reservoir through continuous monitoring and use of sedimentation model for calculation of reservoir sedimentation; - Maintain downstream flow through allowing the minimum ecological flow rate and following approved reservoir operation procedures. - Ensure proper waste management and use RURA licensed companies for waste collection and transportation to specific dumpsites on a regular basis. (For more about waste management plan refer annex 13)	EDCL Contractor EUCL	Maintenance cost

5.2.4. Decommissioning

Components/ Activities	Negative Impacts	Mitigation Measures	Responsible Inst	Cost Estimates (USD)
Transformers, cables	Waste Debris from Equipment and Machines	- Ensure all the machines and equipment are disposed in the right places, Explore available recycling opportunities	EDCL	Included in decommissioning cost
CFLs Poor disposal of used CFLs	Likely to lead to ground and surface water contamination. CFLs contain mercury a hazardous heavy metal (substance) that is harmful to aquatic resources, soil resources and human population. Soil contamination is a likely adverse impact if the CFLs are dumped in an open dumping site without mitigation measures and controls. Soil contamination could impact on agriculture.	- Develop a waste disposal plan for the disposal of the CFL lamps. - Replacing existing transformers and other electrical equipment containing PCB, and ensuring appropriate storage, decontamination, and disposal of contaminated units; - Prior to final disposal, retired transformers and equipment containing PCB should be stored on a concrete pad with curbs sufficient to contain the liquid contents of these containers should they be spilled or leaked. - The storage area should also have a roof to prevent precipitation from collecting in the storage area. - Disposal should involve facilities capable of safely transporting and disposing of hazardous waste containing PCB.	EDCL	Included in decommissioning cost

Components/ Activities	Negative Impacts	Mitigation Measures	Responsible Inst	Cost Estimates (USD)
Disposal of obsolete batteries waste	- Adequate waste receptacles and facilities should be provided at project sites/camp sites	- Ensure that all spent/obsolete batteries from the solar panels are recycled	BRD	
Health and safety	Accidents during decommissioning including oil spills	- Apply the accidents reduction /mitigation impacts specified in the construction phase of the project	EDCL	Included in decommissioning cost

5.6 Environmental and Social Monitoring Plan-ESMP

This section sets out requirements for the monitoring of the environmental and social impacts of the EAQIP subprojects. Monitoring of environmental and social indicators will be mainstreamed into the overall monitoring and evaluation system for the project. In addition, monitoring of the implementation of this ESMF will be carried out by REMA and PIU Environmental and Social Safeguards Specialists.

The objective of monitoring is twofold;

1. To alert project authorities (i.e. EDCL primarily) by providing timely information about the success or otherwise of the environmental management process outlined in this ESMF in such a manner that changes can be made as required to ensure continuous improvement to EAQIP environmental management process (even beyond the project's life).
2. To make a final evaluation in order to determine whether the mitigation measures incorporated in the technical designs and the ESMP have been successful in such a way that the pre-project environmental and social condition has been restored, improved upon or is worse than before and to determine what further mitigation measures may be required.

5.6.1. Monitoring of environmental and social indicators

The goals of monitoring are to measure the success rate of the project, determine whether interventions have resulted in dealing with negative impacts, whether further interventions are needed, or monitoring is to be extended in some areas. Monitoring indicators will be very much dependent on specific project contexts.

5.6.1.1. Monitoring of participation process

The following are indicators for monitoring of the participation process involved in the project activities.

Number and percentage of affected households consulted during the planning stage;

- Levels of decision-making of affected people;
- Level of understanding of project impacts and mitigation;
- Effectiveness of local authorities to make decisions;
- Frequency and quality of public meetings;
- Degree of involvement of women or disadvantaged groups in discussions.

Monitoring of implementation of mitigation plans lists the recommended indicators for monitoring the implementation of mitigation plans.

5.6.2 Evaluation of Results

The evaluation of results of environmental and social mitigation can be carried out by comparing baseline data collected in the planning phases with targets and post-project situations.

A number of indicators would be used in order to determine the status of affected people and their environment (land being used compared to before, how many clean water sources than before, etc). In order to assess whether these goals are met, the EDCL EDCL-PCU Environmental and Social safeguard Specialists with technical support of the two environmental and social to be hired by EDCL will indicate in the EMP, parameters to be monitored, institute monitoring milestones and provide resources necessary to carry out the monitoring activities.

The following are some pertinent parameters and verifiable indicators/questions to be used to measure the ESMF process, mitigation plans and performance;

- Does the project have the environmental and social safeguards specialist?
- Does the project have the ESIA cleared by the RDB?
- Have the Civil Works from Contractors got considerable legal right to enforce the ESMP?
- At what rate are the civil works been monitored by EDCL and by the REMA?
- How many violations of the contractors/transporters have been recorded and at what rate are they occurring?
- How many RAPs have been fully executed before civil works?
- How many outstanding complaints and level where they are pending?
- How many recorded grievance cases have been settled within one year?

5.6.3. Monitoring of ESMF implementation

In addition to the Project Reports and ESIA studies required under the Organic Law, an Annual Audit on ESMF Implementation will be prepared by the EDCL. In addition, each large project that has been subject to an ESIA study (or RAP etc.) will also be required to produce a social and environmental audit report.

Table 15: Environmental and Social Monitoring Plan for all project phase

5.6.3.1. Monitoring during design and planning phase

Activity / Impact	**What** (Is the parameter to be monitored?)	**Where** (Is the parameter to be monitored?)	**How** (Is the parameter to be monitored?)		**When** (Define the frequency / or continuous?)	**Who** (Is responsible for monitoring?)
			Method	**Indicator**		
Land acquisition and assets loss	Utilize the RPF/ESMF document available and develop RAP (Resettlement Action Plan), ESIA/ESMP Implementation of RAP/ESIA/ESMP	Location of Project, RoW for distribution lines and access roads	Inspection of implementation of RAP/ESIA/ESMP Compensation of all PAPs	All compensation processes implemented and all PAPs with damaged assets paid.	Before construction begin and throughout construction activities	EDCL social and environmental safeguard specialists EDCL-PCU social safeguard specialists Concerned district authorities
Site selection	Avoid whenever possible to select sites that contravenes the regulations of the Government of Rwanda in relation to natural resources and sensitive Ecosystems	Location of Project distribution lines and NTARUKA HPP	Inspection of selected sites and possible alternatives	ESIA, ESMP approval certificate	During selection of construction sites and	EDCL design and planning directorate

Activity / Impact	**What** (Is the parameter to be monitored?)	**Where** (Is the parameter to be monitored?)	**How** (Is the parameter to be monitored?)		**When** (Define the frequency / or continuous?)	**Who** (Is responsible for monitoring?)
			Method	**Indicator**		
	Undertake detailed ESIA study or Environmental Management Plan on selected site				transmission line routes	Environmental and Social safeguard specialists Design consultant
Designs of plans, equipment and machinery	Ensure during planning and design to incorporate environmental sound design concepts as Appropriate and in compliance with WB EHS Guidelines. All designs, equipment and machineries to be procured should include instructions on their environmental specifications and requirements.	Designs plans and machinery, equipment specification	Checking the design and plans and electrical equipment to be used	Designs plans and electrical equipment which include environmental and social safeguards specifications	Before Constructio n works begin	design and planning directorate EDCL social and environmental safeguard specialists. Procurement Specialist
Specification	All instructions or planning for civil, mechanical, engineering and electrical specifications including technical specifications must have stringent environmental				Before Tender is Advertised and Tender Documents dispatched to	design and planning directorate EARP – PIU Environmental

Activity / Impact	What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)		When (Define the frequency / or continuous?)	Who (Is responsible for monitoring?)
			Method	Indicator		
	obligations in accordance with the World Bank EHS guidelines, international or local guidelines whichever emerges as stringent in terms of environmental and social requirements.				selected bidders	Safeguards Specialists

5.6.3.2. Monitoring during construction phase

Activity / Impact	What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)		When (Define the frequency/or continuous?)	Who (Is responsible for monitoring?)
			Method	Indicator		
Soil and Water Pollution (Part 1)	Regular maintenance of all vehicles and machines at regular service stations, if possible, maintenance and re-fueling of the construction equipment only on sealed and enclosed areas.	Construction sites at Project distribution lines and NTARUKA HPP	Inspection of maintenance records;	All vehicles and machines adequately Maintained, No unsuitable areas used for maintenance and re- fueling,	Regularly during construction and operation	EDCL social and environmental safeguard specialists EARP-PIU

Activity / Impact	**What** (Is the parameter to be monitored?)	**Where** (Is the parameter to be monitored?)	**How** (Is the parameter to be monitored?)		**When** (Define the frequency/or continuous?)	**Who** (Is responsible for monitoring?)
			Method	**Indicator**		
	Store all liquid materials (e.g. fuel, engine oil, etc.) and lubricants in locked tanks and on sealed and roofed areas. Store construction material as bags of cement etc. in containers in order to avoid rinsing out.		Visual inspection of maintenance and re-fueling areas;	All materials adequately stored Adequate number of sanitation facilities separately for men and women; and in proper condition		Environmental and Social safeguards specialists Supervision consultant
	Train workers in appropriate sanitation practices Train transporters and workers in spill prevention and control especially in handling of oil / fuel.		Inspection of training reports; Visual inspection of records;	All workers trained accordingly		

Activity / Impact	What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)		When (Define the frequency/or continuous?)	Who (Is responsible for monitoring?)
			Method	Indicator		
	Design bunds around oil collecting system beneath transformers to prevent contamination of soil and groundwater;		Transformers fitted with bunds and oil collecting system	All transformers fitted with bunds and oil collecting System.		
Soil and Water Pollution (Part 2)	Provide proper equipment (as drip pans) and implement procedures to handle transformer oil Provide spill-control materials to drivers and workers, in order to clean up spills, if Necessary	Construction sites at Project distribution lines and NTARUKA HPP	Inspection of equipment	Equipment provided	Regularly during construction and operation	EDCL social and environmental safeguard specialists
	Report and respond to spills promptly and train workers in how to report		Inspection of spill reports, and training records	Number of spill reports All workers trained accordingly		EDCL-PCU Environment al safeguards specialists Supervision consultant
	Remove contaminated soil if spills occur and handle as hazardous waste		Inspection of spill reports and storage areas	All contaminated materials adequately stored		
	Collect contaminated spill materials and manage as hazardous waste					

Activity / Impact	**What** (Is the parameter to be monitored?)	**Where** (Is the parameter to be monitored?)	**How** (Is the parameter to be monitored?)		**When** (Define the frequency/or continuous?)	**Who** (Is responsible for monitoring?)
			Method	**Indicator**		
Waste Management (Part 1)	Construction Contractor will have to clarify with local authorities, where different kind of wastes may be disposed of	Construction sites at Project distribution lines and NTARUKA HPP, and off grid part	Control of written agreement	Written agreement provided	In advance of construction works	EDCL Environmental and social safeguards specialists
	Development of Waste Management Plan within the ESMP		Control of Waste Management Plan	Waste Management Plan developed		
	Implementation of a Waste Management System		Control of Waste Management System	Waste Management System implemented	Regularly during construction and operation and decommissioning.	Supervision consultant
	Train workers in handling and disposal of recyclable, sanitary, solid, liquid and hazardous waste		Inspection of training records	All workers trained accordingly		
Waste Management (Part 2)	Segregate hazardous waste and store in suitable drums or containers in secure facilities (fitted with roofs, concreting, bunds etc.), and clearly identify hazardous waste	Construction sites at Project distribution lines and NTARUKA HPP	Visual control of storage areas at substation	All hazardous materials and scrap metal stored in appropriate storage areas	Regularly during construction	EDCL social safeguard specialists

Activity / Impact	**What** (Is the parameter to be monitored?)	**Where** (Is the parameter to be monitored?)	**How** (Is the parameter to be monitored?)		**When** (Define the frequency/or continuous?)	**Who** (Is responsible for monitoring?)
			Method	**Indicator**		
	Store used oil in suitable tanks and at proper areas at substation site including storage of already existing oil onsite					EDCL-PCU environmental safeguard specialists External expert
	Store scrap metal (iron, steel, copper, etc.) onsite for later recycling including material already stored onsite					
Employee Health and Safety (Part 1)	Development of an HSE (Health Safety and Environment) Policy for the construction phase, in advance of construction activities	Construction sites at Projectdistribution lines and NTARUKA HPP	Inspection of relevant documents	HSE Policy developed	In advance of construction works.	EDCL social and environmental and Social Safeguard specialists, EDCL-PCU environmental safeguard specialists
	Development of an EHSP for the construction in advance of construction activities			EHSP developed		
	Installation of an HSE Management System (HSEMS) during the construction phase			HSE Management System implemented;	Regularly during construction and operation phase	
	Make sure that all workers have a health Insurance;					

Activity / Impact	**What** (Is the parameter to be monitored?)	**Where** (Is the parameter to be monitored?)	**How** (Is the parameter to be monitored?)		**When** (Define the frequency/or continuous?)	**Who** (Is responsible for monitoring?)
			Method	**Indicator**		
	Provide proper sanitation facilities in adequate number;		Inspection of workers' health documents;	All workers have health insurance;		
	Provision of HIV /AIDS protection equipment for workers;		Visual inspection;	Adequate number of sanitation facilities and in proper condition;		
	Implementation of health and safety, workshops for construction workers;		Interviews and records	Workshops Implemented		
	Installation of warning signs "Danger of		Inspection	warning signs available on sites and Protection equipment provided;		
	Electrocution" at towers, substations etc.		Inspection of workshop			
	Provide workers with appropriate protective equipment (PPE) (dust, noise, thick gloves against snake bites etc.);		Visual inspection;	All workers provided with PPE;		

Activity / Impact	What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)		When (Define the frequency/or continuous?)	Who (Is responsible for monitoring?)
			Method	Indicator		
	Provide first aid kits and fire extinguishers at all Project sites and in all vehicles		Inspection of accident records, Interviews Visual inspection	First aid kits and fire extinguishers provided;		
Employee Health and Safety (Part 2)	Train workers in regard to working at heights, electrical safety, vehicular safety, handling of hazardous materials, PPE, use of first aid and rescue techniques, emergency response, poisonous snakes etc.	Construction sites at Project substation, transmission and distribution lines	Inspection of training records	All workers trained accordingly	Regularly during construction	EDCL social and environmental safeguard specialists EDCL-PCU environmental and social safeguard specialists
	Forbid alcohol and other drugs at construction sites		Inspection of incident records	No workers found under influence of alcohol or other drugs		
	Assure transfer of injured workers to hospitals in the case of serious accidents		Inspection of accident records	Workers transferred to hospital in case of serious accidents		

Activity / Impact	What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)		When (Define the frequency/or continuous?)	Who (Is responsible for monitoring?)
			Method	Indicator		
	Identify area emergency responders, hospitals, and clinics, and provide advance notice of Project activities	Area emergency responders	Interviews	Area emergency responders informed about Project activities	In advance of construction works	Supervision consultant
	Implement programs for medical screening, health and safety monitoring, and reporting	Construction sites at Project substation, transmission and distribution lines	Inspection of records	H&S programs implemented	Regular during construction	
	Limit occupational exposure to EMF by use of shielding materials, and train workers accordingly		Interviews Inspection of training records	Shielding materials in place. All workers trained accordingly.		
	Record all accidents and incidents		Inspection of records	Recording implemented		
Public Health	Ensure that traffic is not interfered by construction through proper traffic management	Residents living near Project/subproject construction/rehabilit	Inspection of complaints Interviews	No complaints from residents	Regularly during construction	EDCL social and environmental safeguards

Activity / Impact	What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)		When (Define the frequency/or continuous?)	Who (Is responsible for monitoring?)
			Method	Indicator		
and Safety (Part 1)	Notification of the public on upcoming construction	ation activities		Public informed About upcoming construction	In advance of construction	specialists
Public Health and Safety (Part 2)	Public education and outreach efforts to provide information about hazard awareness, upcoming construction activities, safety measures, reporting unsafe conditions and environmental impacts, in advance of construction period	Residents living near Project/subproject construction/rehabilitation activities	Interviews Inspection of complaints	Public accordingly informed No complaints	In advance of construction Regularly during construction	EDCL social and environmental safeguards specialists
	Inform population along public roads in advance in case of transporting heavy Equipment	Residents along public roads	Inspection of complaints and accident records	No complaints from residents; no accidents	Regularly during construction	
	Provide adequate security measures to prevent accidents and injury (e.g. keeping speed limits on public roads, grounding objects)	Residents living near Project/subproject construction/rehabilitation activities				

Activity / Impact	**What** (Is the parameter to be monitored?)	**Where** (Is the parameter to be monitored?)	**How** (Is the parameter to be monitored?)		**When** (Define the frequency/or continuous?)	**Who** (Is responsible for monitoring?)
			Method	**Indicator**		
	Provide adequate security to prevent public access to the substations, work sites, hazardous materials and waste	Residents living near Project construction/rehabilitation activities	Visual inspection of records	Security measures implemented and No incident recorded		
Noise (Part 1)	Reduce vehicle speeds in populated areas	Residents living near subproject Construction/rehabilitation activities	Inspection of complaints	No complaints from residents	Regularly during construction	EDCL social and environmental safeguards specialists EDCL-PCU Social and environmental safeguards specialists
	Allow truck movements only during daylight, but not between 7 pm and 6 am					
	Utilization of low sound power mechanical equipment like bulldozer, air compressor, concrete pumps, excavator, concrete mixer etc. whenever possible	Residents living near subproject construction/rehabilitation activities	Visual inspection of complaints	Low sound equipment used No complaints from residents		
	Regular maintenance and service of building machinery and other during construction Works		Inspection of maintenance records	Equipment regularly maintained		
Noise	Shut down or throttling down of noisy machinery to a minimum		Inspection of complaints	No complaints from residents	Regularly during	EDCL social and

Activity / Impact	**What** (Is the parameter to be monitored?)	**Where** (Is the parameter to be monitored?)	**How** (Is the parameter to be monitored?)		**When** (Define the frequency/or continuous?)	**Who** (Is responsible for monitoring?)
			Method	**Indicator**		
(Part 2)	For workers noise levels shall be kept below 80 dB (A), wherever possible. In case of exceeding this value, hearing protections must be provided to workers and warning signs must be installed		Instrumental measurement in case of particularly noisy activities	Noise level below 80 dB (A); if noise levels higher than 80 dB (A): workers fitted with PPE and warning signs installed	construction	environmental safeguards specialists EDCL-PCU Social and environmental safeguards specialists
	Notify nearby residents and businesses at least 24 hours in advance if particularly noisy activities are anticipated	Residents living near Project activities	Instrumental measurement in case of complaints Interviews	Residents informed in advance		
	Conduct noise-generating activities during normal work hours during the day	Construction sites at Project	Inspection of complaints	No complaints from Residents		
Air Quality (Part 1)	Reduction of speed and limited movement of Vehicles	Construction/Rehabilitation sites of Project	Inspection of complaints	No complaints from residents	Regularly during construction	EDCL and EDCL-PCU environmental safeguard
	Maintain vehicles and construction machinery properly, as recommended by suppliers		Inspection of maintenance	Equipment regularly		

Activity / Impact	**What** (Is the parameter to be monitored?)	**Where** (Is the parameter to be monitored?)	**How** (Is the parameter to be monitored?)		**When** (Define the frequency/or continuous?)	**Who** (Is responsible for monitoring?)
			Method	**Indicator**		
			Records	maintained		specialists
	Use dust-suppressing water on unpaved roads, e.g. spraying of water with watering trucks in advance of transportation activity	Unpaved roads used for transport	Inspection of complaints	No complaints from residents		Supervision
	Cover truck beds with tarps during material	Construction site at NTARUKA HPP and transmission lines				
	Transport					consultant
	Use dust-suppressing water spray during civil works, where necessary					
Air Quality (Part 2)	Use equipment with dust suction devices in enclosed spaces during civil works, where Necessary	Construction sites at and NTARUKA HPP and transmission lines	Visual inspection	Dust suction devices used where necessary	Regularly during construction	EDCL EDCL-PCU environmental safeguard specialists
	Store and handle material appropriately to limit dust (e.g. protect cement with tarpaulins)			Appropriate storage		
	Avoid unnecessary idling of construction machines and vehicles			No unnecessary idling		Supervision consultant
	Burning of rubbish onsite must be strictly Forbidden			No rubbish burned		

Activity / Impact	**What** (Is the parameter to be monitored?)	**Where** (Is the parameter to be monitored?)	**How** (Is the parameter to be monitored?)		**When** (Define the frequency/or continuous?)	**Who** (Is responsible for monitoring?)
			Method	**Indicator**		
Social Impacts (Part 1)	Prioritize employment of local people for construction works	Construction sites near NTARUKA HPP, transmission and construction lines	Visual inspection Interviews	Percentage of local people employed	Regularly during construction	EDCL EDCL-PCU Supervision consultant
	Improve recruitment of women for construction works			Percentage of women employed		
	Facilitate other economic opportunities for local communities	Residents living near substation		Other economic opportunities established		
	Health awareness workshops for workers by contractor	Construction sites	Inspection of workshop records	All workers participated		
Social Impacts (Part 2)	Develop and implement a Grievance Redress Mechanism	Construction sites at Project distribution lines and NTARUKA HHP	Inspection of grievances	Percentage of grievances adequately treated	Regularly during construction	EDCL EDCL-PCU Supervision consultant
	Announce start and duration of works through media and signs to the public in advance of construction period	Residents living near MV lines and NTARUKA HHP	Interviews	Public informed About construction works	In advance of construction	
Traffic	Use of existing access roads to construction	Residents living near	Inspection of	No complaints from	Regularly during	EDCL EDCL-

Activity / Impact	**What** (Is the parameter to be monitored?)	**Where** (Is the parameter to be monitored?)	**How** (Is the parameter to be monitored?)		**When** (Define the frequency/or continuous?)	**Who** (Is responsible for monitoring?)
			Method	**Indicator**		
Management	site	substation, MV lines and NTARUKA HHP	complaints	residents	construction	PCU
	Keep to speed limits in public roads	Construction/Rehabilitation sites at project transmission lines	Inspection of complaints Visual inspection	No complaints from residents	Regularly during construction	Supervision consultant
	Establish rights-of-way, speed limits onsite, vehicle inspection requirements, operating rules and procedures before commencement of construction			Speed limits, inspection requirements, operating rules established	Regularly during construction	
	Maintain vehicles regularly and use manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure	Construction/Rehabilitation sites of Project activities, Local communities	Inspection of maintenance records	Vehicles regularly maintained and approved parts used	Regularly during construction In advance of construction	EDCL social and environmental safeguards specialists
	Minimize transport distances by using locally sourced materials, if possible		Visual inspection	Locally sourced material used, if possible		EDCL-PCU Social and

Activity / Impact	**What** (Is the parameter to be monitored?)	**Where** (Is the parameter to be monitored?)	**How** (Is the parameter to be monitored?)		**When** (Define the frequency/or continuous?)	**Who** (Is responsible for monitoring?)
			Method	**Indicator**		
Traffic Management (Part 2)	Collaborate with local communities and authorities to improve signage, visibility and overall safety of roads, particularly along stretches located near power lines construction or HPP rehabilitation.		Visual inspection Interviews	Improvement of overall safety of roads started		environmental safeguards specialists
	Collaborate with local communities about traffic and pedestrian safety	Local communities Emergency responders	Interviews	awareness program about traffic and pedestrian safety established	In advance of construction	
	Coordination with emergency responders			Coordination established		

5.6.3.3. Monitoring during Operation and Maintenance

Activity / Impact	**What (Is the parameter to be monitored?)**	**Where (Is the parameter to be monitored?)**	**How (Is the parameter to be monitored?)**		**When (Define the frequency / or continuous?)**	**Who (Is responsible for monitoring?)**
			Method	Indicator		
Employee Health and Safety	Develop Health and Safety Management Plan (HSMP) and implement HSMS for operation and maintenance of substations	(NTARUKA HHP, stores and MV construction lines	Visual inspection	HSMP developed and HSMS implemented	Operation and maintenance	EDCL EDCL-PCU Environmental and social safeguards team
	Erect fire walls between transformers foreseen in switchyard of EARP substation to prevent spreading of fire in case of an accident			Fire walls erected		
Disposal of CFLs (Compact Fluorescent	Develop a waste disposal plan for disposal of the CFLs	Disposal area	Visual inspection	Availability of effective Waste disposal plan for CFL	Operation and maintenance	EDCL EDCL-PCU safeguards specialists REMA

Lamps) Pollution of land (soil), river and other natural water sources.						
Reservoir sedimentation: Changes to hydrological flow: hazardious and non-hazrdious wastes	Watershed management in the reservoir area that minimize erosion and sedimentation in the Ntaruka reservoir; and Maximize useful life of the reservoir through continuous monitoring and use of sedimentation model for calculation of reservoir sedimentation. Downstream flow maintenance through allowing the minimum ecological flow rate and following approved reservoir operation procedures. Having a waste collection, transportation and disposal subscription/ contract with licensed company including licensed companies for hazardous waste.	NTARUKA HPP and its surroundings including downstream community.	Visual inspection and public consultation on the nearby community	Availability of watershed management, and contract with waste management licensed company	Operation and maintenance	EUCL RDB REMA FONERWA

VI. ESMF SCREENING PROCEDURE

6.1.subproject screening, with reference to the E&S screening tools;

Subprojects and activities with either substantial or moderate risks will need to be reviewed for potential environmental and social impacts. The project is expected to produce net benefits; however, certain project activities may have environmental and social impacts that will require mitigation. For this reason, this project has been rated as substantial risk under the World Bank ESS1. The screening will further ensure that subprojects that may have potential adverse impacts are studied in greater detail including need for subproject specific ESIA, and the due diligence will be also critical to assess the social and environmental impact of the sub-project. As part of the identification of sub-projects, the project proponent will prepare a sample screening checklist. The screening checklist will lead to the preparation of an ESIA or ESMP Report for review by Rwanda Development Board (RDB). The ESIA will be prepared by independent consultants registered under RAPEP, who will be paid by the project implementing entity. The EARP's environmental and social Safeguards specialists will offer guidance in the preparation of the screening forms and project reports.

6.2.Steps of ESIA preparation in Rwanda

6.2.1. Project Brief Submission and Registration

As a first step in the ESIA process, a developer proposing to start a project shall notify Rwanda Development Board (RDB) in writing by submission of a Project Brief. The purpose of a Project Brief, which should be prepared as prescribed in this regulation, is to provide information on the proposed activity so as to enable RDB and Lead Agencies establish whether or not the activity is likely to have significant impact on the environment, and thus determine the level of ESIA necessary. The project brief submitted to RDB by a developer will be registered as the formal application for an ESIA.

6.2.2. Screening

Screening refers to the process a decision making on whether or not and at which level an ESIA is required. This is based on the Ministerial Order N^{o} 001/ 2019 of 15/04/2019 discussed in the previous section. It is through screening a project is classified as either of impact level (IL) 1, 2 or 3. The responsibility for scoping shall be that of the developers (or their ESIA experts) in consultation with Lead Agencies and all relevant stakeholders. Scoping is intended to establish important issues to be addressed in the environmental impact and eliminate the irrelevant ones. After scoping, RDB approves the terms of reference that would be used for carrying out the environmental and social impact study.

6.2.3. Baseline data collection and Analysis of Initial State

Baseline data describes status of existing biophysical and socio-economic environment at a location before intervention of the proposed project. Site-specific primary data on and around a proposed site should be collected by experts conducting the environmental and social impact study to form a basis for future environmental and social monitoring.

6.2.4. Impact prediction and analysis of alternatives

Impact prediction is a way of forecasting the environmental and social consequences of a project and its alternatives. This action is principally a responsibility of an ESIA expert. For every project, possible alternatives should be identified, and environmental attributes compared. Alternatives should cover both project location and process technologies. Alternatives should then be ranked for selection of the most optimum environmental and socio-economic benefits to the community. Once alternatives have been analysed, a mitigation plan should be drawn up for the selected option and is supplemented with an Environmental and Social Management Plan (ESMP) to guide the developer. The ESMP details (a) the measures to be taken during the implementation and operation of a project to eliminate or offset adverse environmental and social impacts, or to reduce them to acceptable levels; and (b) the actions needed to implement these measures.

6.2.5. ESIA Report

An environmental and social impact study culminates into preparation of a report by the ESIA experts. An ESIA report should provide clear information to the decision-maker on the different environmental scenarios without the project, with the project and with project alternatives. The developer is also required to produce an environment and social management plan (ESMP). Any modifications made by a developer to the ESIA report should be presented in form of an Environmental and Social Impact Report Addendum. All these three documents should then be submitted to REMA by the developer.

6.2.6. Public hearing

After completion of ESIA report the Environmental Law requires that the public must be informed and consulted on a proposed development. REMA may, if it deems necessary, conduct a public hearing before ESIA reports are appraised by its Technical Committee. Any stakeholders likely to be affected by the proposed project are entitled to have access to unclassified sections of the ESIA report and make oral or written comments to RDB. Rwanda Development Board shall consider public views when deciding whether or not to approve a proposed project.

6.2.7. Decision-making

During the decision-making and authorization phase, ESIA documents submitted to the Authority shall be reviewed by two decision-making committees: a Technical Committee and an Executive Committee constituted by RDB. If the project is approved, the developer will be issued with an ESIA Certificate of Authorization, which permits implementation of the project in accordance with the mitigation measures in the ESIA Report and any additional approval conditions.

6.2.8. Environmental and Social Monitoring

Monitoring should be done during both construction and operation phases of a project. It is done not just to ensure that approval conditions are complied with but also to observe whether the predictions made in the ESIA reports are correct or not. Where impacts exceed levels predicted in the environmental impact study, corrective action should be taken. Monitoring also enables RDB to review validity of predictions and conditions of implementation of the Environmental and Social Management Plan (ESMP). During implementation and operation of a project, monitoring is a responsibility of the developer and RDB.

6.3.Environmental and social documentation

6.3.1. Screening Checklist

Based on this application, the proposal will be reviewed and selection for the next stage of evaluation undertaken. At this selection stage, a first level of environmental and social screening takes place on the basis of the screening checklist completed by the proponent.

The screening checklist will be reviewed using the Review Form, to be completed either by the district officer in charge of environment or the EARP's Environmental Safeguards Specialist. Where there are social impacts indicated, the form will have to be reviewed in addition by EARP's Social Safeguards Specialist. The form prompts the reviewer to verify the information provided by the proponent and confirm the best course of action. The reviewer must consider the nature and location of the subproject and the anticipated impacts, and based on his/her judgment, confirm or propose the best course of action. The sample screening checklist is provided in the Annex 3

6.3.2. Terms of References for ESIA

This ESMF has prepared ToRs for ESIA preparation based on the guidelines for the content of ESIA report provided by RDB and this is discussed in the annex 6 of this document.

6.3.3. Generic Environmental and Social Management Plan (ESMP):

Generic ESMP provides guidance on procedures to be followed and standards to be met in implementing the EAQIP which should agree with national and the World Bank's Environmental and Social Framework. Institutional arrangements with clearly defined roles and responsibilities as well as monitoring protocols to be followed are presented to ensure that the required provisions are adhered to. The ESMP in this ESMF was prepared considering the activities of the proposed subprojects and activities and their impact mitigation measures were subdivided into four phases including activities in Planning Phase, Construction Phase, Operation Phase and decommissioning phase. The details about the generic ESMP is found in Annex 4 of this ESMF.

6.3.4. Grievance Redress Mechanism (GRM)

6.3.4.1.Introduction

A grievance mechanism has been developed for potential use by all interested stakeholders. The aim of the grievance mechanism is to achieve mutually agreed resolution of grievances raised by such stakeholders. This grievance mechanism ensures that complaints and grievances are addressed in good faith and through a transparent and impartial process, but one which is culturally acceptable.

Grievances raised by stakeholders need to be managed through a transparent process, readily acceptable to all segments of affected communities and other stakeholders, at no cost and without retribution. The grievance mechanism should be appropriate to the scale of impacts and risks presented by a project and beneficial for both a proponent/operator and stakeholders, especially PAPs.

The types of grievances stakeholders may raise include, but are not limited to:

i. Negative impacts on communities, which may include, but not be limited to financial loss, physical harm and nuisance from construction or operational activities;
ii. Health and safety risks;
iii. Negative impacts on the environment such as pollution of water ways, soil, and air;
iv. Relocation of utilities, and
v. Unacceptable behavior by staff or employees.

It is critical that stakeholders understand that all grievances lodged, regardless of the project phase or activity being implemented, will follow one single mechanism. The mechanism must not impede access to other judicial or administrative remedies.

6.3.4.2.Objectives of Grievance Redress Mechanism (GRM)

The GRM works within existing legal and cultural frameworks, providing an additional opportunity to resolve grievances at the local, project level. The key objectives of the GRM are:

i. Record, categorize and prioritize the grievances;
ii. Settle the grievances via consultation with all stakeholders (and inform those stakeholders of the solutions);
iii. Forward any unresolved cases to the relevant authority.

It is vital that appropriate signage is erected at the sites of all works providing the public with updated project information and summarising the GRM process, including contact details of the relevant Project Contact Person within the project implementation unit. Anyone shall be able to lodge a complaint and the methods (forms, in person, telephone, forms written in Kinyarwanda) should not inhibit the lodgement of any complaint.

6.3.4.3. Grievance Redress process

6.3.4.3.1. Project Level Grievance Redress Mechanism: Grievance Redress Committee (GRC)

As the GRM works within existing legal and cultural frameworks, it is organized in such a way that the Grievance Redress Committee (GRC) will comprise of local community representative, PAPs representative, local authority representative at village and cell levels, Contractor and Supervising firm representative. Members of GRC are presented below with their roles and responsibilities.

Many project related grievances are site-specific. Often, they are related to impacts generated during construction such as noise, dust, vibration, contamination, workers dispute etc. Most of the time, they can be resolved easily on site with the contractor commitment to implement the ESMP and proper supervision by the implementing agencies and administrative District officials. Other grievances are more sensitive especially when they are about land boundaries, or misunderstandings between affected households and the Contractor regarding access arrangements, properties accidently damaged by construction activities, accidents on sites among others. All these grievances and claims must be resolved as soon as they are received.

The grievance procedure at project level will be simple and administered at the extent possible at the local levels to facilitate access, flexibility and ensure transparency. All the grievances will be channelled via the Grievance Resolution Committees specifically established for the project at Cell, Sector and District level. Stakeholders will be allowed to use any means easily accessible to them to

voice their concerns and complaints such as filling a grievance form, sending an email, using phone etc. Complaints will be filled in a Grievance Register that will be distributed to GRC free of charge, this register will be available to the hierarchical level for verification of the complaint and an investigation will be carried out by the hierarchical committee members to verify its authenticity. Thereafter a resolution approach will be selected based on the findings. The decisions of the action to be taken will be communicated to all involved parties mainly in written form.

All measures will be undertaken to ensure that the grievance is solved amicably between the concerned parties. If the grievance is not solved at Cell level, Sector or District level, the courts of law will be the last resort. Efficiency in solving of the grievances will be of paramount importance. The selection of members for the sub-project grievance committee will be at the discretion of the PAPs to decide basing on information provided by the PIUs.

In practice, some complaints are expected to appear. This is on the assumption that all proposed works are within the public land where the farmer have many types of crops and trees, this will be specifically on the component one of Increasing access to grid electricity during grid connections for households, commercial and industrial consumers, and public institutions.

However, some complaints are likely to be associated with construction of medium voltage lines impacts. Most are received directly on site by the Contractor's Site Manager/Engineer who will mandatory be responsible to resolve these issues on site. The Contractor will inform and Grievance Committee (GRC) of these complaints and their outcomes, and of others not satisfactorily resolved that the Grievance Committee should take over. The GC will log these in the Complaints Register and inform the Project Implementation Unit.

At each level of the project GRC, complaints will be solved within a period of 24-48 hours or otherwise handed to the next level. Once at judiciary level, due process as mandated by the law will be followed depending on what the courts will require.

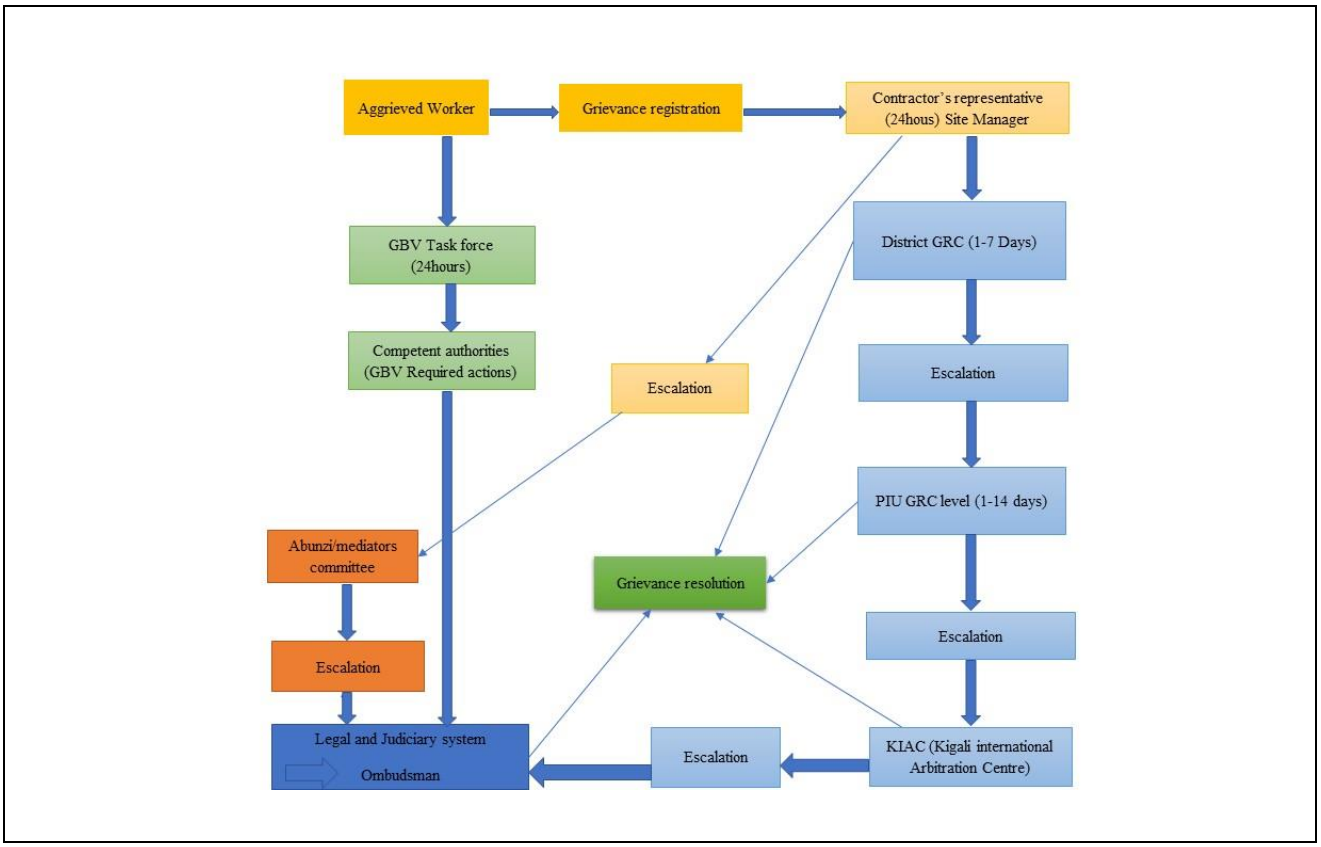
Through citizen engagement meetings the PAPs will be informed of the different grievance mechanisms in place for them to lodge their complaints and dissatisfactions.

6.3.4.3.2. Workers Grievance Redress Mechanism

Provisions in law N° 66/2018 of 30/08/2018 regulating labor in Rwanda will be applied for Grievance Redress Mechanism (GRM) for workers. A GRM shall be established under the EDCL-PCU to address complaints arising during the project implementation of all sub-components, including rehabilitation

works at the Ntaruka Hydropower Plant rehabilitation where no GRM exists as of appraisal. Project direct workers will be informed about the grievance redress mechanism during meetings at the time of the induction and where training will be provided where required, this will follow the same procedure as described in the approved REG manual of procedure for grievance management. Contracted workers will be informed about grievance redress mechanism through meetings at workplaces as well as notices to be made available at the workplace. The Grievance Redress Committees (GRCs) to be established as mentioned earlier will also handle the arising grievances. The process pertaining to how to go about grievances handling are documented for further reference. The worker's GRCs will be established based on below structure and will be followed by all contractors throughout the project implementation.

Figure 7: Structure of the Workers Grievance Redress Mechanism



The workers GRC shall be composed at Site level by the contractor representative, the supervising firm representative, and the workers representative at site level while the GRM at District level shall be composed of Labor inspector at District level as advisor, Project Liaison Officer, Workers representative, contractor representative, the supervising firm representative, and at PIU Level, the committee will be composed of the Social and Environmental safeguards Specialists, Project Coordinator, Human Resource Specialist under PIU, and contractor representative, the supervising firm

representative and workers representative. The EDCL-PCU will require contractors to develop and implement a grievance mechanism for their workforce including sub-contractors, prior to the start of design stage. The construction contractors will prepare their labor management procedure before the start of civil works, which will also include detailed description of the workers grievance mechanism.

A workers' GRC will be established at the Ntaruka Hydropower Plant rehabilitation, where no GRM exists as of appraisal.

The workers grievance mechanism will include:

- A procedure to receive grievances such as comment/complaint form, suggestion boxes, email, a telephone hotline;
- stipulated timeframes to respond to grievances;
- A register to record and track the timely resolution of grievances;
- A responsible department to receive, record and track resolution of grievances.

The Supervision firm's safeguards staff will monitor the contractors' recording and resolution of grievances, and report these to the EDCL-PCU in their monthly progress reports. The process will be monitored by the GRM Focal Point, the safeguards specialists will be responsible for the project GRM. The direct workers grievance mechanism will be described in staff induction trainings, which will be provided to the new recruited project workers. The mechanism will be based on the following principles:

- The process will be transparent and allow workers to express their concerns and file grievances;
- There will be no discrimination against those who express grievances and any grievances will be treated confidentially;
- Anonymous grievances will be treated equally as other grievances, whose origin is known;
- Management will treat grievances seriously and take timely and appropriate action in response.

Information about the existence of the grievance mechanism will be readily available to all project workers (direct and contracted) through notice displaying boards, the presence of "suggestion boxes", and other means of communication as required.

6.3.4.4. Grievance Channel for Gender-Based Violence

As Gender -Based Violence, Sexual Exploitation and Abuse or Sexual Harassment requires timely access to quality, multi-sectoral services and involves confidentiality and informed consent of the GBV

victim. To this end, MININFRA will develop a GBV Action plan that will include an Accountability and Response Framework, and this will form part of project C-ESMP. The GBV Action Plan will identify service providers in the project areas with minimum package of services (health, psychosocial, legal/security, safe house/shelter, and livelihood). The GBV Action Plan will also provide enough details to allow for the development of a localized referral pathways, will establish procedures of handling cases as part of the service providers mapping. The bidding documents will clearly define GBV requirements. During implementation phase, separate facilities for women and men will be recommended to all contractors with indication signage.

6.3.4.5. Primary supply workers

Where a significant risk of child labor or serious safety issues in relation to primary suppliers has been identified, the procedure for monitoring and reporting on primary supply workers will involve various measures that have been put in place to prevent and control them such as establishment of child labour prevention committees from District to Cell level. In the event of identification of child labour cases, it will be reported to concerned authorities (The labour law also provides for penal and administrative penalties in case of non-compliance with labour law provisions. In instances where local suppliers would be engaged, contractors shall be required to carry out due diligence procedure to identify if there are significant risks that the suppliers are exploiting child or forced labor or exposing worker to serious safety issues. In other hand where foreign suppliers would be contracted, contractors will be required to inquire during their procurement process whether the supplier has been accused or sanctioned for any of these issues and their corporate requirements related to child labor, forced labor, and safety. If there are any risks related to child and forced labor, and safety identified, in case of occurrence, the sanctions stipulated by Rwanda labour law will be applied.

6.3.4.6. Contractors management

The EDCL-PCU will use the Bank's 2018 Standard Procurement Documents for solicitations and contracts, and these include labor and occupational, health and safety requirements.

As part of the process to select design and build contractors who will engage contracted workers, the EDCL-PCU and/or the supervision consultant may review the following information:

- Information in public records, for example, corporate registers and public documents relating to violations of applicable labor law, including reports from labor inspectorates and other enforcement bodies in the Districts where the project will be being implemented;
- Business licenses, registrations, permits, and approvals;

- Documents relating to a labor management system, including OHS issues, for example, labor the prepared management procedures;
- Identification of labor management, safety, and health personnel, their qualifications, and certifications;
- Workers' certifications/permits/training to perform contracted work;
- Records of safety and health violations, and responses;
- Accident and fatality records and notifications to hierarchical authorities;
- Records of legally required worker benefits and proof of workers' enrolment in the related programs;
- Worker payroll records, including hours worked and pay received;
- Identification of safety committee members and records of meetings; and
- Copies of previous contracts with contractors and suppliers, showing inclusion of provisions and terms reflecting ESS2.

The contracts with selected contractors will include provisions related to labor and occupational health and safety, as provided in the World Bank Standards Procurement Documents 2018 and law N°62/2018 of 25/08/2018 governing Public Procurement in Rwanda and AfDB OS5–Labour conditions, health and safety. The Supervision Consultant will manage and monitor the performance of Contractors in relation to contracted workers, focusing on compliance by contractors with their contractual agreements (obligations, representations, and warranties). This may include periodic audits, inspections, and/or spot checks of project locations or work sites and/or of labor management records and reports compiled by contractors. Contractors' labor management records and reports may include: (a) a representative sample of employment contracts or arrangements between third parties and contracted workers; (b) records relating to grievances received and their resolution; (c) reports relating to safety inspections, including fatalities and incidents and implementation of corrective actions; (d) records relating to incidents of noncompliance with national law; and (e) records of training provided for contracted workers to explain labor and working conditions and OHS for the project.

6.3.4.7. Judiciary Level Grievance Redress Mechanism

The project level process will not impede PAPs access to the legal system. Local communities have existing traditional and cultural grievance redress mechanisms (Abunzi committees) established and regulated by law no 37/2016 of 08/09/2016 determining organization, jurisdiction, and competence and functioning of Abunzi committee. These are established at cell and Sector level to solve community-based conflicts and grievances their regulatory body being the Ministry of Justice. This mechanism cannot be overlooked by the project. The population can choose to use this channel instead

of the project GRC. The escalation at this level leads to the court process. At any time, the complainant may take the matter to the appropriate legal or judicial authority as per Rwanda National Legal procedure.

Figure 8: Grievance Redress Process for the implementation of EAQIP

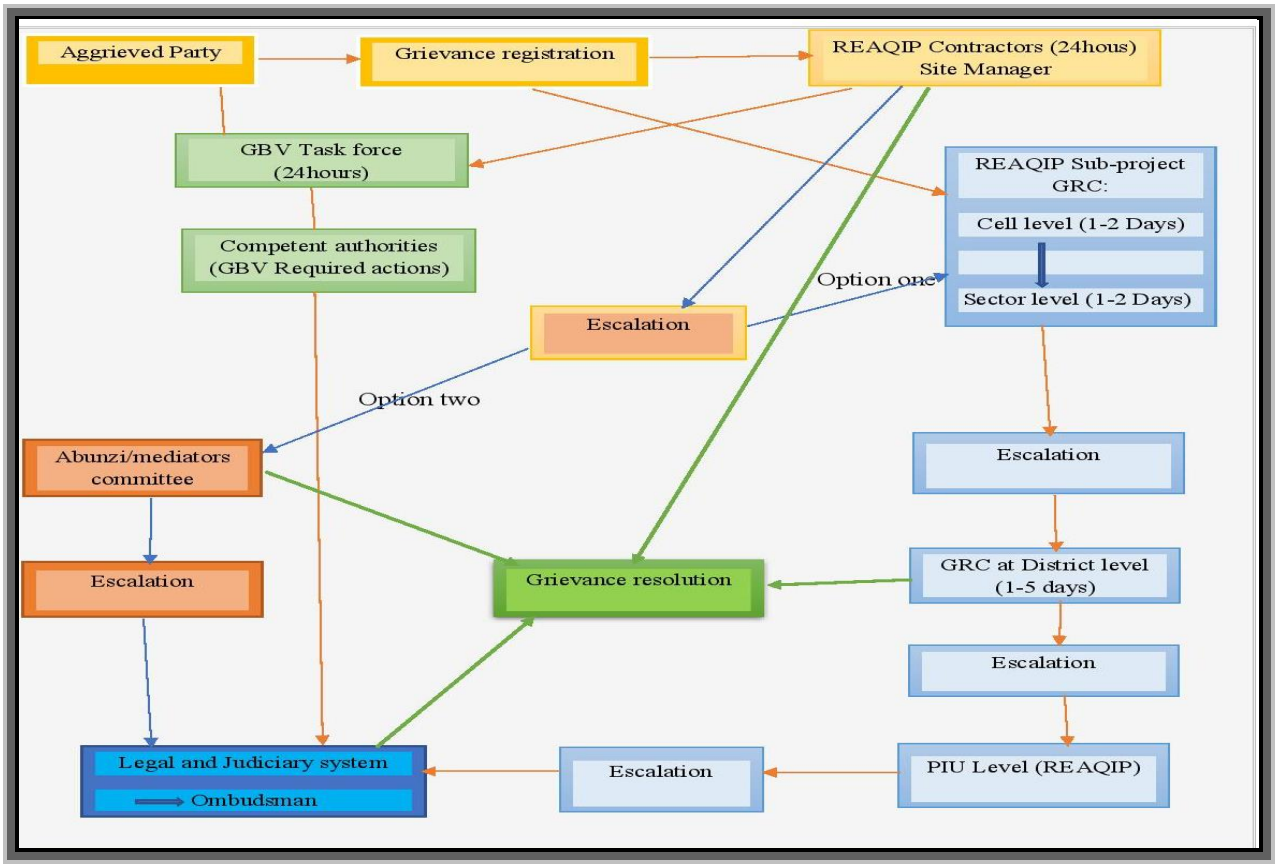


Table 16: Process, stage and timeframe for grievance resolution

Stage	Process	Duration
1a	Since most of complaints during the execution of works involves directly the contractor, at first the Aggrieved Party (AP) will take his/her grievance to the contractor representative or site Manager of the relevant subproject who will endeavour to resolve it immediately. The contractor representative or site Manager will inform the District Electricity and Maintenance officer or the appointed focal project at the district level**.** Where AP is not satisfied, the complaint will be transferred to the Sub-project Grievance Committee (GC) at cell level. For complaints that were satisfactorily resolved by the Contractor, he/she will inform the GC and the GC will log the grievance and the actions that were taken. There is also a possibility that the AP directly takes his/her complainants directly to the GRC without going to the Contractor or Site Manager first. In this case, the GRC will solve it working with the Contractor or Site Manager.	24hours
1b	The AP may choose to escalate the grievance to the Abunzi Mediation Committee[4] especially if she/he is not directly linked to the sub-project.	Not fixed
2	On receipt of the complaint, the GRC at cell level will endeavour to resolve it immediately. In case the GRC at cell level fail to solve the complaint, it will be escalated to the GRC at Sector level. If unsuccessful, the GRC or the complainant then notifies District Officials.	1-2 days at Cell level 1-2days at Sector level
3	The District Officials where the project activities are being implemented, he/she will endeavour to address and resolve the complaint and inform the aggrieved party. The District Authority	1 – 5 days

[4] *The word Abunzi can be translated as 'those who reconcile' or 'those who bring together' (from verb kunga). In the traditional Rwanda, Abunzi were men known within their communities for personal integrity and were asked to intervene in the event of conflict. Each conflicting party would choose a person considered trustworthy, known as a problem-solver, and who was unlikely to alienate either party, the result is a set of Home-Grown Solutions - culturally owned practices translated into sustainable development programs.*

Stage	Process	Duration
	will refer the complaint to the Project Implementation Unit (EAQIP) with other unresolved grievances for their consideration.	
4	If it remains unresolved or the complainant is dissatisfied with the outcome proposed by the PIU, he/she is free to refer the matter to the court of law.	1 – 7 days
5	If the issue remains unresolved through the courts, then the ultimate step will be for the ombudsman. The decisions at this level are final.	Not fixed
6	The dimension represented in purple is strictly for GBV related matters. The AP will approach directly the GBV task force to ensure her/his anonymity and safety. However, in case the complaint was addressed first to the contractor's Site Manager, the latter is required to immediately refer it to the task force. The GBV task force will work with competent authorities to ensure the proposed official structure for GBV has respected to guarantee the victim the real justice and required medical care.	Not fixed

Table 17: Proposed Members of GRC and their roles under EAQIP.

No	Member of GRC	Roles and responsibilities
1	President (PAPs representative)	- Chairing meetings; - Give direction on how received grievances will be processed; - Assign organizational responsibility for proposing a response; - Referring cases to next level; - Speaks on behalf of GRC and s/he is the one to report to the cell or the sector administration level; - Represents the interests of aggrieved parties. - Give feedback on the efficiency of GRM.
3	Village leader	- Represents local government at village level; - Resolves and lead community level grievance redress

No	Member of GRC	Roles and responsibilities
		- Sends out notices for meetings; - Records all grievance received and report them to next local level
4	Cell executive secretary	- Proposes responses to grievances and lead in resolving community grievance unsolved from village level; - Records and reports all grievances received from village leaders; - Chairs sensitization meeting at the cell level during public consultations meetings; - Assists and guides in identifying vulnerable and disadvantaged groups within the cell. - Signs the valuations sheets for compensation facilitate a proper Resettlement Plan
5	Women and youth representatives	- Represent the interests of women and youth; - Advocate for equity and equal opportunities; - Help in prevention of sexual harassment and promote wellbeing of the women and youth - Take part in resolution of any grievance related to sexual harassment and any gender domestic violence that may arise; - Mobilize women and youth to be active in income generating activities specifically for opportunities in the project's intervention areas.
6	Contractor representative	- Receive and log complaints/grievances, note date and time, contact details, nature of complaint and inform complainant of when to expect response; - Handle complaints revolved around nuisance resulted from construction and endeavor to handle them satisfactory; - Inform engineer (supervisor) and GRC of received complaints/grievances and outcomes and forward unresolved complaints/grievance to GRC - Attend community meetings, respond and react to PAPs complaints raised concerning the contractor.

No	Member of GRC	Roles and responsibilities
7	Supervising firm representative	- Represent client (EDCL); - Ensure that all grievances raised have been responded to, and that the contractor responds to the complaints raised concerning them, - Attend community meetings and respond to all concerns related to EAQIP from community - Report on monthly basis the progress of GRM process.

Table 18: Proposed members of the GBV taskforce under EAQIP.

Institution	Staff position
PIU National level (EARP-EAQIP)	Environmental and Social Safeguard Specialists
PIU (District level)	Gender Monitoring Officer, Environmental and Social Safeguards Specialist
Contractor	Human Resources Officer, Social Safeguards Specialist
Supervising firm	Social Safeguards Specialist
NGO in GBV prevention and advocacy	Designated representative

As mandated by the law on gender equality, women representation will make up at least 30% of the GRC. All PAPs representatives will be directly elected by their peers and the number of members may vary depending on the context and particularities of each sub-project site characteristics.

The project will plan to facilitate any other person external to the project to communicate with the project, to provide or request for information or file a complaint. These arrangements are provided in the table below.

Table 19: Other methods of communication with the stakeholders

To communicate with the project stakeholders by sending their recommendations, claims, and observations are summarized in the following table.

Methods	Description
Project webpage	The ESF documents will be disclosed in the implementing agencies of the project – a specific webpage will be prepared for EAQIP containing project description, implementing arrangements and ESF documents including to communicate with the team, and the email, phone of contact of the concerned PIU Environmental Specialist or Social Safeguards Specialist.
Community project Displaying board	In a community selection point or the Administrative District, a Displaying board with project information, timeline, and information of the works, contractor, announcements will be placed and box for comments/suggestions will be placed with a lock so only the environmental or social safeguards can open and respond to any messages. Any complaint from a third party can be filed using this method.
E-mail, Telephone, instant message or other media	All contacts of the environmental and social safeguards of PIU at National or District Energy Project liaison officer will be made public to be used by any stakeholder or third party willing to ask for information, provide suggestion or file a complaint.

6.3.4.8. Grievance Logbook

The GRM Committee will ensure that each complaint has an individual reference number and is appropriately tracked, and recorded actions are completed.

The log will contain record of the person responsible for an individual complaint, and records dates for the following events:

i. Date the complaint was reported;
ii. Date the Grievance Log was added onto the project database;
iii. Date information on proposed corrective action sent to complainant (if appropriate);
iv. The date the complaint was closed out; and

v. Date response was sent to complainant.

6.3.4.9. World Bank Grievance Redress Service (GRS)

Communities and individuals who believe that they are adversely affected by a World Bank (WB) supported project may submit complaints to existing project-level grievance redress mechanisms or the WB's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service.
For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.

6.4. Monitoring of Complaints

The monitoring of complaints will be done by administrative districts and PIU at REG on regular basis. The monitoring team will be responsible for:

i. Providing the sub-project Resettlement and Compensation Committee with a Monthly report detailing the number and status of complaints;
ii. Any outstanding issues to be addressed; and
iii. Quarterly reports, including analysis of the type of complaints, levels of complaints, actions to reduce complaints and initiator of such action.

6.5. Resettlement Action Plans

Due to the fact that the Environmental and Social Standard 5 (Land Acquisition, Restrictions on Land Use and Involuntary Resettlement) has been triggered, an abbreviated or Resettlement Action Plan will be prepared in parallel with ESIA/ESMP, which the project will follow in order to restore livelihood and ensure full compensation for loss of asset and livelihood through a consultative and mutually agreeable process where applicable.

6.6. Review and clearance of the environmental and social instruments;

EAQIP Subprojects activities will need to be reviewed for potential environmental and social impacts. The project is expected to produce net benefits. However, certain project activities may have environmental and social impacts that will require mitigation. For this reason, this project has been classified Substantial risk under the World Bank ESS1. The subprojects are categorized among the projects which must undergo ESIA process before their implementation.

All ESSs instruments to be prepared should comply with the World Bank ESF, Ministerial order 001//2019 of 15/04/2019 discussed above and Law 48/2018 of 13/08/2018 on Environment in Rwanda. The documents will be prepared either by Independent consultant or PIU environmental and Social Safeguards specialists. They will be reviewed by the project safeguards team, the World Bank and finally be submitted to RDB for review and approval. However, some documents like RAP and other documents that may be required by the Bank but not demanded by RDB will only be submitted to and cleared by the Bank only. All ESIA and ESMP will be subject to RDB approval and evidenced by clearance certificate.

VII. PROJECT ENVIRONMENTAL AND SOCIAL CAPACITY ASSESSMENT, TRAINING RESPONSIBILITIES, AND IMPLEMENTATION ARRANGEMENT.

7.1. Capacity assessment

The capacity assessment conducted at the administrative district level in the implementation of environmental and social impacts management shows that a district has two departments in the environmental and social impact management. These are the one stop centre and the department of environment and natural resources management. However, the department of social protection sometimes intervenes in the management of social risks related to construction project implementation such as conflict redress mechanisms, and gender and inclusion. In the case of Electricity access, the staff in charge of electricity (District electricity Engineer) and land valuator are more involved. The PIU has environmental and social safeguards specialist with solid background in WB safeguards policies implementation and are now working for RESSP and REF in EDCL and BRD respectively. Moreover, the EDCL has the experienced environmental and social safeguards who are now working in Transmission lines. However, there is a need to train the existing safeguards staff on WB ESF to boost their knowledge and skills but also to enable them to train the remaining of the PIU and administrative Districts staff on the safeguard requirements.

7.2. Capacity development

Effective implementation of Environment and Social Management Framework requires technical capacity in the human resource base of implementing institutions as well as logistical facilitation. Implementers (Project PIU and Districts Liaison Officers) need to understand inherent social and environmental issues and values and be able to clearly identify indicators of these. Even with existence of policies and laws such as the Environment new Law (2018), evidence on the ground still indicates that there is significant shortcoming in the abilities of local and district level stakeholders to correctly monitor, mitigate and manage environmental performance of development projects. It is important for EDCL PIU staff, District Environmentalist, Districts Liaison Officers and Electricity Engineer to get the appropriate trainings to safeguards policies including WB ESSs and National environmental law and policy, which will help them ensuring that the project complies with Rwandese and WB's environmental and social standards and policies, and that the project adheres to this ESMF. Enough understanding of the mechanisms for implementing the ESMF will need to be provided to the various stakeholders implementing the sub-projects. This will be important to support the teams appreciate their role in providing supervision, monitoring and evaluation including environmental reporting on the project activities. The PCU should carefully analyze the project scope, their availability to the project activities and their capacity for the successful implementation of the project and its ESMF. The project will recruit 3 more safeguards specialists' staff additional to the 5 existing in the EDCL.

7.3. Implementation Arrangement

Effective implementation of the Environmental and Social Management Framework for EAQIP will require technical capacity in the human resource base of implementing institutions as well as logistical facilitation. Implementers need to understand inherent social and environmental issues and values and be able to clearly identify indicators of these.

The EAQIP will be implemented by EDCL and BRD. The existing EDCL-PCU has the necessary capacity for the project coordination, fiduciary, and safeguards management aspects and has been rated satisfactory for the ongoing Bank-supported portfolio under its mandate and BRD has the experience of managing the similar project under the existing Renewable Energy Fund Project. The social and environmental specialists existing in RESSP will ensure compliance with environmental and social safeguards related issues during the implementation of EAQIP subproject activities, public awareness, particularly among construction contractors and their works about the importance of undertaking development work while safeguarding the environment both biophysical and social environment.

The EAQIP will fund the capacity building of PIU staffs. The main objective of the training is to support the newly created entities to develop capacity and in the medium term to have in-house capacity to mainstream safeguard activities and to upgrade skills and carry regular outreach about the utility benefits of compliance. This will help to improve the effectiveness of stakeholders at various levels in the management of environmental and social impacts during planning, implementation and operation of EAQIP subproject, and this is good for continued implementation and sustainability of project activities.

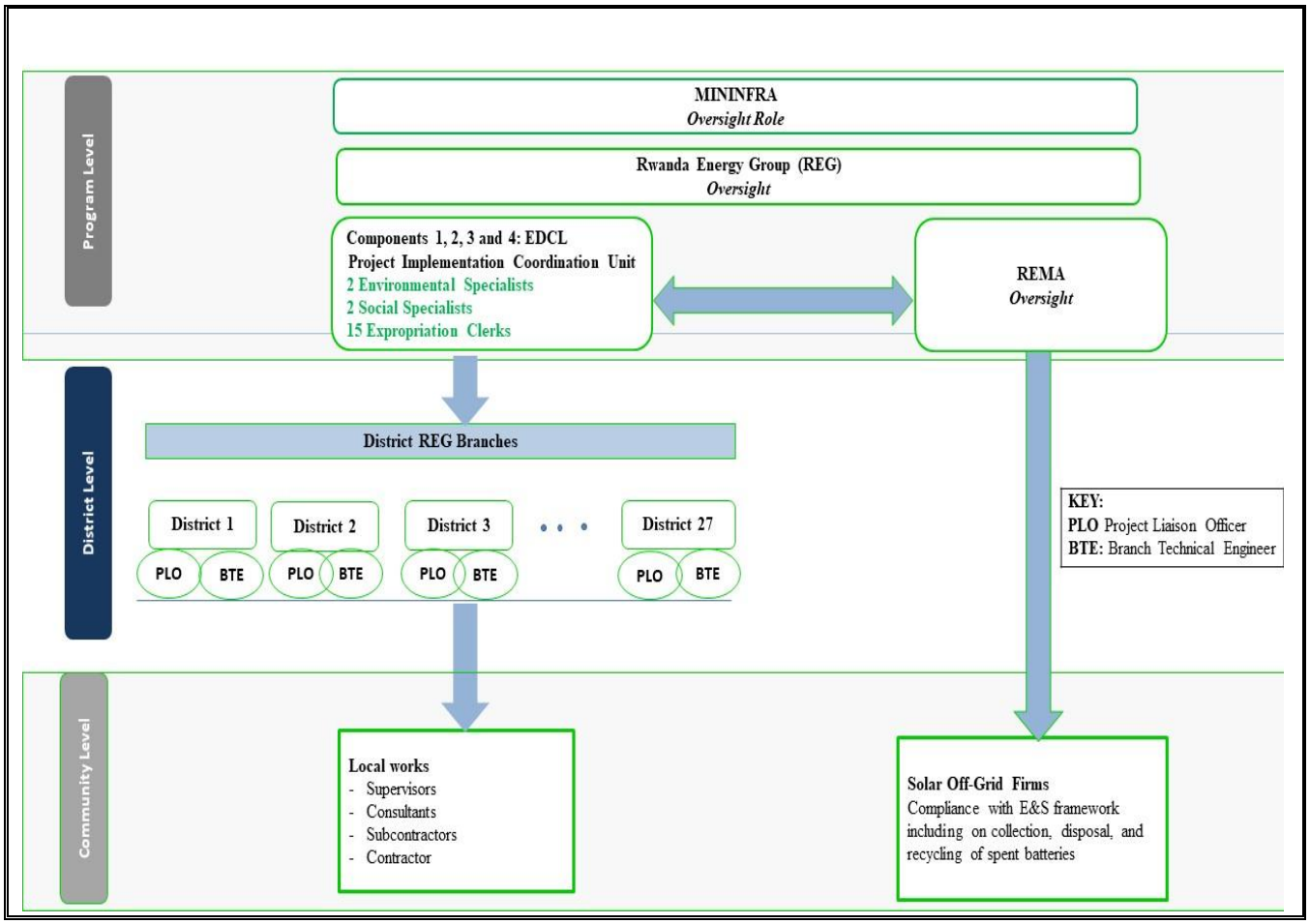
As regards the institutional capacity building of EDCL, BRD and the districts staff as the key stakeholders of EAQIP implementation at local level, are necessary in different aspects of the implementation of the ESMF, including interpretation and implementation of environmental impact management guidelines and the World Bank ESSs and EHS guidelines, including the EHS Guidelines for Electric Power Transmission and Distribution.

The BRD will lead implementation of Component 3, supported in certain technical aspects by EDCL**.** For the off-grid electrification and clean cooking subcomponents under Component 3, the BRD will take the lead in implementation while EDCL will cover certain technical aspects of implementation and verification. The BRD will receive applications from interested private sector firms for both off-grid access and clean cooking (under separate windows), appraise and approve eligible firms, with EDCL providing technical advice in the evaluation process. As the eligible firms expand operations across target consumers, they will be able to submit claims for disbursement under the RBF to the BRD. In terms of the Environment and Social risk management for this component, the BRD also has an adequate established ESMS under its REF that will apply to this component.

7.3.1. Responsible team and support

Given that ESMF activities will be implemented by several partners in 27 administrative Districts, there is a need to ensure that all concerned entities are included or kept informed on the ESMF implementation process during all stage of the project activities, the below figure illustrate the key concerned staff.

Figure 9: Safeguards Institutional Arrangement under EAQIP



7.3.2. Environmental and Social management Unit under EAQIP

The project will have an Environmental and Social Management Unit composed of:

a. National Team
b. District team
c. Contractor team
d. Supervision team

The PIU will have an Environmental and Social Management Unit composed of a Social Safeguards Specialist and an Environmental safeguards Specialist that are responsible for overseeing and coordinating all activities associated with ESMF, manage all activities related to database, logistics, and interaction with other departments of Implementing Agencies. The responsibilities will be as follows:

i. The implementation of ESMF activities will be directly managed by the Environmental and Social Management Unit based in EDCL PIU.

ii. For all components, Districts will have Project Liaison Officer who will work closely with the Branch Technical Engineer based at REG District Branch.

The PIU will have a Social and Environmental Specialist at National level with the responsibility of overseeing the compliance with the Environmental and Social Management Framework including collection, disposal and recycling the spent batteries in the community in collaboration with the E-waste recycling facility. District based Project Liaison Officer will be supporting the District in monitoring effectiveness of ESMF, represent and periodically report to PIUs issues and concerns related to Stakeholders.

The Environmental and Social management Unit at PIU and the Project Liaison Officer at District level will supervise the implementation of all resettlement activities. Furthermore, the Safeguard team will ensure that all stakeholder engagement aspects are a permanent item on all high-level management agendas and that all actions arising from management decisions are implemented. They will play a critical role as internal change agent for environmental/social and stakeholder-related matters in the PIU. This becomes important if environmental/social and stakeholder risks identified needs to be escalated for higher-level decision-making to identify a resolution. The Safeguards team is required to remain actively involved with the ESIA and ESMP process implementation in order to identify potential risks or opportunities and ensure that the necessary administrative support is provided. Moreover, grievances submitted as a result of project implementation, temporarily land acquisition/resettlement processes need to be addressed under the GRM scheme. Responsibilities of the Safeguard team are detailed in sections below:

7.3.3. Safeguard team and expropriation clerks based at EDCL-EARP PIU

The team is comprised of Environmental and Social Specialists based in EARP-EDCL PIU. The team main role is to: (detailed responsibilities are described in the EARP Program Implementation Manual), the safeguards team shall work closely with the expropriation clerks for speeding up the PAPs payments and other required documents when needed.

i. Oversee all environmental safeguarding aspects of project activities implemented under the Rwanda Energy Access and Quality Improvement Project;
ii. Lead the development of guidelines/manuals and trainings materials for contractors to support implementation of the ESMF and other safeguard instruments;
iii. Ensure a satisfactory implementation of the ESMF through frequent visits to project sites;
iv. Assess closely the efficiency of GRM and regularly communicate with GRCs
v. Ensure capacity building is provided to the GRCs through trainings,

vi. Update RPF and other safeguards instruments as required and recommend on necessary changes;

vii. Report on quarterly and annual basis the progress of ESMF and associated instruments to the WB and other development partners and facilitate external environmental audits if required

7.3.4. Project Liaison Officer at District level

Those will be EDCL-EARP staffs based at every administrative District supporting the PIU in fulfilling safeguard obligations. District Project Liaison officer and Branch Technical Engineer staff will oversee and monitor project's aspects related to environment, social, health and safety. The main responsibilities will include but not limited to:

(i) Supporting PIU Environmental and Social Management in EDCL-EARP, in assessing the effectiveness of RPF and associated documents as prepared;

(ii) Carryout regular site visits and take records of grievances logged by contractor and grievance committee and ensure complaints/grievances are handled following GRM;

(iii) Establish and maintain effective working relationships with safeguarding experts working for contractor and supervisor;

(iv) Liaise with District Administration Officials, supervising firm and contractors' safeguards to ensure that stakeholder ESMF requirements/protocols are understood;

(v) Carryout regular stakeholder's consultation, risk and impact assessment and propose mitigation measures for emerging issues;

(vi) Collect necessary data related to ESMF and other associated documents;

(vii) Collect necessary data related to off grid for the users;

(viii) Arrange field visits as required by PIU;

(ix) Report the implementation status of ESMF and prepared ESMP;

(x) Represent EDCL-EARP PIU in all field activities including meetings with stakeholders at district level.

7.4. Roles and Responsibilities of Rwanda Energy Group, EDCL-PCU

The ESMP/ESIA will address with specific details how the environmental and social impacts and their designed mitigation measures are to be monitored during implementation (construction/rehabilitation works) and operation (including maintenance stages). EDCL with the technical support of EDCL-PCU has the responsibility to successfully manage, mitigate or monitor any adverse impacts caused by their activities under this project during construction phase while during operation responsibilities to manage and maintain fall under EUCL responsibilities. EDCL assisted by EDCL-PCU environmental and

social safeguard specialists' team will monitor the implementation of the approved ESMP and technical designs.

7.5. Roles and Responsibilities of BRD

BRD will administer and disburse funds to companies/ contractors for the component 3 of the project while EDCL will be the technical counterpart. All safeguards responsibilities will be ensured by EDCL safeguards team and the implementation of this ESMF will be done by the same team.

7.6. Rwanda Environment Management Authority

REMA will play the leading oversight role of monitoring the EAQIP activities. REMA will carry out this role by ensuring that the environmental and social management plans (ESMPs) contained in the cleared design package is being implemented as specified therein. REMA will monitor the reports on a regular basis, perhaps quarterly. They will rely on a bottom up feedback system to them from the ground by going through the monitoring reports prepared by the EDCL's Environmental and Social specialist as well as consultants in cases where they will be used in preparing of the ESMP. REMA will also make regular site visits to inspect and verify for themselves the nature and extent of the impacts and the success or lack off, of the mitigation measures.

REMA will prepare brief consolidated periodic monitoring reports for submission to the World Bank.

7.7. EDCL and EDCL-PCU

The EDCL-PCU Environment and Social Safeguards Specialists and using external qualified environmental consultants will screen the design (using all drawings, specifications for workmanship and materials, screening checklist and review forms in Annex 3), for the rehabilitation and new works, at the NTARUKA HPP and along the proposed distribution lines, that all planning, building and environmental laws and requirements are complied with, and to identify any adverse potential and social environmental impacts of the designs.

EDCL social and environmentalist and EDCL-PCU environmental and social specialists will work with the team of EDCL engineers to ensure that any adverse environmental impacts identified will be mitigated in the designs, before they are finalized. Some mitigation measures would be adjustments to the technical drawings, while others may require incorporation/adjustment of clauses to contract conditions or specifications for goods and workmanship. The EDCL engineers will also be provided with adequate training in environmental best practice aspects and management procedures related to design of distribution lines, effective mitigation and monitoring measures and reporting.

Where land acquisition that leads to resettlement is expected, such as at the distribution and access to electrical lines, the Social Safeguards Specialist will use the separately prepared and disclosed Resettlement Policy Framework for this project, to guide and manage external consultants to prepare on behalf of EDCL, the appropriate Resettlement Action Plans (RAPs), one for each affected site in accordance to the sub-project.

EDCL and EDCL-PCU social and environmental specialists using external qualified consultants will prepare an Environmental and Social Management Plan (ESMP) to accompany the final designs (including complete set of contract documents) which will include details of all mitigation measures, including RAPs or ARAP, which will be sent to World Bank for review and clearance.

Only after clearance of the ESIA/ESMP and from RDB can tenders be launched to select contractors to carry-out the works. RDB may require certain revisions to the ESIA before granting its clearance. Additionally, for sites affected by resettlement activities that lead to impacts on affected people requiring them to lose the assets, Construction works will commence after the PAPs are paid for their assets. The RAPs will be reviewed for compliance with the disclosed RPF.

7.8. Project administration and coordination

In Rwanda, each Ministry and independent agency have a unique PIU in charge of implementation of the project activities. This arrangement avoids the multiplication of development partners led PIUs within one Ministry implementing projects. PIU staffs are civil servants supported by national technical assistance recruited, as needed. This project will use the existing PIU for RESSP operating in the EARP and REF (PIU in BRD) which has experience of managing Line of credit and direct financing for off-grid electrification. EDCL will provide overall coordination of the project implementation and be technical counterpart for component three while BRD will administer and disburse the funds for the same component of the project. The implementation arrangement involves the following main actors:

- EDCL Project Coordination Unit (PCU) to coordinate all the project activities and be technical counterpart for component three of the project including the implementation and follow up of this ESMF;
- BRD to administer and disburse the funds for component three of the project;
- Energy Project liaison Officers to regularly monitor and report on environmental and social issues at districts level.
- The district land valuer from one stop centre will assist, the project valuer in the identification and demarcation of the properties of project affected people
- The Community who will be employed as manpower and get paid.

- The community will be member of grievance redress committee at Cell and Sector level

Note that the field officers based at districts will be coordinated by Environmental Safeguards Specialist and Social Safeguards Specialist who will be at the Central Level and these will be the ones to consolidate reports to be submitted to the World Bank. The Environmental and Social Safeguards Specialists and Field Officers will be provided with the Capacity Building Training for improvement of their capacity to follow up on environmental and social safeguards matters.

The project Implementation will be guided by the Project Implementation Manual (PIM).

7.9. Anticipated challenges based on lessons learnt from on-going projects (WB and other DPs)

7.9.1. Anticipated project challenges

The resettlement impacts present different challenges which should be handled fully so that the project be implemented smoothly. With respect to previous project implementation the main challenges included relocation issues, compensation payment delays, encroachment, disclosures meeting participation, contractors delaying to start which affect the relevancy of the RAP (Resettlement Action Plan), certified valuators using not updated asset prices and contractors using not enough skilled safeguards staffs. All challenges were addressed in the precious project but also, they served as a lesson learnt for this project to implemented with least challenges due to the preparedness at hand. The table below illustrate the challenge, which is anticipated, the reason that would contribute to the defect and the way to overcome the challenge which should be used for effective preparedness and timely project implementation.

Table 20: Anticipated challenges

Challenge	Reason	How the challenge will be addressed
Relocation issues	PAPs with family conflicts will pose a serious issue to the project involving physical relocation. Some other social issues like asset which were given like a collateral also may delay the relocation process. PAPs which are not on board due to different reason especially when they	- Engage fully local authorities and community court known as ABUNZI to handle family and social issues involving litigation to be resolved in advance. - To use public treasury account for compensation to people who are not on board during the required time as stipulated in the expropriation law 32/2015 of 11/6/20015.

Challenge	Reason	How the challenge will be addressed
	are not in the country and deny giving the power of attorney.	
Compensation payment delays	PAPs with family conflicts will pose a serious issue to the project involving physical relocation. Some other social issues like asset which were given like a collateral also may delay the relocation process. PAPs which are not on board due to different reason especially when they are not in the country and deny giving the power of attorney. PAPs who do not have the land titles` PAPs without the Bank account PAPs without National ID	- Engage fully local authorities and community court known as ABUNZI to handle family and social issues involving litigation to be resolved in advance. - To use public treasury account for compensation to people who are not on board during the required time as stipulated in the expropriation law 32/2015 of 11/6/20015. - Work closely with Local Government Officials to deliver the required document for compensation on time and the District One Stop Center role will be crucial.
Encroachment	PAPs who can build houses in the Right of Way with intention to be compensated for their houses after the cut-off date is proclaimed.	- To work closely with local Government Officials for timely information transmission. - Contractor staffs on board should regular check the irregular activities in the line routes. - To establish Grievance Redress Committees at all cell levels and make sure that they are trained for timely reporting. - To announce the cut off date to all concerned PAPs using UMUGANDA (Community works) and community

Challenge	Reason	How the challenge will be addressed
		assemblies' meetings.
Disclosures meeting participation	PAPs who are not available during the public disclosure and hence do not raise their issues on time due to different reason such as people who are not in localities during the disclosure time, people who were not informed of the disclosure activity, People who neglected the attending due to their mindset.	- Work closely with Local Government Officials and GRC for mobilization to attend, and the relevancy of the meeting. - Prepare in advance the disclosure and be communicated publicly in different meetings assembling public.
Contractors delaying to start which affect the relevancy of the RAP	Some contractors may delay to start the works or may even fail to deliver and quit without any single activity as the case experienced by RESSP for Overseas Infrastructure Alliance (India) Private Limited which completely failed to deliver and this resulted in the contract termination after two years of delay.	- Procurement should consider the past performance of the contractor within the country for the same duties where possible.
Certified valuators using not updated asset prices	Valuators who use the prices which are not up to date and result in over valuation or under valuation of assets because the prices that are set by IRPV are updated annually and based on real market value.	- Regular inspection of valuators during asset inventory exercises and be ready to notice any inconsistency in the valuation on time. - To work closely with IRPV to handle the insolvent valuators.
contractors using not enough skilled	Contractors who make internal recruitment and recruit inexperienced staff due to different reason including the reason that experienced worker are	- EDCL should make sure that every safeguard staff's CV is approved by the project for competitiveness.

Challenge	Reason	How the challenge will be addressed
safeguards staffs	expensive, hence they fail to perform the safeguards duties properly.	

7.10. ESMF Implementation Activities and allocated Budget

The total budget for the ESMF implementation is estimated at US$ 277,500.00, taking into account of existing current norms and expert estimates for proposed activities. The estimated total budget is highly influenced by the number of connections and MV lines that would require a full or partial environmental assessment to be undertaken before and during the subproject's implementation. The budget for the implementation of the project environmental and social enhancement measures will be detailed while preparing ESIAs or ESMPs for EAQIP subprojects. The budget stands open for revision and improvement as and when needed by REG/EDCL.

The ESMPs are site-specific and will be prepared at each subproject site in consultation with EARP Environmental and Social Safeguards Specialists. The ESIA will be prepared by the ESIA experts following the ESIA guidelines in Rwanda. Actions to be undertaken before and during the project implementation include (1) Training and capacity building for the project PIU; (2) Training and capacity building for Project Liaison Officers, contractor staff and supervisor staff, including the supporting staff, PAPs and local communities; (4) Preparation of ESIA for subprojects with that conditions; (5) Preparation of ESMP for subprojects, (6) Implementation of Environmental and Social Management Plan (ESMP); Monitoring and evaluation of ESMPs; and Implementation of grievance redress mechanism. The cost associated with these activities is shown in Table below.

Table 21: Indicative Budget for the ESMF implementation

No	Activity to be undertaken	Number (Districts)	Unit cost (USD$)	Unit cost (USD$)
1	Training and capacity building for the project PIU	14	185	5,000
2	Training and capacity building for District Environment Officers, District Electricity Engineers, contractor staff and supervisor staff, including the supporting staff	14	556	7,500

No	Activity to be undertaken	Number (Districts)	Unit cost (USD$)	Unit cost (USD$)
3	Tranings of contractor staffs, consultation meetings with PAPs and local communities	14	741	10,000
4	Preparation of ESIA for the projects	14	LS	50,000
5	Preparation of ESMP for different subprojects	14	LS	55,000
6	Implementation of Environmental and Social Management Plan (ESMP)	14	LS	120,000
7	Monitoring and evaluation of ESMPs	14	LS	15,000
8	Implementation of grievance redress mechanism	14	LS	15,000
	Total			**277,500**

LS: Lump Sum

VIII. PUBLIC CONSULTATION AND DISCLOSURE

8.1. Disclosure of the ESMF

The ESMF serves as the project's umbrella for the environmental and social management document, setting out the strategy to screening process that will ensure capturing all the project's environmental and social issues. Disclosure of ESMF should conform to the Public Communications Policy of the WB: Disclosure and Exchange of Information which requires that the ESMF document for WB projects be accessible to the interested parties and the general public. As soon as the client (MININFRA) receives the cleared ESMF from the development partners, should initiate the process of public hearings which includes the disclosure of the ESMF document, arrangement of communication interaction with stakeholders and conduct public hearings. At the same time, the bidding commission shall include draft check list for ESMPs in the bidding packages and add a provision specifying that if new information arises out of (may occur in parallel) public hearings for the ESMPs to be updated, without effect on the budget of contracted companies (it is extremely rare occasion when changes in ESMPs checklists on the basis of public hearings require a significant budget increase which can put bidders at risk). After the successful contractor is selected, the contractor prepares site specific ESMP with due account of the contractor's equipment, technology, status of the facility etc. This document shall be included in the first monitoring report on the sub-project.

8.2. Public Consultation

The public consultation for this ESMF was carried out in 27 administrative districts within the four provinces of Rwanda (Eastern, Western, Northern and Southern) and different relevant institutions from 20th January 2020 to 26 February 2020 and the result of public consultation showed that this project is urgently needed by the population but also some issues were raised concerning the delay in compensation payment. All stakeholders consulted promised to support the project as indicated in the Annex 7 of Public consultation outcomes.

Public participation and community consultation will continue to be an integral part of social and environmental assessment process of the project. Consultation is used as a tool to inform project affected people, beneficiaries and stakeholders about the proposed activities both before and after the development decisions are made. It assisted in identification of the problems associated with the project as well as the needs of the population likely to be impacted. This participatory process helps in reducing the public resistance to change and enabled the participation of the local people in the decision-making process. Initial Public consultation has been carried out with Administrative districts within the project area, key institutions involved in project implementation and land acquisition. Further consultation is planned during the preparation and implementation of Resettlement Action Plans. The objectives of those consultations are to minimize probable adverse impacts of the project and to achieve speedy implementation of the project through bringing in awareness among the community on the benefits of the project.

8.3. Project Stakeholders

Key stakeholders have been identified and initial discussions held with decision making bodies, key stakeholders, sector institutions and specialist experts were made on the very concepts and nature of the proposed project, giving emphasis on levels of public participation, role of key stakeholders and joint contributions of these actors to the success of the project. In addition, the scope of the proposed project and possible means of maximizing local communities' social, economic and environmental benefits from the project implementation were underlined. Key stakeholders identified for consultation during preparation of this ESMF include but not limited to the following:

At national level

- Ministry of Environment (MoE);
- Ministry of Infrastructure (MININFRA);
- Rwanda Environment Management Authority (REMA);

- Rwanda Development Board (RDB);
- Rwanda Land Use and Management Authority (RLUMA)

At local level

- Local Government Officials (Districts and Sectors);
- REG District Branch managers and
- Potential Project Affected People (PAPs).

List of consulted people is attached on annex 9 of this ESMF.

8.4. Public participation – methods and process

During the Public consultation, the study team applied different participatory methods, namely; interviews, face-to-face discussions, focused group discussions (FGD) and official meetings with stakeholders. Stakeholders consulted were informed on the proposed project and by using the key guiding questionnaires, the study was able to guide discussions and obtain relevant information on the likely impacts of the project activities.

8.5. Feedback from initial consultation from stakeholders

Initial one-to-one consultation and meeting were held with government or private institutions, academicians and researchers, concerned administrative districts officials, Administrative Sector level and few numbers of members of local communities, the detailed consultation outcome is available on annexe 7 of Itinerary of Stakeholder Consultations and outcome of this ESMF.

Table 22: Summary of the feedback from stakeholders' consultation

No	Stakeholder	Issues raised	Response provided
1	Rwanda Environment management Authority (REMA)	Has the Ministry of Infrastructure budgeted for Resettlement Impacts	Once the project designs are completed and required land and other assets known, the Ministry will request for the compensation from Ministry of Finance and Economic Planning to secure the compensation fees.
		What will be done to ensure that the project does not adversely affect the environment?	The project is preparing this ESMF to foresee all environmental and social impacts so that to develop the required mitigation measures. The

No	Stakeholder	Issues raised	Response provided
			projects will carry out ESIA for a detailed environmental and social impacts mitigation.
		What is the mechanism put in place to ensure that People are compensated on time	The Ministry has agreed with DPs that construction works will start after compensation of affected People.
2	Rwanda Land Management and Land Use Authority	How the ministry is planning to work with administrative districts especially land Bureau?	The concerned administrative districts are fully involved in project preparation and implementation and the administrative districts will be in charge of Resettlement process.
		How land under ROW will be used after implementation of the project?	The land use under RoW will be used referencing on the Guidelines No 01/GL/EL-EWS/RURA/2015
4	District Land Bureaus (District One stop Centres)	Will all project components be implemented in the same time?	Project components will be implemented in the same time as this is urgently needed to achieve NST1 target on time.
		How will you mitigate or avoid Environmental and social impacts related to the project?	To mitigate these issues, the ESIA for each project will be prepared in accordance with National environmental regulations and WB ESF requirements detailing all mitigation.
4	Sector Level officials (SLM and Executive Secretaries)	What do you think on expropriation and compensation for this project?	This project will make difference to other project as the consultation was started at early stage and your views will be incorporated in the preparation of this project and you will be informed on the further process of the project.

No	Stakeholder	Issues raised	Response provided
		How this project should support vulnerable people?	For vulnerable people who might be affected by the project, they suggest that these people must be compensated and suggested that a family member or relative to vulnerable people must be prioritized during job recruitment, and this will be detailed in ESIA which will be prepared.
5	Local Community including farmers organization	We have heard even experienced some projects that do not compensate affected assets or delay in providing compensation.	The REG-EDCL PIU will work closely with the administrative districts and ensure that all compensations are made before engineering works start.
		Some of us will be affected by the project. Which compensation mode do you prefer? (compensation in cash or compensation in kind).	The consultation meeting will be organized during RAP and ESIA preparation and all concerned PAPs will choose the compensation methods to be applied.
		Will our cooperatives benefit from this project	Your organizations/cooperative will be able to increase their productivity due to the availability of the electricity and the service delivery to your customers will be improved because you will work many hours as you want for achieving your organizational goals.

IX. CONCLUSION AND RECOMMENDATIONS

This Environmental and Social Management Framework (ESMF) has been prepared in order to guide project planners, implementers and other stakeholders to identify and mitigate environmental and social impacts in the Context of Rwanda Energy Access and Quality Improvement Project. The ESMF provides project implementers with an environmental and social screening process that will enable them to identify, assess and mitigate potential environmental and social sub-projects' impacts, in accordance with the Government of Rwanda, African Development Bank ISS and the World Bank Environmental and Social Framework and EHS guidelines. The implementation of the project will have the environmental and social impacts that should be mitigated following the ESMF guidelines. Successful implementation of this ESMF will depend to a large extent on the active participation of different key stakeholders (MININFRA, REMA, RDB, REG, EDCL, EARP PIU, Districts, Private operators, academician and researchers, Home Solar Systems Companies and local communities). To be successful it is recommended that:

- Environmental and Social awareness and education for the key stakeholders and affected communities must be an integral part of the ESMF implementation.
- EDCL PIU staff, District Environmentalist, District Electricity Engineers and Sector land managers should be adequately trained to implement the screening process, and where required to help develop and to implement appropriate Environmental and Social Management and Monitoring Plans. They should be empowered to adequately administer the ESMF and should be given the necessary support and resources to ensure effective implementation.
- This ESMF should be regularly updated to respond to changing local and environmental conditions and should go through the national approval processes, reviewed and approved. It should also incorporate lessons learned from implementing various Components of the project activities.

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11. GoR, 2017. National Strategy for Transformation (2017-2024) _NST1;
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13. GoR, 2005. Law N° 08/2005 of 14/07/2005 Determining the Use and Management of Land in Rwanda;
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15. MIFOTRA, 2018. Law N° 66/2018 du 30/08/2018 Regulating Labour in Rwanda;
16. MoE, 2019. Ministerial Order N^{o} 001/ 2019 of 15/04/2019 establishing the list of projects that must undergo environmental impact assessment, instructions, requirements and procedures to conduct environmental impact assessment.
17. MININFRA, 2015. Rwanda Energy Policy;
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19. MININFRA, 2016. Rural Electrification strategy;
20. MININFRA, 2018. Energy sector strategic plan
21. GoR, 2015. Law No. 32/2015 of 11/06/2015 Relating to Expropriation in the Public Interest.
22. REG, 2019. REG Strategic plan;
23. MININFRA, 2020. Rwanda Universal Energy Access Program, Aide-Mémoire;
24. WB, Environmental and Social Framework;
25. WB, Environmental and Social Review Summary;

ANNEXES

Annex 1: General Sub-Project Information

INSTITUTIONAL AND ADMINISTRATIVE INFORMATION				
Country				
Sub-project Title				
Sub-project area and Scope				
Institutional arrangements (Name and contacts)	World Bank (Project Team Leader)	Project Management	MININFRA (Recipient)	
Implementation arrangements (Name and contacts)	Safeguard Supervision	Local Supervision (District Electricity Engineer or Environmentalist)	Construction Supervision	Contractor
SITE DESCRIPTION				
Name of facility/site				
Describe the location				
Who is the land lot owner?				
Describe the geographical, physical, biological, geological, hydro-graphical and socio-economic context				
Indicative need construction				

Materials	
LEGAL FRAMEWORK	
Identify national and regional legal framework and permits applicable to the project	
Identify when / where the public hearings took place	

Annex 2: Checklist to Identify the Scope of Environmental Assessment and Application of Safeguard Provisions

ENVIRONMENTAL/ SOCIAL SCREENING FOR THE APPLICATION OF SAFEGUARDS PROVISIONS	
Will the site activity include/involve the following aspects	**Activity/issue** **Status**
	A. General reconstruction and construction activities [ ]Yes [ ]No
	B. Impact on surface and ground waters [ ]Yes [ ]No
	C. Buildings belonging to historical and cultural heritage and artifacts [ ]Yes [ ]No
	D. Land lot acquisition [ ]Yes [ ]No
	E. Hazardous or toxic materials and wastes [ ]Yes [ ]No
	F. Conservation of forests, wetlands and/or protected natural territories [ ]Yes [ ]No
	G. Risk of unexploded ordnance [ ]Yes [ ]No
	H. Traffic and pedestrian safety [ ]Yes [ ]No

Annex 3: Checklist for Environmental Selection (Screening) of Sub-Projects

CRITERIA	YES	NO	Comments by SPIU Consultant for Engineering and Technical Monitoring
Will the planned economic activity be located within or near protected natural territories or vulnerable area (unstable slope, gully, ravines, wetlands, water bodies)			
Can the works under this sub-project have a potential impact on areas that are important for local or national cultural heritage (memorial sites, tombs, cultural sites, etc.)			
Have residents or public associations expressed concerns or clear opposition with regard to environmental aspects of the planned economic activity?			
Is the vegetation cover planned to be disrupted during the reconstruction and retrofitting of the facility?			
Are the soil, lands and landscapes planned to be disrupted during the reconstruction and retrofitting of the facility?			
Will the planned economic activity induce an increased level of noise, ionizing radiation and vibration which will require the arrangement of noise, vibration and radiation management as required by the laws of the Republic			
Will the level of noise make an impact on neighboring? and staff or on facilities located close by (natural habitats, hospitals and medical institutions, social welfare centers)?			
Will measures be taken to reduce atmospheric air pollution during the performance of construction works?			
Is it planned to arrange and timely service appropriate toilets at the construction site?			
Is it planned to use hazardous materials and/or substances? in accordance with the laws of the Republic of Rwanda during the performance of reconstruction and retrofitting works, which:			

• require special permits or licenses • require licenses or trained personnel or prohibited • are subject to handling requirements in accordance with the laws of the Republic of Rwanda • can cause soil and water pollution in case no adequate management measures are taken			
Will a system be arranged to handle construction waste and solid utility waste during the performance of construction works?			

Annex 4: Suggested Format for a Sample Environmental and Social Management Plan (ESMP)

The ESMF emphasizes that an Environmental and Social Management Plan (ESMP) should fit the needs of a subproject and be easy to use. The basic elements of an ESMP are:

a) A description of the subproject activity

b) A description of potential Environmental and social impacts;

c) A description of planned mitigation measures;

d) An indication of institutional/individual responsibility for implementing

e) mitigation measures (including enforcement and coordination);

f) A program for monitoring the Environmental and Social effects of the subproject both positive and negative (including supervision);

g) A time frame or schedule; and

h) A cost estimate and source of funds.

Table below is a matrix to be filled out for each subproject that will have a separate ESMP according its impact level.

Subproject Activity	Potential Environmental or Social Impacts	Proposed Mitigation Measures	Responsibility (including enforcement and coordination)	Monitoring Requirements (including supervision)	Time Frame or Schedule	Cost Estimate

Annex 5: Impact Mitigation Measures

ACTIVITY	PARAMETER	CHECKLIST FOR IMPACT MITIGATION MEASURES	BUDGET
0. General Conditions	Notification and worker safety	(a) District Director of One Stop Center, District Environmentalist, District Electricity Engineer and Sector Land Manager have been notified of upcoming activities. (b) The public has been notified of the upcoming works through appropriate notification in the media and/or at publicly accessible sites (including the site of the works). (c) All legally required permits to perform construction/repair/rehabilitation works, including extraction and transportation of required materials such as sands and gravels where needed, have been acquired. (d) The Contractor has formally consented that all works will be carried out in compliance with construction safety measures and construction rules to maximally minimize negative impacts on the health of neighboring residents and the environment. (e) Workers' personal protective equipment are available and will comply with international standards (there will always be used construction helmets and, where required, respirators and protective glasses, fall arrest mechanisms and special footwear). (f) Appropriate signposting of the sites will inform workers of key rules and regulations to follow.	
A. General Reconstruction, rehabilitation and /or	Atmospheric air Quality	(a) Dust management measures are taken during earthworks, e.g.: water spraying and topsoil watering. (b) Construction waste excavated earth and aggregates are kept at controlled temporary storage sites with regular watering and dust control.	

extension activities		(c) During pneumatic drilling or removal of road surface layer or base, dust should be suppressed by ongoing water spraying and/or installing on-site dust screen enclosures. (d) Pavements and roads around the site are kept free of dust and construction waste to reduce dust. (e) All machinery shall undergo timely maintenance at service stations with regard to CO emissions and smoke; construction equipment engine idling on site is not allowed.	
	Noise	(a) Construction/rehabilitation works shall be performed exclusively during working hours specified in the permit. (b) During operations the engine covers of generators, air compressors and other powered equipment should be closed, and equipment placed as far away from residential areas as possible.	
	Water quality	a) Anti-erosion and anti-slump measures shall be taken, in particular, the construction/rehabilitation site shall be banked; rainwater sewerage can be built, or earth stabilization can be done to prevent the slumped soil from moving beyond the construction site boundaries.	
	Waste Management	(a) Collection sites and facilities to use, neutralize and bury wastes shall be specified for all basic wastes expected to be generated during the works to remove fertile topsoil, dismantling works and construction/rehabilitation works. (b) Construction/rehabilitation wastes will be separated from municipal wastes through their collection in different containers. (c) Construction/rehabilitation waste will be collected and appropriately disposed in authorized dumpsite (d) Waste management records will be maintained to prove appropriate waste management.	
B. Impact on surface and	Water quality	(a) No uncontrolled ground water intake and no uncontrolled discharge of cement solutions or other polluted waters into soil or nearby surface waters will be done. If necessary, the Contractor will apply and be granted permits for water use.	

ground waters		(b) The site shall be equipped with sewerage systems and measures shall be taken to prevent pollution, blocking or other negative impact that construction/rehabilitation works can make on natural ecosystems. (c) Measures shall be taken to prevent spillage of fuels, lubricants and other toxic or hazardous substances. (d) Construction vehicles and machinery shall only be washed at specially designated areas, and polluted waste waters shall be prevented from getting into surface waters.	
C. Buildings belonging to historical and cultural heritage and artifacts	Cultural heritage	(a) If construction works are performed near a cultural site or habitat for protected trees or animals, REMA and the Ministry in charge of Culture shall be notified, and all necessary permits shall be obtained from competent authorities, and all construction/rehabilitation works shall be planned and performed in accordance with the national laws. (b) All necessary rules and requirements shall be met to ensure that artifacts or other possible 'chance finds' discovered during earthworks or construction works are inventoried and put on the register, the responsible persons are informed, and all works are suspended or their schedules are changed, depending on the finds' nature. To this end, chance finds procedure is attached in Annex 10 of this ESMF. The chance finds procedure will be annexed to the site specific ESIAs/ESMPs for subprojects as well.	
D. Land lot acquisition	Land lot acquisition Formalities	(a) If no extension of territory has been planned but such necessity arises, advice shall be promptly sought from the Project Implementation Team of the Ministry of Infrastructure. (b) An approved Land Lot Selection Certificate will be implemented to locate the facility (if the design so requires).	

E. Hazardous or toxic materials and wastes	Asbestos management and other hazardous waste in Ntaruka HPP	(a) Training of staff who can potentially come into contact with the material to avoid damage and prevent exposure. The plan should be made available to all persons involved in operations and maintenance activities. (b) Repair or removal and disposal of existing Asbestos Containing Materials in buildings should only be performed by specially trained personnel following host country requirements, or in their absence, internationally recognized procedures. (c) The asbestos removal should comply with the Prime Minister's Instructions determining procedure for eradication of asbestos materials...52N° 002/03 du 05/05/2015. (d) The contractor should work with Rwanda Asbestos removal Project under Rwanda Housing Authority which has asbestos removal in its attributions. (e) The contractor should have the contract with waste management company licensed by RURA with mandate to collect hazardous waste or nonhazardous waste.	
	Management of hazardous substances and wastes	(a) Temporary on-site storage of all hazardous or toxic substances and wastes belonging to hazard classes 1 and 2 will be arranged in separate rooms (mercury-containing wastes, intact spent lead batteries with electrolyte inside, cell batteries etc.), including restricted access and marking affixed. (b)The hazardous waste management procedures shall be specified in the waste management manual. (c) Wastes shall be transported in accordance with legal requirements applicable to the transportation of hazardous wastes. (d) Paints or solvents with toxic ingredients or lead-based paints will not be used. (e) All solar Home systems companies should present the certificate that they have contract with Enviro Serve Company which is Bugesera E-waste recycling company being in charge of e-waste management in Rwanda including recycling options.	

		(f) Companies in Off grid components should submit waste management Plan addressing the collection, storage, Transportation and disposal of used solar panel and batteries.	
F. Conservation of forests, wetlands and/or protected natural territories	Ecosystem protection	(a) All-natural ecosystems, wetlands and protected territories located in the immediate vicinity of the construction site will not be disturbed or used. (b) Protection measures should be taken regarding nearby wetlands to avoid erosion and fallout, including, e.g. construction site banking. (c) It is prohibited to arrange borrow pits or storage sites or keep waste without authorization in adjacent areas, especially in unprotected areas. (d) It is prohibited to damage or use natural ecosystems, wetlands and protected territories located in the immediate vicinity of the construction/rehabilitation site.	
G. Risk of unexploded Ordnance	Hazard for human health and safety	a) Prior to any earthworks, the Contractor shall make sure that the construction site has been inspected for the availability of unexploded ordinance.	
H. Safety of public transport and pedestrians	Direct or indirect hazards to public traffic and pedestrians by	(a) In line with national legal requirements, the contractor guarantees that the construction site will be fenced, and that the construction works will be clearly regulated at the site. (b) Visible warning signs shall be posted for the public and public transport to notify of all potentially hazardous works. (c) A traffic management system and personnel training shall be arranged, especially about the access to the site and heavy traffic in the vicinity. Safe passages and crossings for pedestrians will be provided in the locations of public traffic and construction machinery traffic.	

	construction	(d) Working hours shall be corrected depending on local traffic, e.g. to avoid heavy traffic in rush hours or livestock driving hours.(e) Where needed, traffic management shall be carried out at the site to ensure safe passage of people. (f) Safe and uninterrupted access for the public to nearby offices, sales outlets and residential houses shall be maintained during construction works.	
G. Technical assistance activities	Direct &/or indirect E&S impacts	Policies/regulations to be prepared through the TA activities should focus on: • Reviewing taxes of cook stoves equipment by putting in this sector the intensive that will make the cook stove affordable to the community. • The energy source/fuel to be used in the cook stove should be tested for the emissions and the biomass with lower emissions shall be used. • Reducing the tax of LPG (*Liquefied Petroleum Gas)* which will reduce the buying price to the community, which will help to reduce the pressure on the forest. • Increasing the tax on charcoal which is massively used by the community to reduce by the half the population who depends on firewood. • People who previously should be given the alternative and priority in the promoted fuel eg: Clean cooking stove.	
H. NTARUKA HPP rehabilitation activities	Direct &/or indirect E&S impacts	Reservoir sedimentation: Carry out of watershed management in the reservoir area to minimize erosion and sedimentation in the Ntaruka reservoir; and Maximize useful life of the reservoir through continuous monitoring and use of sedimentation model for calculation of reservoir sedimentation. Changes to hydrological flow: Maintain downstream flow through allowing the minimum ecological flow rate and following approved reservoir operation procedures.	

Annex 6: Terms of Reference for Environmental and Social Impact Assessment

These Terms of Reference (ToR) are applicable to development projects involving Energy development projects. The ToRs outline the aspects of an Environmental and Social Impact Assessment (ESIA) which when thoroughly addressed will provide a comprehensive evaluation of the sites, in terms of predicted environmental impacts, needed mitigation strategies, potentially viable alternatives to the development proposed and all related legislation.

Planed Areas: Issues such as slope stability, impact on drainage patterns, property etc. should be examined. The path of the corridor cleared of vegetation for transmission lines, substations and Hydro power plants should be the major focus of this exercise.

Rivers/ Riverine Areas: Issues such as erosion and siltation, macro invertebrate habitat destruction, disrupting of regular flow of the river and the possible impact of upstream activities on the area ecosystems e.g. wetlands etc.

Distinct Terrestrial Forest Types: Issues relating to the specific growth form of the vegetation, the carrying capacity, the successional stage of the forest and the projected level of disturbance which the forest can withstand.

Sites located within and adjacent to areas listed as protected or having protected species:

The main issue(s) of concern will be in part determined by the local legislation as well as Government of Rwanda (GoR) responsibilities under applicable international conventions. The impact of the development on the specific sensitivities of the protected area should be highlighted. Mitigation of impacts should assess if the post mitigation status would be acceptable in the protected area context. Alternative sites should be rigorously evaluated. Socio–Economic issues such as land acquisition and impact of these conveyances on commerce in the community should be closely examined.

The Environmental Impact Assessment should:

1) Provide a complete description of the corridor proposed for development. This should include a description of the main elements of the development, highlighting areas to be reserved for construction, the creation of verges and other green areas.

- Identify the major environmental and social issues of concern through the presentation of baseline data which should include social and cultural considerations. Assess public perception of the proposed development.
- Outline the Legislations and Regulations relevant to the project.

- Predict the likely impacts of the development on the described environment, including direct, indirect and cumulative impacts, and indicate their relative importance to the design of the development's facilities.
- Identify mitigation action to be taken to minimize adverse impacts and quantify associated costs.
- Design a Monitoring Plan which should ensure that the mitigation plan is adhered to.
- Describe the alternatives to the project that could be considered at that site

To ensure that a thorough Environmental and Social Impact Assessment is carried out, it is expected that the following tasks be undertaken:

1. Executive summary

- Concisely discusses significant findings and recommended actions.

2. Legal and institutional framework

- Analyses the legal and institutional framework for the project, within which the environmental and social assessment is carried out, including the issues set out in ESS1, paragraph 264.
- Compare the Borrower's existing environmental and social framework and the ESSs and identify the gaps between them.
- Identifies and assesses the environmental and social requirements of any co-financiers.
- Outline the pertinent regulations and standards governing environmental quality, safety and health, protection of sensitive areas, protection of endangered species, siting and land use control at the national and local levels. The examination of the legislation should include at minimum, legislation such as the land law, Environmental protection and conservation law, expropriation law, the Public Health Act, the urban Planning Act, Building Codes and Standards, Development Orders and Plans and the appropriate international convention/protocol/treaty where applicable.

3. Description of the subproject

- Concisely describes the proposed subproject and its geographic, environmental, social, and temporal context, including any offsite investments that may be required (e.g., dedicated pipelines, access roads, power supply, water supply, housing, and raw material and product storage facilities), as well as the project's primary suppliers.
- Through consideration of the details of the project, indicates the need for any plan to meet the requirements of ESS 1 through 10.

- Includes a map of sufficient detail, showing the project site and the area that may be affected by the project's direct, indirect, and cumulative impacts.

4. Baseline data

This task involves the generation of baseline data which is used to describe the study area as follows:

- Physical environment
- Biological environment
- Socio-economic and cultural constraints.

It is expected that methodologies employed to obtain baseline and other data be clearly detailed.

Baseline data should include:

(A) Physical

- A detailed description of the existing **geology** and **hydrology.** Special emphasis should be placed on storm water run-off, and drainage patterns. Any slope stability issues that could arise should be thoroughly explored.

- **Water quality** of any existing rivers, ponds, streams or coastal waters in the vicinity of the corridor or substation. Quality Indicators should include but not necessarily be limited to suspended solids, turbidity, oil and grease.

- Climatic conditions and air quality in the area of influence including particulate matter wind speed and direction, precipitation, relative humidity and ambient temperatures,
- Obvious sources of pollution existing and extent of contamination.

(B) Biological

- Present a detailed description of the flora and fauna (aquatic and terrestrial) in the proposed corridor of influence, with special emphasis on rare, endemic, protected or endangered species. Migratory species should also be considered. There may be the need to incorporate microorganisms to obtain an accurate baseline assessment. Generally, species dependence, niche specificity, community structure and diversity ought to be considered.

(C) Socio-economic & cultural

- Present and projected population; present and proposed land use; planned development activities, issues relating to squatting and relocation, community structure, employment, distribution of income, goods and services; recreation; public health and safety;

- Cultural peculiarities, aspirations and attitudes should be explored. The historical importance of the area should also be examined. While this analysis is being conducted, it is expected that an assessment of public perception of the proposed development be conducted. This assessment may vary with community structure and may take multiple forms such as public meetings or questionnaires.

5. Identification of Potential Environmental and Social Impacts

Takes into account all relevant environmental and social risks and impacts of the project. This will include the environmental and social risks and impacts specifically identified in ESS2 – 8, and any other environmental and social risks and impacts arising as a consequence of the specific nature and context of the project, including the risks and impacts identified in ESS1, paragraph 28.

Identify potential impacts as they relate to, (but are not restricted by) the following:

- public health and safety, risk assessment, change in drainage pattern flooding potential and aesthetics
- landscape impacts of excavation and construction
- loss of natural features, habitats and species by construction and operation
- noise, air pollution, pollution of potable, coastal, surface and ground water - Socio-economic and cultural impacts.
- Loss of land and assets due new transmission lines construction and operation
- Distinguish between significant positive and negative impacts, direct and indirect, long term and immediate impacts.
- Identify trigger, avoidable reversible and irreversible impacts.

6. Environmental and Social Management Plan

- Identifies mitigation measures and significant residual negative impacts that cannot be mitigated and, to the extent possible, assesses the acceptability of those residual negative impacts.

- Identifies differentiated measures so that adverse impacts do not fall disproportionately on the disadvantaged or vulnerable.

- Assesses the feasibility of mitigating the environmental and social impacts; the capital and recurrent costs of proposed mitigation measures, and their suitability under local conditions; the institutional, training, and monitoring requirements for the proposed mitigation measures.

- Specifies issues that do not require further attention, providing the basis for this determination

Design a plan to monitor implementation of mitigation or compensation measures and project impacts during and post construction and decommissioning of the power lines. **An Environmental and Social Management Plan** for the long-term operations of the development should also be prepared.

An outline **monitoring** programme should be included in the EIA, and a detailed version submitted to RDB's e-portal system for review and approval and prior to the commencement of the development. At the minimum the monitoring programme and report should include:

- The activity being monitored, and the parameters chosen to effectively carry out the exercise.

- The methodology to be employed and the frequency of monitoring.

- The sites and project components being monitored. These may in instances, be predetermined by the EDCL and should incorporate a control site where no impact from the development is expected.

7. Design measures

- sets out the basis for selecting the particular project design proposed and specifies the applicable EHSGs or if the ESHGs are determined to be inapplicable, justifies recommended emission levels and approaches to pollution prevention and abatement that are consistent with GIIP.

8. Key measures and actions for the Environmental and Social Commitment Plan (ESCP)

- Summarizes key measures and actions and the timeframe required for the project to meet the requirements of the ESSs. This will be used in developing the Environmental and Social Commitment Plan (ESCP).

9. Appendices

- List of the individuals or organizations that prepared or contributed to the environmental and social assessment.

- References—setting out the written materials both published and unpublished, that have been used.

- Record of meetings, consultations and surveys with stakeholders, including those with affected people and other interested parties. The record specifies the means of such stakeholder engagement that were used to obtain the views of affected people and other interested parties.
- Tables presenting the relevant data referred to or summarized in the main text.
- List of associated reports or plans.
- Terms of reference;

Annex 7: Itinerary of Stakeholder Consultations and outcome

Dates	Consulted person/ Position	Venue	Observation / Points raised by stakeholders	Suggestions by stakeholders and how they are considered by the project (proposed action in this ESMF)
KARONGI Administrative District				
January 20,2020	V/M ED Director of OSC District Electrical engineer District environmental officer District land valuator Sector Executive secretaries Sector Land managers	District Headquarter' office	Considerable delays in compensation payments; Some cases of expropriation are also pending; Delays are generally due to errors not because of lack of funds but due to errors in account numbers; There is no problem with assets valuation. The district staff presented the priority areas that urgently need electricity and suggested that this should be the basis for planning on electrification within the district. Delayed people due to their cause like not having all required documents should not stop the project to move on The project should consider employing local people for their economic development	Local authorities should work hand in hand with SACCOs (bank) in order to avoid errors in accounts numbers. Local authorities should help the local population to secure the required document for a file to be complete. Local government officials should have a permanent eye on hired certified valuator for the quality of valuation but also they should speed up the activity of signing the forms within their offices so that they can be transferred to EDCL for payment Compensation payments should be done before the commencement of project works.

Dates	Consulted person/ Position	Venue	Observation / Points raised by stakeholders	Suggestions by stakeholders and how they are considered by the project (proposed action in this ESMF)
				Local people who are physically capable will be given the priority for employment.
January 20,2020	Community including PAPs	Nyarugenge cell of Rubengera District	Electricity can help them to go on the same speed as the country, they said that the country development is leaving theme behind because they lack major infrastructures including lack of access to reliable electricity. The safety of the line will be safeguarded and different activities like welding, haircut, showing movies… Please we are capable, for physical work, consider giving us the job as we are ready to serve but also for development.	The project will be implemented, and they will be having electricity at the end of it. They should safeguard the electrical line and be ready to make this project productive by implementing the activities and project that are energy based and develop the areas. People who are ready and physically capable will be given the priority in employment as casual workers.
RUSIZI Administrative District				
January 21,2020	V/Mayor ED Director of OSC District Electrical engineer	District headquarter office	The delay in compensation is an issue. REG should fin a way to address all outstanding issues related to expropriation. There is an issue of poverty to local people, there is likelihood that they will not have the fund to purchase the cash power and	REG has inventoried all old cases from district, and all have undergone the valuation, there payment is being done.

Dates	Consulted person/ Position	Venue	Observation / Points raised by stakeholders	Suggestions by stakeholders and how they are considered by the project (proposed action in this ESMF)
	District environmental officer District land valuator Sector Executive secretaries Sector Land managers		make installation. Can the project help them in terms of installing their houses?	Client who want cash power, they get it free of charge and they pay 50% as they consume until the debt is finished.
RUTSIRO Administrative District				
January 23,2020	V/Mayor ED Director of OSC District Electrical engineer District environmental officer District land valuator Sector Executive secretaries Sector Land managers	District headquarter office	The project is appreciated. The compensation should be handled efficiently. The district will help to speed up the compensation process and will be the public awareness campaign after the project effectiveness and when all the lots are identified and marked. The encroachment after the cut off date will be avoided to the extent possible. When the project is expected to get started?	The valuation process will involve the local government officials as per Rwandan expropriation law. The involvement of the district will make the job easy. The project effectiveness is expected in July 2020.

Dates	Consulted person/ Position	Venue	Observation / Points raised by stakeholders	Suggestions by stakeholders and how they are considered by the project (proposed action in this ESMF)
NYABIHU Administrative District				
January 23,2020	Director of OSC District Electrical engineer District environmental officer District land valuator Sector Executive secretaries Sector Land managers	District video conference office	The project is appreciated and any help for its implementation will be rendered. Community mobilization will be carried out for a smooth asset inventory and valuation. The local authorities will help the valuer to avoid any delay and inconsistency in valuation. The district staff presented the priority areas that urgently need electricity and suggested that this should be the basis for planning on electrification within the district.	The district priority sites to be connected, will be handed over to EDCL Planning so that they can be taken into consideration. They will always be consulted before the implementation of any project so that what is being done to them(they service they are receiving) should be done considering the district priority
NGORORERO Administrative District				
January 24,2020	V/Mayor FED Director of OSC District Electrical engineer	District headquarter office	The project is appreciated and any help for its implementation will be rendered. Community mobilization will be carried out for a smooth asset inventory and valuation. The local authorities will help the valuer to avoid any delay and inconsistency in valuation.	The district priority sites to be connected, will be handed over to EDCL Planning so that they can be taken into consideration. They will always be consulted before the implementation of any project so that what

Dates	Consulted person/ Position	Venue	Observation / Points raised by stakeholders	Suggestions by stakeholders and how they are considered by the project (proposed action in this ESMF)
	District environmental officer District land valuator Sector Executive secretaries Sector Land managers		The district staff presented the priority areas that urgently need electricity and suggested that this should be the basis for planning on electrification within the district.	is being done to them (they service they are receiving) should be done considering the district priority
RUBAVU administrative district				
January 27,2020	V/Mayor FED Division manager District Electrical engineer District environmental officer Sector Land managers	District headquarter office	The district staff presented the priority areas that urgently need electricity and suggested that this should be the basis for planning on electrification within the district. This include the district industrial park being considered and Kanzenze sector. The information about compensation on the project being implemented should be shared with district so that they can handle different relevant claims	The district priority sites to be connected, will be handed over to EDCL Planning so that they can be taken into consideration. They will always be consulted before the implementation of any project so that what is being done to them (they service they are receiving) should be done considering the district priority.

Dates	Consulted person/ Position	Venue	Observation / Points raised by stakeholders	Suggestions by stakeholders and how they are considered by the project (proposed action in this ESMF)
				The information about expropriation is available on REG website and every PAP can access his/her own account.
	Local community	Akabagoyi cell of Busasamana sector	The community appreciated this project and they are waiting impatiently the starting. They said that they are expecting a lot from this project, like getting casual jobs, but also it will help them in the employment creation like welding, using mill, haircut saloon but also they are fed up of darkness caused by the lack of electricity access	The district priority sites to be connected, will be handed over to EDCL Planning so that they can be taken into consideration. They will always be consulted before the implementation of any project so that what is being done to them (they service they are receiving) should be done considering the district priority
GICUMBI administrative district				
January 29,2020	Dir OSC Sector Executive Secretaries Sector Land managers REG Branch manager	District headquarter office	The district together with REG branch manager proposed the site which are more isolated and need urgently electricity according to their priority. All people cannot afford the price of meters. Will you give them free meters?	The priority sites that were given will be handed over to EDCL planning department for their consideration Normally REG facilitate all people who do not have the means to purchase the meter. It

Dates	Consulted person/ Position	Venue	Observation / Points raised by stakeholders	Suggestions by stakeholders and how they are considered by the project (proposed action in this ESMF)
			The compensation is an issue. How are you planning to handle this?	is given before and the payment is postpaid. You pay 50% as you buy the cash power. We will involve local authorities and
RULINDO administrative District				
January 31,2020	V/Mayor ED District director of planning District Electrical engineer District environmental officer Sector Land managers ES-Sectors	District meeting hall	Due to the big pace of development we are undergoing, everyone needs access to electricity ever. Anything that you will need will be granted from the district as the main stakeholder. However, any planning on new sites to be connected should take into account the priority from district. The contractor should pay his workers on time. Always contractor do not pay labors on time. How will your project protect workers from accidents?	The Project team appreciated the effort of the district engagement and told the meeting attendant that the sites as prioritized by the district will be handed over to EDCL planning department for their consideration. However, after the project effectiveness, the project team will also consult the district to update the data. The project will use World bank environmental health and social guidelines to comply with occupational health and safety; and Labor Management Procedure (LMP) has been prepared with detail

Dates	Consulted person/ Position	Venue	Observation / Points raised by stakeholders	Suggestions by stakeholders and how they are considered by the project (proposed action in this ESMF)
				concerning worker right should be captured and monitored for effective implementation.
GAKENKE administrative District				
January 31,2020	VM ED DES Dir OSC Dir Planning District Environmental Officer District Electricity Engineer	District Executive Secretary Office	There is a problem of information sharing concerning expropriation process and update. What will you do improve this? Labors always claim from contractors, please follow up on contractors. The Health and safety of workers should be given the value, and workers be given the Personal Protective Equipment. The project should consider giving job to local people for their economic development. The District has the priority sites which urgently need electricity, and these should be the one to connect first.	The information on the update for expropriation for PAP can be now accessed through website on the link: https://www.reg.rw/customer-service/expropriation/ Labor Management procedure has been prepared for compliance on workers' rights and employers' responsibilities. Health and safety will be complied to World Bank Standards, and the priority will be to eliminate the harm, but where not possible to Personal Protective Equipment will be used to ensure the safety of workers, employers, Visitors and the public.

Dates	Consulted person/ Position	Venue	Observation / Points raised by stakeholders	Suggestions by stakeholders and how they are considered by the project (proposed action in this ESMF)
				The sites provided by the district will be handed over to EDCL Planning department for their consideration.
KAYONZA administrative District				
February 5, 2020	Director of One Stop Center (OSC) District Electrical engineer District environmental officer District Land valuer Kabarondo SLM	District headquarter office	The district staff presented the priority areas that urgently need electricity and suggested that this should be the basis for planning on electrification within the district. The information about compensation on the project being implemented should be shared with district so that they can handle different relevant claims. The project should consider giving the local people the job. But also should any them on time and make sure that they are protected from any occupational hazard.	The district priority sites to be connected, will be handed over to EDCL Planning so that they can be taken into consideration. They will always be consulted before the implementation of any project so that what is being done to them (they service they are receiving) should be done considering the district priority. The information about expropriation is available on REG website and every PAP can access his/her own account. The information on the update for expropriation for PAP can be now accessed through website on the link:

Dates	Consulted person/ Position	Venue	Observation / Points raised by stakeholders	Suggestions by stakeholders and how they are considered by the project (proposed action in this ESMF)
				https://www.reg.rw/customer-service/expropriation/ Labor Management procedure has been prepared for compliance on workers rights and employers responsibilities. Health and safety will be complied to World Bank Standards, and the priority will be to eliminate the harm, but where not possible to Personal Protective Equipment will be used to ensure the safety of workers, employers , Visitors and the public.
	Local community	Kabarondo Sector, Cyabajwe Cell, Rwagwa Village	The community appreciated this project and they are waiting impatiently the starting. They said that they are expecting a lot from this project, like getting casual jobs, but also it will help them in the employment creation like welding, using mill, haircut saloon	The district priority sites to be connected, will be handed over to EDCL Planning so that they can be taken into consideration. They will always be consulted before the implementation of any project so that what is being done to them (they service they are

Dates	Consulted person/ Position	Venue	Observation / Points raised by stakeholders	Suggestions by stakeholders and how they are considered by the project (proposed action in this ESMF)
			but also, they are fed up of darkness caused by the lack of electricity access	receiving) should be done considering the district priority
KIREHE administrative District				
February 5, 2020	Mayor Dir OSC District forest officer District irrigation officer Districtenvironmental officer OSC Legal Advisor	District headquarter offices	Compensation of losses is an issue since the payments process is long. After having collected the signed lists of beneficiaries on which the damaged assets and owed amount is mentioned, the lists are sent to continue the journey to Kigali EDCL headquarter to MINECOFIN, which pays beneficiaries through BNR (Banque National du Rwanda) then from their the compensation is deposited to the beneficiary's account. The process is too long. The district has the two dumpsites where waste is sorted. However, Inorganic waste is becoming accumulated and will have to be transported for recycling industries.	District officers suggested the decentralization of notonly the funds for compensation and expropriation but also to be given the ESIA report and involve its officers in the planning and implementation of EARP subprojects The project will conduct public consultations during environmental and social studies and reports will be disclosed to the public.

Dates	Consulted person/ Position	Venue	Observation / Points raised by stakeholders	Suggestions by stakeholders and how they are considered by the project (proposed action in this ESMF)
NGOMA administrative district				
February 6, 2020	Dir OSC District irrigation officer Districtenvironmental officer REG Branch Manager	District headquarter offices	The district together with REG branch manager proposed the site which are more isolated and need urgently electricity according to their priority. All people can not afford the price of meters. Will you give them free meters? The compensation is an issue. How are you planning to handle this? The district dumpsite will help for waste management; However, Inorganic waste is becoming accumulated and will have to be transported for recycling industries.	The priority sites that were given will be handed over to EDCL planning department for their consideration Normally REG facilitate all people who do not have the means to purchase the meter. It is given before and the payment is postpaid. You pay 50% as you buy the cash power. We will involve local authorities and local population by timely public awareness campaign after the project effectiveness.
NYAGATARE Administrative District				
February 6, 2020	Mayor Dir OSC District of Social development	District headquarter offices	The district together with REG branch manager proposed the site which are more isolated and need urgently electricity according to their priority. The district is a secondary city to Kigali and is developing itself, the only matter is the lack of reliable energy to make	Priority sites provided will be given to EDCL Planning department for their consideration.

Dates	Consulted person/ Position	Venue	Observation / Points raised by stakeholders	Suggestions by stakeholders and how they are considered by the project (proposed action in this ESMF)
	District environmental officer REG Branch Manager		heavy industries working. The existing electricity service is single phased and this only facilitates us only for lighting purposes, we can not use machines. We will help the project to speed up compensation by getting involved in all steps of the compensation up to the district. We will carry out the public awareness campaign to mobilize people avail the required documents on time, and we will help them to secure those documents easily like land title, id cards, account so that we can have all PAPs cleared on time	There is another project under Enabel which has started doing the upgrade from single phase to three phases.
KAMONYI administrative District				
February 8, 2020	DES Dir OSC Dir Planning District Environmental Officer	District Executive Secretary Office	There is a problem of information sharing concerning expropriation process and update. What will you do improve this? Labor always claim from contractors, please follow up on contractors.	The information on the update for expropriation for PAP can be now accessed through website on the link: https://www.reg.rw/customer-service/expropriation/

Dates	Consulted person/ Position	Venue	Observation / Points raised by stakeholders	Suggestions by stakeholders and how they are considered by the project (proposed action in this ESMF)
	District Electricity Engineer; REG Branch Manager GACURABWENGE SLM		The Health and safety of workers should be given the value, and workers be given the Personal Protective Equipment. The project should consider giving job to local people for their economic development. The District has the priority sites which urgently need electricity, and these should be the one to connect first.	Labor Management procedure has been prepared for compliance on workers rights and employers responsibilities. Health and safety will be complied to World Bank Standards, and the priority will be to eliminate the harm, but where not possible to Personal Protective Equipment will be used to ensure the safety of workers, employers , Visitors and the public. The sites provided by the district will be handed over to EDCL Planning department for their consideration.
	Local community	Rubona Cell	The community appreciated this project and they are waiting impatiently the starting. They said that they are expecting a lot from this project, like getting casual jobs, but also it will help them in the employment creation like welding, using mill, haircut saloon	The district priority sites to be connected, will be handed over to EDCL Planning so that they can be taken into consideration. They will always be consulted before the implementation of any project so that what is being done to them (they service they are

Dates	Consulted person/ Position	Venue	Observation / Points raised by stakeholders	Suggestions by stakeholders and how they are considered by the project (proposed action in this ESMF)
			but also, they are fed up of darkness caused by the lack of electricity access	receiving) should be done considering the district priority
MUHANGA administrative District				
February 12, 2020	V/Mayor ED Director of OSC REG Branch Manager District director of planning District Electrical engineer District environmental officer Sector Land managers ES-Sectors	District meeting hall	Due to the big pace of development we are undergoing, everyone needs access to electricity ever. Anything that you will need will be granted from the district as the main stakeholder. However, any planning on new sites to be connected should take into account the priority from district. The contractor should pay his workers on time. Always contractor do not pay labors on time. How will your project protect workers from accidents?	The Project team appreciated the effort of the district engagement and told the meeting attendant that the sites as prioritized by the district will be handed over to EDCL planning department for their consideration. However, after the project effectiveness, the project team will also consult the district to update the data. The project will use World bank environmental health and social guidelines to comply with occupational health and safety and Labor Management Procedure (LMP) has been prepared so that detail

Dates	Consulted person/ Position	Venue	Observation / Points raised by stakeholders	Suggestions by stakeholders and how they are considered by the project (proposed action in this ESMF)
				concerning worker right should be captured and monitored for effective implementation.
February 13, 2020	MINICOM-BUGESERA E-waste Recycling Facility: e-Waste management specialist	Head Office	We are ready to manage electronic waste; However, the problem is that we normally do not get the totality of this waste due to scavengers who always go everywhere looking for the recyclable waste as illegal business. There is also people who do not know/do not care that if electronic material is used up should not be disposed of with other waste, but should be given to people who can treat them. We advise you to mobilize solar home systems companies to fully work with us and avoid to the extent possible the scavengers. People using the These solar Home Systems should be mobilized and make sure that at the end of solar system life, especially those batteries, they give them back to the company that sold the device to them, so that they can safely arrive at this e-waste recycling facility which was done for that purpose.	The safeguards team through Social and Primary Energy department in EDCL will liaise with all solar Home Systems companies on this issue. They will be mobilized to mobilize the clients and give a regular report on the status of devices and the waste management arrangement in place.
RUHANGO administrative district				

Dates	Consulted person/ Position	Venue	Observation / Points raised by stakeholders	Suggestions by stakeholders and how they are considered by the project (proposed action in this ESMF)
17/02/2020	Dir OSC District irrigation officer Districtenvironmental officer REG Branch Manager	District headquarter offices	The district together with REG branch manager proposed the site which are more isolated and need urgently electricity according to their priority. All people can not afford the price of meters. Will you give them free meters? The compensation is an issue. How are you planning to handle this? The district dumpsite will help for waste management; However, Inorganic waste is becoming accumulated and will have to be transported for recycling industries.	The priority sites that were given will be handed over to EDCL planning department for their consideration Normally REG facilitate all people who do not have the means to purchase the meter. It is given before and the payment is postpaid. You pay 50% as you buy the cash power. We will involve local authorities and local population by timely public awareness campaign after the project effectiveness.
NYANZA Administrative Distrrict				
18/02/2020	V/Mayor ED Director of OSC REG Branch Manager District director of planning	District meeting hall	Due to the big pace of development we are undergoing, everyone needs access to electricity ever. Anything that you will need will be granted from the district as the main stakeholder. However, any planning on new sites to be connected should take into account the priority from district.	The Project team appreciated the effort of the district engagement and told the meeting attendant that the sites as prioritized by the district will be handed over to EDCL planning department for their consideration. However, after the project effectiveness, the

Dates	Consulted person/ Position	Venue	Observation / Points raised by stakeholders	Suggestions by stakeholders and how they are considered by the project (proposed action in this ESMF)
	District Electrical engineer District environmental officer Sector Land managers ES-Sectors		The contractor should pay his workers on time. Always contractor do not pay labors on time. How will your project protect workers from accidents?	project team will also consult the district to update the data. The project will use World bank environmental health and social guidelines to comply with occupational health and safety and Labor Management Procedure (LMP) has been prepared so that detail concerning worker right should be captured and monitored for effective implementation.
NYAMAGABE Administrative District				
19/02/2020	DES Dir OSC Dir Planning District Environmental Officer District Electricity Engineer;	District Executive Secretary Office	There is a problem of information sharing concerning expropriation process and update. What will you do improve this? Labors always claim from contractors, please follow up on contractors. The Health and safety of workers should be given the value, and workers be given the Personal Protective Equipment.	The information on the update for expropriation for PAP can be now accessed through website on the link: https://www.reg.rw/customer-service/expropriation/ Labor Management procedure has been prepared for compliance on workers rights and employers responsibilities.

Dates	Consulted person/ Position	Venue	Observation / Points raised by stakeholders	Suggestions by stakeholders and how they are considered by the project (proposed action in this ESMF)
	REG Branch Manager GACURABWENGE SLM		The project should consider giving job to local people for their economic development. The District has the priority sites which urgently need electricity, and these should be the one to connect first.	Health and safety will be complied to World Bank Standards, and the priority will be to eliminate the harm, but where not possible to Personal Protective Equipment will be used to ensure the safety of workers, employers, Visitors and the public. The sites provided by the district will be handed over to EDCL Planning department for their consideration.
NYARUGURU Administrative District				
20/02/2020	Dir OSC District Social development District environmental officer REG Branch Manager	District headquarter offices	The district together with REG branch manager proposed the site which are more isolated and need urgently electricity according to their priority. The district is developing itself; the only matter is the lack of reliable energy to make heavy industries working. The existing electricity service is single phased, and this only facilitates us only for lighting purposes, we cannot use machines.	Priority sites provided will be given to EDCL Planning department for their consideration. There is another project under Enabel which has started doing the upgrade from single phase to three phases.

Dates	Consulted person/ Position	Venue	Observation / Points raised by stakeholders	Suggestions by stakeholders and how they are considered by the project (proposed action in this ESMF)
			We will help the project to speed up compensation by getting involved in all steps of the compensation up to the district. We will carry out the public awareness campaign to mobilize people avail the required documents on time, and we will help them to secure those documents easily like land title, id cards, account so that we can have all PAPs cleared on time	
HUYE Administrative District				
21/02/2020	Mayor Dir OSC District forest officer District irrigation officer Districtenvironmental officer OSC Legal Advisor	District headquarter offices	Compensation of losses is an issue since the payments process is long. After having collected the signed lists of beneficiaries on which the damaged assets and owed amount is mentioned, the lists are sent to continue the journey to Kigali EDCL headquarter to MINECOFIN, which pays beneficiaries through BNR (Banque National du Rwanda) then from their the compensation is deposited to the beneficiary's account. The process is too long.	District officers suggested the decentralization of notonly the funds for compensation and expropriation but also to be given the ESIA report and involve its officers in the planning and implementation of EARP subprojects The project will conduct public consultations during environmental and

Dates	Consulted person/ Position	Venue	Observation / Points raised by stakeholders	Suggestions by stakeholders and how they are considered by the project (proposed action in this ESMF)
			The district has the two dumpsites where waste is sorted. However, Inorganic waste is becoming accumulated and will have to be transported for recycling industries.	social studies and reports will be disclosed to the public.
GISAGARA Administrative District				
22/02/2020	Dir OSC Sector Executive Secretaries Sector Land managers REG Branch manager	District headquarter office	The district together with REG branch manager proposed the site which are more isolated and need urgently electricity according to their priority. All people cannot afford the price of meters. Will you give them free meters? The compensation is an issue. How are you planning to handle this?	The priority sites that were given will be handed over to EDCL planning department for their consideration Normally REG facilitate all people who do not have the means to purchase the meter. It is given before and the payment is postpaid. You pay 50% as you buy the cash power. We will involve local authorities and

Annex 8: Timeframe for the consulted stakeholders

a. Districts Administration

Dates of consultation	Administrative District name/Local Government	Participants category	Number of participants by gender	
			Male	Female
20/01/2020	Karongi	Districts officials, Sector Executive Secretaries, SLM and Local Community, EARP Team, EUCL District Branch Manager	19	3
21/01/2020	Rusizi	Districts officials, Sector Executive Secretaries, SLM and Local Community, EARP Team, EUCL District Branch Manager	26	6
21/01/2020	Nyamasheke	Districts officials, Sector Executive Secretaries, SLM and Local Community, EARP Team, EUCL District Branch Manager	8	2
23/01/2020	Rutsiro	Districts officials, Sector Executive Secretaries, SLM and Local Community, EARP Team, EUCL District Branch Manager	12	1
23/01/2020	Nyabihu	Districts officials, Sector Executive Secretaries, SLM and Local Community, EARP Team, EUCL District Branch Manager	17	4
24/01/2020	Ngororero	Districts officials, Sector Executive Secretaries, SLM and	15	3

Dates of consultation	Administrative District name/Local Government	Participants category	Number of participants by gender	
			Male	Female
		Local Community, EARP Team, EUCL District Branch Manager		
27/01/2020	Rubavu	Districts officials, Sector Executive Secretaries, SLM and Local Community, EARP Team, EUCL District Branch Manager	9	1
31/02/2020	Gakenke	Districts officials, Sector Executive Secretaries, SLM and Local Community, EARP Team, EUCL District Branch Manager	29	14
25/02/2020	Musanze	Districts officials, Sector Executive Secretaries, SLM and Local Community, EARP Team, EUCL District Branch Manager	13	7
29/01/2020	Gicumbi	Districts officials, Sector Executive Secretaries, SLM and Local Community, EARP Team, EUCL District Branch Manager	27	5
31/01/2020	Rulindo	Districts officials, Sector Executive Secretaries, SLM and Local Community, EARP Team, EUCL District Branch Manager	26	8
31/01/2020	Burera	Districts officials, Sector Executive Secretaries, SLM and	9	2

Dates of consultation	Administrative District name/Local Government	Participants category	Number of participants by gender	
			Male	Female
		Local Community, EARP Team, EUCL District Branch Manager		
13/02/2020	Bugesera	Districts officials, Sector Executive Secretaries, SLM and Local Community, EARP Team, EUCL District Branch Manager	7	2
05/02/2020	Kayonza	Districts officials, Sector Executive Secretaries, SLM and Local Community, EARP Team, EUCL District Branch Manager	11	1
06/02/2020	Ngoma	Districts officials, Sector Executive Secretaries, SLM and Local Community, EARP Team, EUCL District Branch Manager	21	9
06/02/2020	Nyagatare	Districts officials, Sector Executive Secretaries, SLM and Local Community, EARP Team, EUCL District Branch Manager	7	0
07/02/2020	Gatsibo	Districts officials, Sector Executive Secretaries, SLM and Local Community, EARP Team, EUCL District Branch Manager	9	4
05/02/2020	Kirehe	Districts officials, Sector Executive Secretaries, SLM and	8	1

Dates of consultation	Administrative District name/Local Government	Participants category	Number of participants by gender	
			Male	Female
		Local Community, EARP Team, EUCL District Branch Manager		
11/02/2020	Rwamagana	Districts officials, Sector Executive Secretaries, SLM and Local Community, EARP Team, EUCL District Branch Manager	7	2
12/02/2020	Muhanga	Districts officials, Sector Executive Secretaries, SLM and Local Community, EARP Team, EUCL District Branch Manager	27	5
17/02/2020	Ruhango	Districts officials, Sector Executive Secretaries, SLM and Local Community, EARP Team, EUCL District Branch Manager	7	4
18/02/2020	Nyanza	Districts officials, Sector Executive Secretaries, SLM and Local Community, EARP Team, EUCL District Branch Manager	8	3
8/02/2020	Kamonyi	Districts officials, Sector Executive Secretaries, SLM and Local Community, EARP Team, EUCL District Branch Manager	13	2
19/02/2020	Nyamagabe	Districts officials, Sector Executive Secretaries, SLM and	13	2

Dates of consultation	Administrative District name/Local Government	Participants category	Number of participants by gender	
			Male	Female
		Local Community, EARP Team, EUCL District Branch Manager		
20/02/2020	Nyaruguru	Districts officials, Sector Executive Secretaries, SLM and Local Community, EARP Team, EUCL District Branch Manager	9	3
21/02/2020	Huye	Districts officials, Sector Executive Secretaries, SLM and Local Community, EARP Team, EUCL District Branch Manager	13	2
22/02/2020	Gisagara	Districts officials, Sector Executive Secretaries, SLM and Local Community, EARP Team, EUCL District Branch Manager	9	3

b. Public and Private Institutions

Date of consultation	INSTITUTION	FULL NAMES	POSITION
24/02/20202	Ministry of Environment	Mr. DUSINGIZIMANA Theophile	Environment & Climate Change Policy Specialist&
24/02/2020	MININFRA	Mr. SAFARI Brian	Energy Economist
24/02/2020	RLUMA	Miss. NISHIMWE M. Grace	Head of Land Administration Department
25/02/2020	RDB	Mr. KARARA Jean de Dieu	EIA Specialist
25/02/2020	REMA	Mr. DUHUZE Remy Norbert	Director of environmental regulation and pollution control
24/02/2020	Rwanda Forest Authority	Mr. MUGABO Jean Pierre	Ag. DG
13/02/2020	Enviroserve Rwanda Green Park/Rwanda E-waste recycling Facility	Mr. NDUWAYEZU Venuste	Technical Supervisor
25/02/2020	RURA	Mr. MUTWARE Alexis	Director of electricity and Renewable Energy

Date of consultation	INSTITUTION	FULL NAMES	POSITION
26/02/2020	IRPV	Mr. MUNYABUGINGO Bonaventure	Member of Committee on research and reference prices
26/02/2020	Energy Private Developers	Mr. NDAYISABA Eduard	Vice Chairman & Director of Operations and Development
26/02/2020	University of Rwanda	Mr. NSENGUMUREMYI Damien	Academician
17/02/2020	Catholic Institute of Kabgayi	Dr. Innocent SIMPUNGA	Academician and researcher

Annex 9: Attendance List of consulted people

No	Full names	Position
KARONGI ADMINISTRATIVE DISTRICT		
1	NIRAGIRE THEOPHILE	V/MAYOR ED
2	NTAKIRUTIMANA GASPARD	ES MUBUGA
3	NIYONSABA CYRIQUE	ES GITESI
4	AYABAGABO FAUSTIN	ES BWISHYURA
5	HABIMANA PROTEGENE	ES GASHALI SECTOR
6	NKUSI MEDARD	ES RUGABANO
7	NSENGIYUMVA R. SONGA	ES MUTUNTU
8	MUDACUMURA APHRODIS	ES MURUNDI
9	UWIMANA PHANUEL	ES MURAMBI
10	KUZABAGANWA VEDASTE	ES RWANKUBA
11	UWIMANA EMMANUEL	SLM/GITESI
12	UWIMBABAZI ELIE	SLM/RUGANDA
13	MBATEZIMANA JOSIANE	ETAT CVM
14	ISAAC MANANTIRENGANYA	ENGINEER
15	GATERANO ETIENNE	SLM/MUNK
16	DUSENGIMANA DAMIEN	BRANCH MANAGER

17	RUKESHA K. EMILE	ES RUBENGERA SECTOR
18	HAVUGIYAREMYE THARCISSE	LAND MANAGER RUBENGERA
19	NIKUZE MICHEL	LAND MANAGER RUGABANO
20	NSANGANIRA VIANNEY	ES/SECTOR
21	NSHIMYUMUREMYI JOEL	BILLYING OFFICER
22	DUSABIMANA CONCORDE	TWUMBA SLM
RUTSIRO ADMINISTRATIVE DISTRICT		
1	RUTAYISIRE M. DEO	ES RUHANGO
2	HAGENIMANA MATTHIEN	DISTRICT ELECTRICAL ENG.
3	MUKESHIMANA MARIE ALICE	SLM
4	KAGABA JEAN BAPTISTE	LAND MANAGER
5	NDAGIJIMANA ALOYS	LAND MANAGER
6	HARERIMANA XAVERIEN	LAND MANAGER MANIHIRA
7	NIZIYIMANA AIME ADRIEN	ENVIRONMENTAL OFFICER
8	KABARE JEAN PAUL	EUCL/RUTSIRO BRANCH
9	RUGABA ABEL	AGRONOME/RUSEBEYA
10	IREMISHAKA PASCAL	SLM /GIHAGO
11	SEKAMANA THEOPHILE	SLM/RUHANGO
12	NDAYAMBAJE Jerome	REPRESENTATIVE of Rwanda Family Initiative-NGO(RFI)
RUBAVU ADMINISTRATIVE DISTRICT		
1	NZABONIMPA DEOGRATIAS	V/MAYOR ED
2	NTIBATEKEREZA INNOCENT	ELECTRICAL ENGINEER
3	NIYIBIZI NTABYERA HUBERT	DIVISION MANAGER
4	NDUWAYO ELIE	SLM/CYANZARWE
5	BUREGEYA EVARISTE	SLM/KANAMA
6	CAMUBANDI FRED	SLM/BUSASAMANA
7	KABERA	SLM/KANZENZE
8	AYINKAMIYE ODILLE	SLM/NYAMYUMBA
RUSIZI ADMINISTRATIVE DISTRICT		
1	KANKINDI LEONCIE	V/M ED
2	DUKUZUMUREMYI ANNE MARIE	SES/NYAKARENZO
3	HABIMANA EMMANUEL	S/E GASHORA
4	BANZUBAZE THOMAS	LAND MANAGER
5	NIYOMUGABO YUSUF	LAND MANAGER
6	MUSHIMIYIMANA JANVIER	ES OF THE SECTOR
7	RUKESHA EMMANUEL	ES BUTARE SECTOR
8	NDAMYIMANA DANIEL	ESAI OF THE SECTOR
9	RWANGO JEAN DE DIEU	ES/NZAHAHA SECTOR
10	HATEGEKIMANA CLEVER	ES GIKUNDAMVURA
11	MUNYEMANA PROSPER	T.E RUSIZI BRANCH
12	HABIMANA MATHIAS	ELECTRICITY M.ENG.
13	NTIKUGURURWA GERVAIS	ES BUGARAMA
14	NTWUHARUWE NAPOLEON	AIR OF SECTOR

15	CYIMANA METOR	SCM /GIKUNDAMVURA
16	MURAGIMANA PIE	SLM/BWENGE
17	HAGENIMANA JEAN DE DIEU	ES GIHEKE
18	IRAGUHA BASILE	SLM
19	IBONABYOSE JEAN DAMASCENE	SLM
20	KAMANYANA EVELYNE	SLM
21	BYIRINGIRO ZEPHANIE	SLM
22	SIBOMANA APHRODIS	SLM
23	NKURUNZIZA EMMANUEL	SLM
24	KARANGWA ALEXIS	DISTRICT DASSO COORD.
25	NIYIBIZI JEAN DE DIEU	ES GIHURWE SECTOR
26	BISENGIMANA EUGENE	AI ES NYAKABUYE
27	NZEYIMANA JEAN BEN FONTAINE	LAND MANAGER KAMEMBE
28	NZABANDORA PIERRE	LAND MANAGER BUGARAMA
29	IZADUKIZA MARIE CLAIRE	SLM NYAKARENZO
30	NYIRANEZA RACHEL	SLM GASHONGA
31	MUKANYANGEZI CHANTAL	SLM MUGANZA
32	NEMA ESTHER	SLM MURURU
NYABIHU ADMINISTRATIVE DISTRICT		
1	UWIMANA BLANDINE	AGRONOME
2	DUKUZUMUREMYI BEATRICE	
3	DUSABUMUREMYI CLEMENT	SLM/SHYIRA
4	NSHIMYUMUKIZA ISRAEL	SLM/KABARA
5	NIYIGENA ERNEST	SLM/JENDA
6	BAVUDIRIJE JUVENAL	DIRECTOR of OSC
7	NDANDU MARCEL	ES of RUREMBO sector
8	KAMPIRE GEORGETTE	ES/JENDA SECTOR
9	MITALI ADOLPHE	TECHNICAL ENG.NYABIHU
10	NDAHUNGA PRIMIEN	CUSTOMER CARE OFFICER
11	NDIKUMANA J. BAPTISTE	AGRONOME
12	MUSIRIKARE ADALBERT	ES/JOMBA
13	HABIYAREMYE AMINADABU	LAND MULINGA
14	BYUKUSENGE EMMANUEL	ES/MULINGA
15	HAKIZIMANA INNOCENT	ES/KINJOMBO
16	NDAHIMANA JEAN PAUL	SSLM/KARANGO
17	UWIRINGIYIMANA ADEOOTUS	LSLM/RUREMBO
18	TUYIZERE FIACRE	LAND RAMBURA
19	NKURUNZIZA JOSEPH	FORESTER MUKANIRA
NGORORERO ADMNISTRATIVE DISTRICT		
1	PATRICK UWIHOREYE	V/MAYOR ED
2	KAYANGE CARINE	INFRASTRUCTURE
3	NIYOYITA FRANCIS	SLM/NDARO
4	UWIMANA JOSELYNE	SLM/NYANGE

5	MUNYANEZA FABIEN	INTERN/NGORORERO
6	NTEZIRYAYO PHILPPE	SLM/HINDIRO
7	MUJYANAMA MATHIAS	SLM//KAGEYO
8	MAPENDANO JMV	SLM/NGORORERO
9	IHORIKIZA MARIE CLAUDINE	SLM/MUHORORO
10	MUGEMANA J. BOSCO	SLM/KABAYA
11	TWAYIGIRA J.DE DIEU	SLM/MATYAZO
12	KAGABO NOEL	SLM/KAVUMU
13	HABINEZA SIMON PIERRE	T.E NGORORERO
14	KAYANGE JEAN D AMOUR	ES SECTOR /NGORORERO
15	NSANZIMANA AIMABLE	SLM/BWIRA
16	BIZIYAREMYE J. CLAUDE	SLM/GATUMBA
17	NTAYIMANA JP CELESTIN	DIR.OSC
GICUMBI ADMINISTRATIVE DISTRICT		
1	MWANAFUNZI DEOGRATIAS	ES/MIYOVE SECTOR
2	REBERAHO TELESPHORE	AGRONOME/RUSHAKI SECTOR
3	MANIRAGUHA ANASTASE	FAO/RUSHAKI
4	NIYITEGEKA ALPHONSE	Ag.ES RUKOMO
5	NTIVUGURUZWA SYLVESTRE	Ag.ES MANYAGIRO
6	BYIRINGIRO DAVID	SECTOR LAND MANAGER
7	MBONIMPAYE HONORE	Ag. LAND OFFICER RWAMIKO
8	NSHIMYIMANA THEOGENE	LAND OFFICER/MANYAGIRO
9	BIZIMENYERA THEONESTE	LAND OFFICER/NYANKENKE
10	NDACYAYISENGA SCHOWLWCK	LAND OFFICER /BUKURE
11	INGABIRE FRANCINE	LAND OFFICER MUKARANGE
12	MUKAWIZEYE	LAND OFFICER BUKURE
13	NTEZIRYAYO ALPHONSE	ELECTRICITY /GICUMBI
14	CHRYSOLOGUE NGENDAHAYO	REG/EUCL MB
15	TUGIRIMANA EMMANUEL	SLM/RUKOMO
16	BAYINGANA JMV VIANNEY	ES/NYAMIYAGA
17	UWABAGIRA SERAPHINE	LAND OFFICER
18	HAKIZIMANA EPAPHRODITE	LAND OFFICER
19	SIBOMANA DAVID GILBERT	LAND OFFICER
20	NSABIMANA JEAN PAUL	LAND OFFICER/
21	KWITARE LAMBERT	ES/SHANGASHA SECT.
22	BENINGOMA OSCAR	ES/MUKARANGE
23	MBARUSHIMANA PRUDENCE	ES/MUTETE
24	NKUNZABERA SYLVESTRE	ES/BUKURE
25	RUSIZANA JOSEPH	ES/RWAMIKO SECTOR
26	JOLIE BEATRICE	ES/NYANKENKE SECTOR
27	MUNYARUGERERO M.	CRMO/KANIGA
28	ICYIMANA GERARD	Ag.ES RUTARE
29	NSHIMIYIMANA VALENS	Ag.ES/BYUMBA

30	ISHIMWE SAMWEL	LAND OFFICER/MUTETE
RULINDO ADMINISTRATIVE DISTRICT		
1	MULINDWA PROSPER	V/MAYOR ED
2	RUBAYITA ERIC	ES KINIHIRA SECTOR
3	MUTUYIMANA JEANNETTE	ES CYUNGO SECTOR
4	BIZUMUREMYI AL BASHIR	D ES RULINDO
5	NIYONIRINGIYE FELICIEN	DIRECTOR OF OSC
6	AYABAGABO ILDEPHONSE	SLM
7	NSABIMANA EMMANUEL	SLM
8	MUHAWENIMANA DESIRE	SECTOR LAND MANAGER
9	NZEYIMANA JEAN VEDASTE	ES MBOGO
10	NDAGIJIMANA FRODUALD	ES/RWIGE
11	MWUMVINEZAYIMANA FIACRE	E/S B. SECTOR
12	KAYIRANGA J. NEPO	OSC LAWYER RULINDO HQ
13	NSENGIYUMVA CHARLES	LAND ADMIN
14	NDAHAYO LEOPOLD	SLM /CYUNGO
15	SEBAZUNGU J.BAPTISTE	SLM /KISARO
16	UWANYAGASANI	SLM/NTARABANA SECTOR
17	NDARUHUTSE JEAN CLAUDE	SLM/RUKOZO
18	NDIKUMANA ERNESTE	SLM/MBOGO
19	IYAKAREMYE PASCAL	SLM/BUYOGA
20	TWIZERIMANA JEAN BERCHMAS	SLM/RUSINE
21	MUSHIMIYIMANA JEAN PIERRE	DASSO CYINZUZI SECTOR
22	NIYONSABA SYMPHORIEN	SLM/BUSHOKI
23	MUHIGIRA ANTOINE	ES OF SECTOR
24	SHUMBUSHO PAPIAS	ES OF RUTONDE CELL
25	UMUBYEYI MEDIATRICE	ES/TUMBA SECTOR
26	NZEYIMANA PIERRE CLEVER	ES/BUSHOKI SECTOR
27	UWIRINGIYIMANA THOMAS	RULINDOHQ/BUSHOKI
28	NYIRAMUGISHA CHRISTINE	SLM/BASE
29	KUBWAMUNGU ELIE	GOOD GOVERNANCE/MASORO
30	UGIRIMBABAZI CONCESSA	S/E KAJEVUBA
31	MUHAYIMANA CELESTIN	RULINDO REG-MANAGER
32	UMUHOZA MARIE GRACE	SLM/MASORO
33	NKUNDABERA FAUSTIN	SLM/CYINZUZI
34	GASANA GASPARD	KIMU REPRESENTATIVE
MUHANGA ADMINISTRATIVE DISTRICT		
1	KAYIRANGA INNOCENT	VICE MAYOR ECONOMIC
2	KAYIRANGWA VESTINE	ACTING ES/S
3	BIGIRIMANA J.PAUL	ACTING ES/S
4	BAZIZANE PACIFIQUE	ACTING ES/CYEZA SECTOR
5	MUKAMUTARI VALERIE	ES SHYOGWE
6	DUKUNDANE SERGE	SLM SHYOGWE

7	NTEZIYAREMYE GERMAIN	ACTING ES KIYUMBA
8	NYAMINANI AIMABLE	ACTING ES
9	NTAWURUHUNGA CHARLES	ELECTRICAL ENGINEER
10	MUKASETI ROSINE	REG BRANCH MANAGER
11	NZABONIMPA ONESPHORE	Dir OSC MUHANGA DISTRICT
12	NSENGIMANA SILAS	ES/NYAMABUYE
13	NDAYISABA AIMABLE	ES KABACUZI
14	NSHIMIYIMANA JEAN CLAUDE	ES KIBANGU
15	BYICAZA CLAUDE	Ag MUHANGA
16	NIRAGIRE EZECHIEL	WATSAN
17	MVUYEKURE EDOUARD	SLM/RONGI
18	RUZINDANA FIACRE	AIR ES/MUHANGA
19	HAKIZIMANA ALPHONSE	SECTOR LAND MANAGER
20	MUSHIMIYIMANA ESPERANCE	S.LAND MANAGER
21	HAGENIMANA EMMANUEL	S.LAND /M.NYAMABUYE
22	NIYONSENGA ALPHOSE	SECTOR LAND MANAGER
23	NDACYAYISABA ILDEPHONSE	SECTOR LAND MANAGER
24	NYIRAMUNINI MUKIZA SOLEIL	SECTOR LAND MANAGER
25	HABINEZA INNOCENT	SECTOR LAND MANAGER
26	NKUBITO AMOS	SECTOR LAND MANAGER
27	NKURUNZIZA J.M.V	SECTOR LAND MANAGER
28	NTURANYENABO EMMANUEL	SECTOR LAND MANAGER
29	REV KAMANZI GALLICAN	REVEREND PASTEUR DE L'EMLR
NGOMA ADMINISTRATIVE DISTRICT		
1	MUTABAZI CELESTIN	DIRECTOR OF OSC
2	KANAYOGE ALEXIS	ES NGOMA
3	TURYAREBA SYLVESTRE	ELECTRICITY ENG.NGOMA
4	SEMATABARO MBWECK	DISTRICT ENV.OFFICER
RWAMAGANA ADMINISTRATIVE DISTRICT		
1	IGOOMA STEPHEN	BM/REG
2	MUKANDAYISHIMIYE OLIVE	DISTRICT EME
3	RUBANGUTSANGABO ANSELME	LAND VALUER
KAYONZA ADMINISTRATIVE DISTRICT		
1	JEAN DE DIEU NYIRINGANGO	BRANCH MANAGER
2	DUKUZUMUREMYI EPIPHANIE	DISTRICT EME
3	GAKUNZI EMMANUEL	Dir OSC
4	KARANGWAYIRE CHARLOTTE	LAND OFFICER/KABARONDO
5	UZABAKIRIHO LAUBEN	UMUTURAGE/CYABAJWA
6	TWIZEYEMUNGU NOWA	USHINZWE ISIBO KABARONDO
7	NSENGIYUMVA PATRICE	UMUTURAGE
8	NSENGIYUMVA CELESTIN	UMUTURAGE CYABAJWA
9	NDUWAYEZU	UMUTURAGE
10	NTAWUKIRUWABO FERETIEN	UMUTURAGE

11	MUNYANEZA JEAN DAMASCENE	MUTEKANO
12	UWIMANA SAMSON	UMUJYANAMA
13	MBONIGABA JEAN PAUL	UMUTURAGE
14	MANIRAGUHA LAURANT	UMUTEKANO
15	NIZEYIMANA ERIC	MUTWARASIBO
16	NSHIMIYIMANA JEAN PIERRE	MUTWRASIBO
17	NDAGIJIMANA EMMANUEL	USHINZWE UMUTEKANO
18	MUSAYIDIZI ANANIAS	ES OF CELL
NYAGATARE ADMINISTRATIVE DISTRICT		
1	MUSHABE DAVID CLAUDIEN	MAYOR/NYAGATARE
2	NIYONKURU BENOIT	BM/REG
3	SAM GATUNGE	Dir OS SOCIAL
4	MUGENZI	ENVIRONMENTAL
5	MANIHIRA JEAN CLAUDE	BUILDING INSPECTOR
6	UWIZEYIMANA ETIENNE	ELECTRICAL ENGINEER
KAMONYI ADMINISTRATIVE DISTRICT		
1	BAHIZI EMMANUEL	DES
2	KALISA ROSINE	REG-MANAGER
3	ABRAHAM UKWISHAKA	DIRECTOR/OSC
4	RUBADUKA SAMSON	DIRECTOR/PM&E Ag.
5	KABALISA VALUAS	DDMO
6	UZABATUNGA BERTRARD	SLM GACURABWENGE SECT.
7	MINANI JEAN PAUL	TEACHER (RUBONA PRIMARY)
8	NISHIMWE ALLERUA	TAILLEUR/GACURABWENGE
9	HITAYEZU FIDELE	UMUCURUZI/RUBONA
10	HAKUZIYAREMYE XAVER	UMUCURUZI/RUBONA
11	NDIHOKUBWAYO AROYS	UMUCURUZI/RUBONA
12	NSENGIYUMVA JUVENSI	UMUCURUZI
13	BIKORIMANA PASTOR	EPR
14	NSENGIYUMVA JEAN	UMUHINZI/UMWUBATSI
KIREHE ADMINISTRATIVE DISTRICT		
1	MUZUNGU GERALD	MAYOR/KIREHE
2	EGIDE MASUMBUKO	CUSTOMER CARE OFFICER
3	MARC NTIRENGANYA	ELECTRICIAN
4	BUTETO MONIQUE	DISTRICT IRRIGATION OFICER
5	NGIRABAKUNZI OCTAVIEN	DISTRICT ENVIRON. OFICER
6	KALINDA M. VITAL	FOREST&NR
7	MUNYANEZA WILLIAM	DIR OSC/KIREHE DISTRICT

Annex 10: Chance find procedures under EAQIP

Chance find procedures under Rwanda Energy Access and Quality Improvement Project will be designed as follows:

- Immediate Stop the construction activities in the area of the chance find.
- Delineate the discovered site or area.
- Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be present until the responsible local authorities take over. The Institute of National Museum of Rwanda shall be responsible for significant movable and immovable cultural property that pertains to Rwanda history, heroes and the conservation of historical artifacts and the National Museum shall be responsible for significant movable and immovable cultural and natural property pertaining to collections of fine arts, archaeology, anthropology, botany, geology, zoology and astronomy, including its conservation aspect. Institute of National Museum of Rwanda Cultural Properties Division take over. The address of Institute of National Museum of Rwanda is as follows:
    - Rwanda, Huye
    - Address: SH 1RD 2
    - P.O.BOX 6397, Kigali
    - +250730741093
    - +250783379597
    - E-mail: info@museum.gov.rw
- Notify the supervisory Engineer who in turn will notify the responsible local authorities and the Institute of National Museum of Rwanda Cultural Properties Division immediately (less than 24 hours).
- Contact the responsible local authorities and the Institute of National Museum of Rwanda Cultural Properties Division who would be in charge of protecting and preserving the site before deciding on the proper procedures to be carried out. This would require a preliminary evaluation of the findings to be performed by the archaeologists of the Institute of National Museum of Rwanda Cultural Properties Division (within 72 hours). The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage, including the aesthetic, historic, scientific or research, social and economic values.
- Ensure that decisions on how to handle the finding be taken by the responsible authorities and the Institute of National Museum of Rwanda Cultural Properties Division. This could include changes in the layout (such as when the finding is an irremovable remain of cultural or archaeological importance) conservation, preservation, restoration and salvage.

- Implementation for the authority decision concerning the management of the finding shall be communicated in writing by the Institute of National Museum of Rwanda Cultural Properties Division; and
- Construction work will resume only after authorization is given by the responsible local authorities and the Institute of National Museum of Rwanda, Cultural Properties Division concerning the safeguard of the heritage.
- These procedures must be referred to as standard provisions in construction contracts, Safeguards Procedures for Inclusion in the Technical Specifications for Contracts. During project supervision, the Site Engineer in collaboration with the contractor safeguards shall monitor the above regulations relating to the treatment of any chance find encountered are observed.
- Relevant findings will be recorded by the safeguards and will be reported in monitoring and Evaluation Report on quarterly basis to the World Bank, and Implementation Completion Report on safeguards part will assess the overall effectiveness of the project's cultural property mitigation, management, and activities when the chance find encountered during the implementation.

Annex 11: Environment Health and Safety Guidelines for Electric Power Transmission and Distribution

The EHS Guidelines for Electric Power Transmission and Distribution include information relevant to power transmission between a generation facility and a substation located within an electricity grid, in addition to power distribution from a substation to consumers located in residential, commercial, and industrial areas.

1. Environmental Impacts mitigation guidelines

Right-of-way construction

- Proper Site transmission and distribution rights-of-way, access roads, lines, towers, and substations to avoid critical habitat through use of existing utility and transport corridors for transmission and distribution, and existing roads and tracks for access roads, whenever possible;
- Installation of transmission lines above existing vegetation to avoid land clearing;
- Avoidance of construction activities during the breeding season and other sensitive seasons or times of day;
- Revegetation of disturbed areas with native plant species; Removal of invasive plant species during routine vegetation maintenance (see right-of-way maintenance section below).

Right of way maintenance

- Implement an integrated vegetation management approach (IVM). The selective removal of tall-growing tree species and the encouragement of low-growing grasses and shrubs. Observing manufacturer machinery and equipment guidelines, procedures with regard to noise, and oil spill prevention and emergency response;
- Avoiding clearing in riparian areas;
- Avoiding use of machinery in the vicinity of watercourses.

Forest Fires

- Monitoring right-of-way vegetation according to fire risk;
- Removing blowdown and other high-hazard fuel accumulations;
- Time thinning, slashing, and other maintenance activities to avoid forest fire seasons;
- Planting and managing fire resistant species (e.g. hardwoods) within, and adjacent to, rights-of-way; Establishing a network of fuel breaks of less flammable materials or cleared land to slow progress of fires and allow firefighting access.

Avian and Bat Collisions and Electrocutions

- Aligning transmission corridors to avoid critical;
- Maintaining1.5 meter (60-inch) spacing between energized components and grounded hardware or, where spacing is not feasible, covering energized parts and hardware;
- Considering the installation of underground transmission and distribution lines in sensitive areas (e.g. critical natural habitats).

Aquatic Habitat Alteration

- Site power transmission towers and substations to avoid critical aquatic habitat (e.g. watercourses, wetlands, and riparian areas;
- Minimizing clearing and disruption to riparian vegetation.

Electric and Magnetic Fields

- Evaluating potential exposure to the public against the reference levels developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). Average and peak exposure levels should remain below the ICNIRP recommendation for General Public Exposure;

- Considering siting new facilities so as to avoid or minimize exposure to the public. Installation of transmission lines or other high voltage equipment above or adjacent to residential properties or other locations intended for highly frequent human occupancy, (e.g. schools or offices), should be avoided;
- If EMF levels are confirmed or expected to be above the recommended exposure limits, application of engineering techniques should be considered to reduce the EMF produced by power lines or transformers.

Hazardous Materials

- The use of SF6 should be avoided due to its potential GHGs potential effect.
- Replacing existing transformers and other electrical equipment containing PCB, and ensuring appropriate storage, decontamination, and disposal of contaminated units;
- Prior to final disposal, retired transformers and equipment containing PCB should be stored on a concrete pad with curbs sufficient to contain the liquid contents of these containers should they be spilled or leaked. The storage area should also have a roof to prevent precipitation from collecting in the storage area. Disposal should involve facilities capable of safely transporting and disposing of hazardous waste containing PCB.

Wood Preservatives

- Poles should be pre-treated at an appropriate facility to ensure chemical fixation and prevent leaching, and to impede the formation of surface residues at the right-of-way.

2. **Occupational Health and Safety guidelines**

Occupational health and safety hazards specific to electric power transmission and distribution projects primarily include: Live power lines; Working at height; Electric and magnetic fields; Exposure to chemicals

Live Power lines

- Only allowing trained and certified workers to install, maintain, or repair electrical equipment;
- Deactivating and properly grounding live power distribution lines before work is performed on, or in close proximity, to the lines;
- Ensuring that live-wire work is conducted by trained workers with strict adherence to specific safety and insulation standards;
- Workers should not approach an exposed energized or conductive part even if properly trained unless: The worker is properly insulated from the energized part with gloves or other approved insulation or the

energized part is properly insulated from the worker and any other conductive object or the worker is properly isolated and insulated from any other conductive object (live-line work);

- Where maintenance and operation is required within minimum setback distances, specific training, safety measures, personal safety devices, and other precautions should be defined in a health and safety plan;
- Workers not directly associated with power transmission and distribution activities who are operating around power lines or power substations should adhere to local legislation, standards, and guidelines relating to minimum approach distances for excavations, tools, vehicles, pruning, and other activities;
- Minimum hot stick distances may only be reduced provided that the distance remaining is greater than the distance between the energized part and a grounded surface.

Working at height on poles and structures

- Testing structures for integrity prior to undertaking work;
- Implementation of a fall protection program that includes training in climbing techniques and use of fall protection measures;
- Inspection, maintenance, and replacement of fall protection equipment; and rescue of fall-arrested workers, among others;
- Establishment of criteria for use of 100 percent fall protection (typically when working over 2 meters above the working surface, but sometimes extended to 7meters, depending on the activity). The fall protection system should be appropriate for the tower structure and necessary movements, including ascent, descent, and moving from point to point;
- Installation of fixtures on tower components to facilitate the use of fall protection systems;
- Provision of an adequate work-positioning device system for workers; Connectors on positioning systems should be compatible with the tower components to which they are attached;
- Hoisting equipment should be properly rated and maintained and hoist operators properly trained;
- Safety belts should be of not less than 16millimeters (mm)(5/8 inch) two-in-one nylon or material of equivalent strength. Rope safety belts should be replaced before signs of aging or fraying of fibers become evident;
- When operating power tools at height, workers should use a second (backup) safety strap;
- Signs and other obstructions should be removed from poles or structures prior to undertaking work;
- An approved tool bag should be used for raising or lowering tools or materials to workers on structures.

Electric and magnetic fields Electric and magnetic fields (EMF)

- Identification of potential exposure levels in the workplace, including surveys of exposure levels in new projects and the use of personal monitors during working activities;
- Training of workers in the identification of occupational EMF levels and hazards;
- Establishment and identification of safety zones to differentiate between work areas with expected elevated EMF levels compared to those acceptable for public exposure, limiting access to properly trained workers;
- Implementation of action plans to address potential or confirmed exposure levels that exceed reference occupational exposure levels developed by international organizations such as the (ICNIRP), and the Institute of Electrical and Electronics Engineers (IEEE). Action plans to address occupational exposure may include limiting exposure time through work rotation, increasing the distance between the source and the worker, when feasible, or the use of shielding materials.

Exposure to chemicals

- Train personnel to apply pesticides and ensure that personnel have received the necessary certifications, or equivalent training where such certifications are not required;
- Respect post-treatment intervals to avoid operator exposure during reentry to crops with residues of pesticides;
- Ensure hygiene practices are followed to avoid exposure of family members to pesticides residues.

3. Community Health and Safety guidelines

The operation of live power distribution lines and substations may generate the following industry-specific impacts to the community: Electrocution; Electromagnetic interference; Visual amenity; Noise and Ozone and Aircraft Navigation Safety

Electrocution

- Use of signs, barriers (e.g. locks on doors, use of gates, use of steel posts surrounding transmission towers, particularly in urban areas), and education / public outreach to prevent public contact with potentially dangerous equipment;
- Grounding conducting objects (e.g. fences or other metallic structures) installed near power lines, to prevent shock.

Noise and Ozone

- To mitigate this impact during project planning stages to locate rights-of-way away from human receptors, to the extent possible and use of noise barriers or noise canceling acoustic devices should be considered as necessary.

4. Performance Indicators and Monitoring

Environment: Environmental monitoring activities should be based on direct or indirect indicators of emissions, effluents, and resource use applicable to the particular project. Monitoring frequency should be sufficient to provide representative data for the parameter being monitored. Monitoring data should be analyzed and reviewed at regular intervals and compared with the operating standards so that any necessary corrective actions can be taken.

Occupational Health and Safety: Projects should try to reduce the number of accidents among project workers (whether directly employed or subcontracted) to a rate of zero, especially accidents that could result in lost work time, different levels of disability, or even fatalities. Facility rates may be benchmarked against the performance of facilities in this sector in developed countries through consultation with published sources. Facilities should also maintain a record of occupational accidents and diseases and dangerous occurrences and accidents.

Annex 12: Guidelines for Management of Solar Panels and Batteries (including Recycling/Safe Disposal) in Off-grid Electrification (part of Component 3)

1. Quality requirement

Crystalline type solar PV panels are the only minimum quality recommended panels for importation.

2. Minimum Service level requirements

They should have enough electricity to power at least:

- Three lamps of at least120 lumens each, operating at least four hours per day
- A mobile phone charge supply for at least two hours per day
- A radio charge supply for at least five hours per night
- Supply the above loads for least one day without input from the solar module/when there is sunshine

- Product labeling for system part is mandatory. Eg: Batteries: Voltage storage capacity (in mAh, Ah, or Wh), battery chemistry (eg: lead-acid, lithium iron phosphate, lithium-ion,)
- Dismountable system parts (eg: lamp and battery) and system compatibility is recommended to allow for spare parts replacement.

3. Warranty requirements

- A minimum of three years' warranty and after sales contract that commits to the availability of spare parts and technical service for minimum five years after the installation of the system.

4. Electrical installation

Electrical regulations shall follow the REGULATIONS 002/EL/ENRGY/RURA/2012 ON ELECTRICAL INSTALLATIONS

5. Battery

No batteries should contain Cadmium or Mercury at levels greater than treatable amounts

6. Agreement

The agreement of between purchase and supplier shall cover the following:

- Responsibilities of purchase/user with timeline
- Responsibilities of the supplier
- Dispute resolutions/complaints handling
- Details of the after sales services including timeline,

7. Waste management

The supplier, herein the company that has contract with EDCL to supply the solar home system in the community should:

- Have contract of waste collection and transportation with EnviroSource Rwanda Green Park/Rwanda E-waste Recycling Facility which can recycle the panel and the used batteries.
- Submit the waste management Plan providing the details about collection and transportation of used panel and batteries;
- The waste management plan should be established based on the annex 12 of Waste Management Plan of this ESMF,

- Waste management should comply with REGULATIONS N0 002 OF 26/04/2018 GOVERNING E-WASTE MANAGEMENT IN RWANDA

Annex 13: Indicative contents of waste management plan

- Introduction: Here the contractor should provide the executive summary on waste management and the relevancy to the project Component.
- A review and analysis of national and institutional policy and legislation related to waste
- A description of National legal, policy and procedures in relation to waste management
- A description of the general types and an indication of likely quantities of waste likely to be generated by the proposed development;
- Waste Management Principles; These principles, with the procedures above, will form the basis of the waste management Plan including the used solar panels and batteries. The contractor should discuss in detail the way to
    - Minimize,
    - Reuse,
    - Recycle,
    - Disposal and recover.
- Waste management implementation plan and institutional arrangement: In this section the contractor should discuss in detail how the waste management will be implemented focusing mainly on the way to:
    - Collect waste
    - Storage of waste
    - Waste transportation
    - Waste disposal

He should also discuss an arrangement showing how he will be working with Local Government Officials and Local population to access to produced waste especially waste concerning the used solar home system including used panels and batteries at the end of life.

The implementation arrangement should also show the need to work with certified company for electronic waste management where the contract for collection, transportation and disposal is mandatory and a pre-requisite requirement for being awarded a contract to work in the area of Off Grid intensification in Rwanda for the EAQIP.

Annex 14: Expected Administrative Districts under EAQIP per development Partners

ID	Province	District	DP
1	North	Burera	WB&AFD
2	North	Gakenke	OFID&SFD
3	North	Gicumbi	WB&AFD
4	North	Musanze	WB&AFD
5	North	Rulindo	WB&AFD
6	South	Kamonyi	OFID&SFD
7	South	Muhanga	OFID&SFD
8	West	Karongi	WB&AFD
9	West	Ngororero	WB&AFD
10	West	Nyabihu	WB&AFD
11	West	Nyamasheke	WB&AFD
12	West	Rubavu	WB&AFD
13	West	Rusizi	WB&AFD
14	West	Rutsiro	WB&AFD