



LIMITED STRATEGIC ENVIRONMENTAL AND SOCIAL ASSESSMENT

FOR THE PROPOSED

Rwanda Scaling Up Energy Access II Programme

Draft Report

Prepared by the African Development Bank

ABBREVIATIONS AND ACRONYMS

Acronym	Meaning
AfDB	African Development Bank
CAS	Country Assistance Strategy
CSO	Civil Society Organization
DLIs	Disbursement-linked Indicators
EARP	Electricity Access Rollout Program
EDCL	Energy Development Corporation Limited
EDPRS	Economic Development and Power Reduction Strategy
EUCL	Energy Utility Corporation Limited
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plans
ESSA	Environmental and Social Systems Assessment
ESSP	Energy Sector Strategic Plan
GRM	Grievance Redress Mechanism
HLTO	High-Level Target Objective
kV	Kilovolt
kVA	kilovolt-ampere
LV	low voltage
MINECOFIN	Ministry of Finance and Economic Planning
MININFRA	Ministry of Infrastructure
MV	medium voltage
MW	megawatt
NEP	National Electrification Plan
NST	National Strategy for Transformation
PAP	Project-affected Person
PDO	Project Development Objective
PESA	Preliminary Environmental and Social Assessment
ARAP	Abbreviated Resettlement Action Plan
RBF	Results-based Financing
RURA	Rwanda Utilities Regulatory Authority
SAIFI	System Average Interruption Frequency Index
SCADA/DMS	Supervisory Control and Data Acquisition/Distribution Management System
SE4ALL	Sustainable Energy for All
SEP	Stakeholder Engagement Plan

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EXECUTIVE SUMMARY

The Government of *Rwanda's Energy Sector Strategy Plan (ESSP) 2017-2024* is being proposed for financing through the African Development Bank's innovative financing instrument -Results Based Financing (RBF) - which links the disbursement of funds directly to the delivery of defined results. The instrument builds on increased reliance on Country borrower's safeguard and oversight systems.

The programme development objectives is to improve the power supply reliability, increase on and off grid access in Kigali city and in the Southern, Western and Eastern provinces and enhance institutional capacity for effective implementation of the Government's electrification program. *The RBF based programme will contribute to four key results derived from the 8 sector priority areas of high level targets of the ESSP.* The following outcome indicators will be used to measure achievement of the PDO: (i) PDO Indicator 1: Reduction in average number and frequency of interruptions linked to HLTO2 (High-Level Target Objective) and also HLTO6 (ii) PDO Indicator 2: Number of household and productive usage customers provided with on-grid electricity service; linked to HLTO4 and HLTO3; (iii) PDO Indicator 3: Number of people provided with off-grid electricity access; Linked to HLTO3, and (iv) PDO Indicator 4: Improved planning and implementation capacity of the electricity sector (to support the achievement of above).

To inform the preparation of the RBF lending to the Government of Rwanda, the AfDB has conducted a Preliminary Environmental and Social Assessment (PESA) of the proposed project component activities under the programme areas to identify their potential environmental and social impacts. The preliminary assessment also evaluated the adequacy of the existing Country's Environmental and Social Management Systems reflected in the national legal, regulatory, and institutional framework that will be used to address environmental and social effects of the activities financed by the RBF programme. Furthermore the preliminary assessment evaluated the institutional operational capacity of the programme implementing agency Rwanda Energy Group REG through its subsidiary groups (EDCL- Energy Development Corporation Ltd and EUCL- Energy Utility Corporation Ltd), in screening, assessing, preparing of management plans to manage identified impacts and disclosure of project level information in line with the AfDB's Integrated Safeguard Systems (ISS). The PESA identified gaps and opportunities within both the institutional operational capacity of REG (EDCL and EUCL) and the Country Environmental and Social Management Systems to effectively manage the identified environmental and social impacts associated with the programme activities under the four key programme areas to comply with the Bank's Integrated Safeguard System (ISS).

This Limited SESA Report presents the findings of the PESA and detailed assessments exercises, defines measures to strengthen the existing environmental and social system, and proposes to integrate those measures into the overall RBF Programme design. The assessment was undertaken to assess adequacy of the country safeguard systems and REG's (via EDCL and EUCL) institutional capacity systems against the operational requirements of the five main Operational Safeguard Policies of the ISS in line with the RBF Policy of the Bank in order to effectively manage the identified Program risks and promote sustainable development.

The proposed RBF based programme will generate low to moderate environmental and social impacts.

Environmental benefits will be derived from substitution of electricity for other household and business energy sources and increased reliance on renewable energy sources. Social benefits will result from increased access to electricity. Potential adverse environmental impacts of the Programme are likely to be associated with the installation of Medium- and Low-voltage (MV-LV) distribution lines and their associated transformers. However, none of the residual impacts are expected to be significant or difficult to avoid or mitigate, and few will be localized and of short-term duration.

Potential adverse social impacts are likely to be associated with acquisition of way leaves (rights of way) for 33kV and 11 kV distribution lines. These impacts are also not anticipated to be of large scale¹ in scope but could adversely affect individual project-affected persons (PAPs) that lose assets including structures, crops and trees, and the restricted use of portions of their land. Physical relocation of households, businesses or other assets is not anticipated under the programme and if at all necessary will not be of an extensive nature.

The SESA identifies the key measures to be undertaken for improved environmental and social due diligence in the Programme and is intended to help the Government of Rwanda and the Implementing Agency (REG- EDCL and EUCL) in overcoming deficiencies with regard to environment, social, health and safety aspects of the last mile MV and LV distribution lines under Areas 1, 2 and 3 of the programme component activities as indicated in the table below.

Overall, the programme is deemed to be environmentally sustainable and adequately designed to comply with both the country environmental and social legislative and permitting requirements as well as the AfDB's ISS if the management and work specific mitigation plans are implemented effectively to address the identified low to moderate residual environmental and social impacts associated with the programme components and gaps within the country systems assessment.

Item #	Mitigation Measure	Responsible Entity	Deadline	Monitoring Frequency	Budget
1. REG Develop and Implement an ESMS					
1.1	Develop E&S Policy for REG	REG management	During first year of RBF Implementation	Quarterly monitoring and Verification Report	US\$ 30,000
1.2	Set objectives and targets consistent with E&S Policy.				US\$ 30,000
1.3	Define roles and responsibilities for persons responsible for implementation of the EMS and provide the necessary awareness training to develop and build capacity.				US\$ 50,000
1.4	Develop document control procedures and templates to ensure quality of data entry for the EMS		During second year of RBF Implementation		US\$ 50,000

¹ Less than the mandatory thresholds to warrant re-categorization to 1 in line with the AfDB's ISS (ESAP)

Item #	Mitigation Measure	Responsible Entity	Deadline	Monitoring Frequency	Budget
	system.				
1.5	Develop operational control procedures for operations that are associated with the identified environmental and social aspects of TANESCO's daily operations and those of their approved contractors and suppliers.				US\$ 50,000
1.6	Develop a monitoring programme and system which will allow performance evaluation and review of the EMS for continuous improvement.				US\$ 50,000
1.7	Define performance monitoring indicators and how to measure them to assess performance of the EMS.				US\$ 40,000
1.8	Carry out environment awareness trainings on EMS for both Senior and operational staff of EDCL/EARP and EUCL and other relevant staff of approved contractors and suppliers.		During 3 rd Year of RBF Implementation		US\$ 50,000
2. Road Traffic Impact Management					
2.1	Develop and implement a road traffic and community safety management plan as part of each work package contract prior to commencement of the works under Areas 1, 2 and 3.	EDCL and EARP safeguard teams assisted by Contractor.	Prior to commencement of installation of the distribution units on site	Quarterly monitoring and Verification Report	US\$ 40,000
3. Waste Management					
3.1	Develop and Implement waste management plan as part of each work package contract. Special attention will be taken to minimize and reduce the quantities of solid waste produced during site preparation and construction. Restriction of burning any vegetation and combustible waste at the site. Reusable inorganic waste (e.g. excavated sand/soils) will be stockpiled away from drainage features and used for in filling where necessary and/or possible. Unusable	EDCL and EARP safeguard teams assisted by Contractor.	Prior to commencement of the works under Areas 1, 2 and 3.	Quarterly monitoring and Verification Report	US\$ 40,000

Item #	Mitigation Measure	Responsible Entity	Deadline	Monitoring Frequency	Budget
	construction waste, such as damaged pipes, formwork and other construction material, must be disposed of at an approved dumpsite. Provision of solid waste receptacles and storage containers, particularly for the disposal of plastic bags and boxes, so as not to block drainage system and to prevent littering of the site. Other measures for management of hazardous wastes shall include Collection, storage and disposal of hazardous wastes under a strict regime in line with Government requirements for management of such wastes. , The plan will emphasize the use of licensed disposal contractors if available.				
4. Emergency Response Plan					
4.1	Develop and implement an emergency response management plan as part of each contract work package. Maintaining spill response kits with each work gang and at the site office (where applicable), Preparation and display on site spill response procedures and Training of workers on spill response and management.	EDCL and EARP safeguard teams assisted by Contractor	Prior to commencement of the works under Areas 1, 2 and 3.	Quarterly monitoring and Verification Report	US\$ 40,000
5. Impact to cultural heritage					
5.1	Implement the Chance Find Procedure as part of each work package contract.	EDCL and EARP safeguard teams assisted by Contractor	Prior to commencement of the works under Areas 1, 2 and 3.	Quarterly monitoring and Verification Report	US\$ 40,000
6. Impact from Air Quality, Noise and Vibration					
6.1	Implement standard dust suppression methods as part of each contract work package for works under Areas 1, 2 and 3.	EDCL and EARP safeguard teams assisted by Contractor	Prior to commencement of the works under Areas 1, 2 and 3.	Quarterly monitoring and number of complaints against dust and noise	US\$ 30,000
6.2	Implement standard Noise and vibration abatement methods as part				US\$ 30,000

Item #	Mitigation Measure	Responsible Entity	Deadline	Monitoring Frequency	Budget
	of each contract work package for works under Areas 1, 2 and 3. These shall include but not limited to Restrict noisy construction activities to normal working hours (8am - 5pm). Inform local residents beforehand, via notices and advisories, of pending noisy periods and solicit their tolerance well before the commencement of piling works. Workers operating equipment that generate noise should be equipped with noise protection gear including ear muffs and plugs. Workers operating equipment generating noise levels greater than 80 dBA continuously for 8 hours or more should use earmuffs whereas those experiencing prolonged noise levels of 70 - 80 dBA should wear earplugs. Limit pickup trucks and other small equipment to an idling time of five minutes, observe a common-sense approach to vehicle use and encourage workers to shut off vehicle engines whenever possible. All construction equipment should be regularly inspected and serviced.				
7. Vegetation Clearance					
7.1	Minimize vegetation clearance especially within peri-urban and rural areas through selection of sites for the poles of the last mile distribution line works.	EDCL and EARP safeguard teams assisted by Contractor	Prior to commencement of the works under Areas 1, 2 and 3.	Quarterly monitoring and Verification Report	US\$ 40,000
8. Water Pollution					
8.1	Deposition of excavated materials away from all watercourses and rivers. Storage of bulk fuel, drums and other chemicals in secured storage areas to prevent oil pollution. Provision of drip-pans for	EDCL and EARP safeguard teams assisted by Contractor.	Prior to commencement of the works under Areas 1, 2 and 3.	Quarterly monitoring and Verification Report	US\$ 40,000

Item #	Mitigation Measure	Responsible Entity	Deadline	Monitoring Frequency	Budget
	catching oil to vehicles being fueled or repaired, and stationery machinery. New and waste oil and fuel to be stored carefully and safely on-site until used, or removed from site to an appropriate facility for its safe disposal, or re-used in an environmentally safe and sound procedure. Except in an emergency, no vehicle will be fueled, lubricated or repaired except within the bounds of a project camp or depot. Similar precautions will be applied to paint or other chemicals or potentially toxic materials of any sort. Prohibition of washing vehicles in any watercourses. Prohibition of disposal of any waste material in an uncontrolled manner and especially into the rivers. Providing adequate sanitary facilities for workers located in carefully selected areas to avoid underground water contamination				
9. Worker occupational and Community health and Safety					
9.1	Engage only those workers that are trained to operate specific machines and equipment. Proper signs on site to warn workers of safety requirements as regards machines with moving parts and other equipment at site. Provide a First Aid box and have a trained person to handle site emergencies and incidences. Provide safe scaffoldings and railings for workers working at heights. Proper specialized training should also be provided for such workers. Provide washing (enclosed bathroom) and toilet facilities at site with both drinking and washing water. The number of workers engaged determines the number of the toilets and bathrooms provided.	EDCL and EARP safeguard teams assisted by Contractor	During implementation but Prior to commencement of the works under Areas 1, 2 and 3.	Quarterly monitoring and Verification Report	US\$ 40,000

Item #	Mitigation Measure	Responsible Entity	Deadline	Monitoring Frequency	Budget
	Providing personal protective equipment (PPE) such safety helmets, safety masks, safety boots, uniforms and hand gloves to the workers. Using well-maintained equipment by qualified personnel. Train workers on work site safety issues Monitor and control illegal connection of electricity. The substation site shall be fenced and provided with safety signs. Emergency assembly points will be appointed at the substations site prior to commencement of construction work. Educate local populations to safe behavior in the presence of high voltage power lines. Ensure the developments of local and regional emergency plan and local major outbreaks in case of infrastructure breakdowns, especially near roads or residential areas.				
9.2	Conduct Training on construction health and safety, first aid, fire fighting, emergency response drills, use of PPE including HIV (estimated to cover 1749 persons over 3yr @ US\$400 per head)				US\$ 699600
10. Recruit Dedicated safeguard staff to improve on capacity for SEAP II Implementation					
10.1	Recruit one (1) FTE Environmental safeguard specialist for the EDCL/EARP team	REG Management	Before end of first Quarter following Programme approval by the Bank	Verification Report	US\$ 300,000
10.2	Recruit one (1) FTE Social safeguard specialist for the EDCL/EARP team				US\$ 300,000
11. Develop Gender Policy					
11.1	Develop Gender Policy to mainstream gender outcomes into the SEAP II Programme	REG Management	By November 2019	Study Report approved by the Board	US\$ 20,000
Grand Total					(US\$) 2,059,600

1. INTRODUCTION

The Government of *Rwanda's Energy Sector Strategy Plan (ESSP) 2017-2024* is being proposed for financing support through the African Development Bank's innovative financing instrument -Results Based Financing (RBF) - which links the disbursement of funds directly to the delivery of defined results. The instrument builds on increased reliance on borrowing country's safeguard and oversight systems.

The programme development objectives is to improve the power supply reliability, increase on and off grid access in Kigali city and in the southern and western provinces and enhance institutional capacity for effective implementation of the Government's electrification program. ***The RBF based programme will contribute to four key results derived from the 8 sector priority areas of high level targets (HLOT) of the ESSP.*** The following outcome indicators will be used to measure achievement of the PDO: (i) PDO Indicator 1: Reduction in average number and frequency of interruptions linked to HLTO2 and also HLTO6 (ii) PDO Indicator 2: Number of household and productive usage customers provided with on-grid electricity service; linked to HLTO4 and HLTO3; (iii) PDO Indicator 3: Number of people provided with off-grid electricity access; Linked to HLTO3, and (iv) PDO Indicator 4: Improved planning and implementation capacity of the electricity sector (to support the achievement of above).

To inform the preparation of the RBF based lending to the Government of Rwanda, the AfDB has conducted a Preliminary Environmental and Social Assessment (PESA) of the proposed programme component activities to identify their potential environmental, climate change and social impacts. The preliminary assessment also evaluated the adequacy of the existing Country's Environmental and Social Management Systems as reflected in the national regulatory and institutional framework that will be used to address environmental and social impacts of the activities under programme. Furthermore the PESA evaluated the institutional operational capacity of the programme implementing agency Rwanda Energy Group (REG) and its subsidiary groups (EDCL- Energy Development Corporation Ltd and EUCL- Energy Utility Corporation Ltd), to screen, assess and prepare management plans to manage identified impacts and disclosure of project level information in line with the AfDB's Integrated Safeguard Systems (ISS). The PESA identified gaps and opportunities within both the institutional operational capacity of REG (EDCL and EUCL) and the Country Environmental and Social Management Systems to effectively manage the identified environmental and social impacts associated with the programme activities to comply with the Bank's Integrated Safeguard System (ISS).

This Limited SESA Report presents the findings of the PESA and additional detailed assessments with the objective of defining measures to strengthen the programme's existing environmental and social systems through integration into the overall RBF Programme design. The assessment was undertaken to assess adequacy of the country safeguard systems and REG's (via EDCL and EUCL) institutional capacity systems against the operational requirements of the five main Operational Safeguard Policies of the ISS. This approach complies with the environmental and social safeguard guidelines for the RBF Policy of the Bank in order to effectively manage the identified Program risks and promote sustainable development.

2. ENERGY SECTOR IN RWANDA

This Section gives an overview of the energy sector, discussing the current status, achievements and challenges for electricity generation and distribution within Rwanda.

2.1. INSTITUTIONAL OVERVIEW

2.1.1 *Rwanda Energy Group (REG) Ltd*

REG Ltd operates as the holding company over Energy Utility Corporation Limited (EUCL) and Energy Development Corporation Limited (EDCL). It monitors and evaluates the operations and performance of its two subsidiaries and provides senior leadership. REG is the highest corporate entity of the utility and as such reports to its shareholders (MININFRA- Ministry of Infrastructure and MINECOFIN- Ministry of Finance and Economic Planning). REG Ltd is ultimately responsible for delivering the entity's vision and mission:

- Vision: To be the leading regional provider of innovative and sustainable energy solutions for national development
- Mission: Developing and providing reliable and affordable energy while creating value for their stakeholders

2.1.2 *Energy Development Corporation Limited (EDCL)*

EDCL is responsible for developing both generation, transmission and distribution projects, exploiting new energy resources, and executing a least cost power development plant. Its core objective is to facilitate the development and exploitation of domestic energy resources and investments. In pursuing this objective, it has autonomy in managing its affairs, but regularly reports to MININFRA on progress towards set targets. Specifically, EDCL;

- Collaborates with MININFRA in conducting all activities necessary to explore and assess the country's indigenous resource base;
- Collaborates with MININFRA and RDB (Rwanda Development Board) to reduce the risk profile of energy projects to a level acceptable to the private sector;
- Executes generation and transmission and distribution projects necessary to expand on-grid assets to new areas are handed over to EUCL once commissioned;
- Defines and updates the overall power system master plan, and a least cost power development plan;
- Negotiates along with MININFRA long-term electricity import agreements with neighboring countries.

2.1.3 *Energy Utility Corporation Limited (EUCL)*

EUCL: EUCL is in charge of day-to-day operations of power generation, transmission, distribution and sales to final customers. EUCL is responsible for planning the transmission and distribution grid in areas already reached by electrification and promoting energy efficiency and demand side management programmes. Key objectives for EUCL include cost reductions, technical and non-technical loss reductions, improving customer satisfaction and the economic dispatch of generation to meet demand.

2.2. POLICY CONTEXT

The ESSP exists in a policy context which includes international, national and sectoral strategies, policies and goals. It is these policy documents which provide the orientations for the sector. The ESSP collates these documents, prioritizes key targets and presents plans to ensure delivery.

2.2.1 International Policy context

The **Sustainable Development Goals** (SDGs), otherwise known as the Global Goals, are a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity. The 17 Goals build on the Millennium Development Goals, while including new areas such as climate change, economic inequality, innovation, sustainable consumption, peace and justice, among other priorities.

The clearest link to the energy sector is Goal 7, Affordable and Clean Energy, which aims to achieve universal access to electricity by 2030. This is to be attained through investment in clean energy generation and the adoption of efficiency standards and processes. However, the SDG goals are interconnected, and often the key to success on one will involve tackling issues more commonly associated with another. This means that the energy sector will play a role in delivering all of the goals.

The **Sustainable Energy for All** (SE4ALL) initiative is a multi-stakeholder partnership between Governments, the private sector, and civil society. Launched by the UN Secretary-General in 2011, it has three interlinked objectives to be achieved by 2030:

- 1) Ensure universal access to modern energy services.
- 2) Double the global rate of improvement in energy efficiency.
- 3) Double the share of renewable energy in the global energy mix.

These objectives provide guidance for the energy sector, and an Action Agenda has been incorporated into sector planning. The ESSP supports achievement of the above goals: universal energy access will be achieved by 2024; the Energy Efficiency Strategy will be implemented and supply-side solutions to delivering reliable, affordable electricity will be prioritized; and the generation mix is projected to be made up of around 60% renewable sources by 2024 – above the SE4ALL minimum and far above the international average.

2.2.2 National

Energy policies and strategies interact closely with wider, national policies. High-level national objectives are set by the Vision 2050 and NST-1 (both 2018).

Vision 2050 replaces the previous Vision 2020. This sets out high-level sectoral targets which together will support Rwanda in achieving its ambitions. Vision 2050 sets out a clear path for Rwanda to achieve high income status by 2050. Energy will support the delivery of Vision 2050 by expanding affordable, reliable access to electricity to citizens and industrial users, ensuring sustainability in biomass supply and securing supplies of petroleum. International experience has shown that economic development is impossible without a well-functioning energy sector, and without minimum levels of capacity and consumption. A sub-target exists to achieve upper-middle income status by 2035.

NST-1 (National Strategy for Transformation) replaces EDPRS II (Economic Development and Power Reduction Strategy). It sets sectoral targets to be achieved by 2024. These link sectoral

achievements and progress to national development. As a result, progress towards targets that appear in both the ESSP and NST-1 will be monitored by both MININFRA and MINECOFIN. Table 2.1 outlines how NST-1 pillars and priority areas link to the HLTOs set out in the ESSP.

2.2.3 Sector Specific

The **National Energy Policy (REP)** (2015) is the high-level policy document which guides and influences decisions on the extraction, development and use of Rwanda's energy resources in a transparent and sustainable manner. It sets out governing laws and regulations, strategic directions and guiding principles that Rwandan institutions and partners shall adopt and adhere to, in subsequent implementation of actions.

The REP seeks to establish energy as one of Rwanda's most dynamic sectors and attractive investment destinations. It is founded upon three essential Government principles:

- 1) A resolve for transparent and effective sector governance
- 2) Easing doing business and reducing barriers to private investment
- 3) Enhancing institutional, organizational, and human capacities as well as the legal and regulatory framework.

The REP and ESSP are mutually reinforcing: the REP outlines a long-term vision, provides high-level goals, and recommends clear and coordinated approaches for achieving that vision; the ESSP outlines targets and an implementation framework against which to measure progress towards the realization of the policy. Below these sector-wide documents, a number of policies and strategies cover specific subsectors and topics. The previous ESSP set as an objective the development, adoption and implementation of relevant strategies and policies. Prior to 2015, some papers were either not progressed from draft form, adopted or implemented. A summary of all energy sector documents which have influenced this ESSP is presented in Table 2.2.

Table 2.1: NST-1 pillars and priority areas

NST-1 Pillar	NST-1 Priority Area	NST-1 Outcome	Energy SSP Outcome (HLTO)
1.0 Economic Transformation	1.2 Accelerate Sustainable Urbanization from 17.3% (2013/14) to 35% by 2024	1.2.1 Developed and integrated urban and rural settlements	Street lighting expanded to all populated areas and main roads.
	1.4 Promote industrialization and attain a structural shift in the export base to high-value goods and services with the aim of growing exports by 17% annually	1.4.3: Upgraded minerals, oil & gas sector	Petroleum strategic reserves increased to cover three months' supply.
		1.4.4 Hard infrastructure developed for trade competitiveness	Generation capacity increased to ensure that all demand is met and a 15% reserve margin is maintained. Productive user access to electricity increased to 100%. Losses in the transmission and distribution networks reduced to 15%. Reliability of electricity supply improved: average number of power interruptions per year reduced to 20 and average number of hours without power to 40.
	1.7 Sustainable Management of Natural Resources and Environment to Transition Rwanda towards a Carbon Neutral Economy	1.7.4 Accelerated growth in green innovation	The number of households depending on firewood as a source of energy for cooking halved to 42%.
2.0 Social Transformation	2.5 Moving Towards a Modern Rwandan household	2.5.1 Universal access to basic infrastructure (water, sanitation, electricity, ICT, shelter)	Household access to electricity increased to 100%.

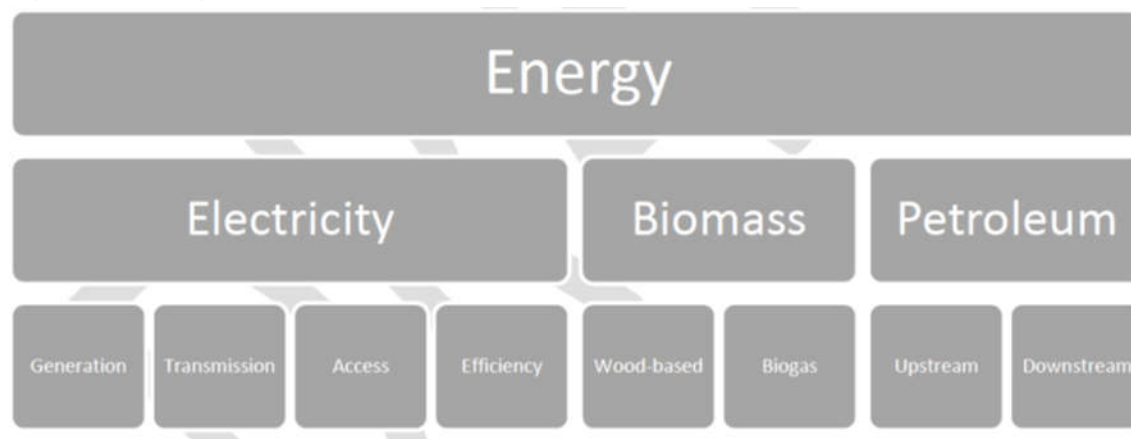
Table 2.2: Summary of all ESSP related documents

Type	Policy / Strategy	Year	Description
Electricity access	SE4All Action Agenda	2016	Presents plan to deliver energy efficiency and renewable energy (biomass, off-grid and power generation from renewable energies).
	Scaling up Renewable Energy Program (SREP) Investment Plan	2015	Supports implementation of the SE4All Action Agenda, with World Bank funding.
	Rural Electrification Strategy (RES)	2016	Sets out four programmes which deliver off-grid solutions (SHS and mini-grids).
	Electricity Access Roll-out Program (EARP)	2013	Key driver of on-grid access growth, with lots established for electrification to 2017/18.
	National Electrification Plan (NEP)	2018	Detailed plan of on and off-grid expansion.
Energy Efficiency	Energy Efficiency Strategy	2018	Outlines initiatives to improve efficiency across generation, transmission and distribution and end-user consumption.
Technical	Rwanda Master Plan & Least Cost Development Plan (LCDP)	2017	Present detailed analysis of current power system and future growth.
	Grid Code	2013	Details the technical running of the power system.
Resources	Management Prescriptions for the Development of Lake Kivu Gas Resources	2009	Sets out required standards and processes for gas extraction. Being updated.
	Peat Resource for Power Generation	2014	Details the peat reserves for power generation across Rwanda.
	Simplified Licensing Procedure	2015	Sets out requirements for small-scale off-grid renewables developers.
Biomass	Biomass Energy Strategy	2018	Forecasts demand and supply balance across scenarios and includes action plan to deliver targets – focused on efficiency.
	National Biomass Programme (NBP)	2018	Presents clear initiatives to promote use of efficient and alternative cooking technologies and establish sustainable biomass consumption.
Petroleum	Downstream Petroleum Strategy	2014	Detailed plan to establish effective regulatory and institutional frameworks, coupled with suitable and sufficient petroleum facilities to ensure supply and distribution.
Laws	Electricity Law of Rwanda	2018	Governs activities of electricity production, transmission, distribution and trading.
	PPP law	2016	Establishes processes and requirements for entering into PPPs (including procurement).
	Radiation Protection Law	2017	Establishes rules and requirements for the use of radiation.
	Renewable Energy and Energy Efficiency Law	2018	Governs renewable energy sources and energy efficiency in Rwanda with the aim of promoting further development, utilisation and sustainability.

2.3. ENERGY CONSUMPTION

The energy sector in Rwanda is made up of three subsectors: electricity, biomass and petroleum. Each of these is then divided into focus areas. This structure is presented in Figure 2.1

Figure 2.1: Energy Sector Structure



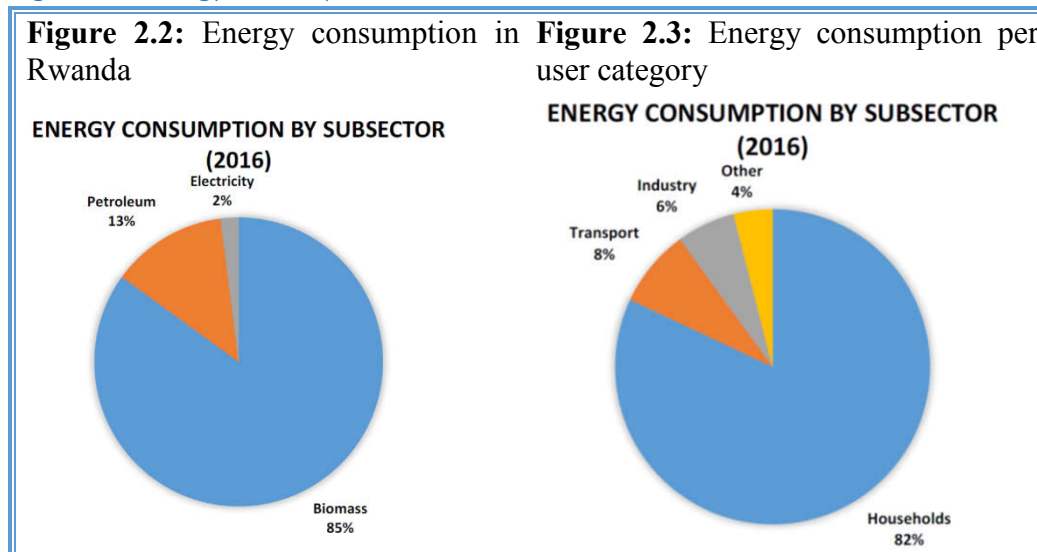
Electricity is increasingly used and will drive Rwanda's growth, but currently it accounts for only 2% of all energy consumed², as shown in Figure 2.2. Electricity is generated from a range of technologies and resources and the grid is being developed to expand access. The rise of off-grid technologies in recent years has been a major innovation, and they are now a major contributor to expanding access. Efficiency across generation and transmission, as well as consumption, is increasingly important, with significant economic and environmental benefits possible.

In contrast, biomass accounts for 85% of all energy consumed. The subsector covers bio-products. Bio-products are fuels developed from biological materials, split into those that are wood-based, such as wood and charcoal, and biogas, which is derived from waste matter. Biomass is largely consumed for cooking, with wood used by rural households and charcoal by urban households. The biomass subsector is being informed by the development of the Biomass Energy Strategy (2018).

Petroleum focuses on the procurement and storage of petroleum and related products, such as diesel, kerosene, LPG and natural gas. 13% of the country's total energy consumption is from petroleum. Petroleum is used in transport, electricity generation and, as LPG, in cooking. The use of LPG in cooking is expected to increase significantly as urban households switch from using firewood. Households are the largest category of energy consumer, at 82%, with transport at 8%, industries at 6% and others at 4%. This is illustrated in Figure 2.3 overleaf.

² MININFRA, 'Energy Balance Study', (2016)

Figure 2.2: Energy consumption in Rwanda



2.4. ACHIEVEMENTS

The major achievements of the energy sector are now set out in the following paragraphs, starting with those of the electricity subsector.

2.4.1 *Electricity Generation Achievements*

Generation capacity increased from 160 MW to 208 MW

Generation capacity has been increased by 43.5 MW since the previous ESSP was published (and has tripled since 2010). The EDPRS II target of 563 MW was based on an overoptimistic assessment of demand growth, and therefore has not been met, but capacity is sufficient to meet all household and industrial demand.

No load shedding has occurred since January 2015

By investing in generation to meet increasing demand, the energy sector has supported Rwanda's economic growth. Further, a pipeline of projects to be delivered in the medium term has been established. These projects can potentially increase capacity to around 512 MW³.

Generation mix diversified

Large-scale, non-hydro generation projects have been commissioned. These include Gigawatt (8.5 MW), East Africa's first utility scale PV solar plant and Kivuwatt (26.5 MW), a globally unique industrial scale methane-to-power plant. Kivuwatt represents great innovation and technical excellence and has proven the potential of Lake Kivu's methane gas reserves. The use of peat as a fuel has been proven by Gishoma, a 15 MW peat-to-power plant. An 80 MW peat station is now under construction. This will be Rwanda's largest power station. Although hydro will continue to

³ *Energy Consumption By Subsector (2016)*

be central to Rwanda's generation mix, diversification will reduce the impact of seasonal variations and improve the dispatch options for the utility.

2.4.2 Transmission Achievements

Transmission network expanded and upgraded

The high voltage transmission network has been extended to 744 km from 462 km in 2014 (and has doubled since 2010) to support the expansion of access for households and industry. Further, the Kigali ring has been strengthened. Reliability of supply has improved significantly, with outages reduced per month in June 2017.

2.4.3 Access Achievements

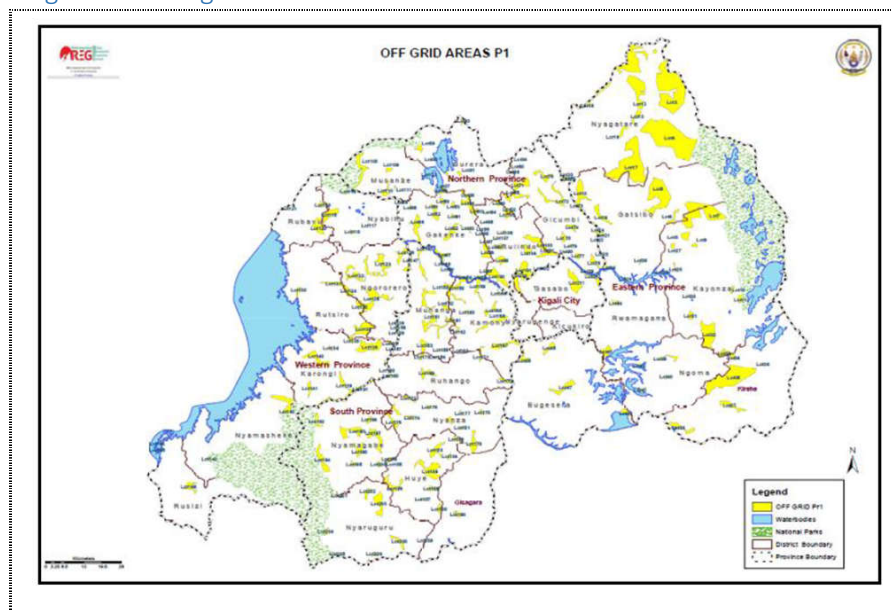
Continued implementation and update of the EARP

Government, in partnership with development partners, launched the Rwanda Electricity Access Roll out Programme (EARP) in 2009 as its flagship programme to realize the primary electricity access targets of the EDPRS. EARP remains the key driver of on-grid electricity access in Rwanda. Since the last ESSP, connections have continued and on-grid access has been expanded to 28%. In 2017, the requirements for connections were altered and the initial connection fee (around \$50) removed to ensure continuing roll out.

Off-grid electricity access established as viable access solution

Off-grid electricity access is now viewed internationally as an important tool in the drive to increase global electricity access. Off-grid incorporates all non-grid connected households, from mini-grids to solar home systems (SHS) fitted to individual houses. Off-grid access in Rwanda has been increased from around 0% to over 7%, equivalent to 189,069 households (See Figure 2.4 below). This has largely been achieved through SHS. Key to the growth has been the publication of the Rural Electrification Strategy (RES, 2016). The RES realigned access targets to place greater emphasis on off-grid, and established programmes to distribute systems to low-income households and support the development of the private sector. A burgeoning private sector now exists and this will drive further expansion of off-grid access.

Figure 2.3: Off grid areas in Rwanda



Tariff reductions from January 2017

The Rwanda Utility Regulatory Authority (RURA) carried out a major tariff review through 2016, with a new pricing regime introduced in January 2017. The tariff has been updated to disaggregate customers, price progressively based on consumption and encourage non-peak usage. Prices for industrial users have been reduced by up to 31% and prices for low-income households have been reduced by 50%, through the introduction of a life-line tariff. Further, RURA committed to regularly review the impact of the new tariff, with changes to be made as required by factors such as exchange rate fluctuations and subsector costs.

2.4.4 Energy Efficiency Achievements

Energy Efficiency Strategy developed

Although ad hoc initiatives had been carried out, no coordinated approach to energy efficiency was in place prior to the Energy Efficiency Strategy (2018). The Strategy covers the full electricity value chain, from generation, through transmission and distribution to end-user consumption. Initial analysis has identified significant environmental and economic benefits for sector stakeholders and consumers. The Strategy sets clear initiatives and its implementation will form the basis of energy efficiency interventions through the NST-1 period.

2.4.5 Biomass Achievements

Biomass Energy Strategy published

MININFRA, MINIRENA and REMA (Rwanda Environmental Management Authority), along with other Government institutions, worked with consultants through 2017 to develop a comprehensive Biomass Energy Strategy (BEST). This was a key requirement for the subsector, with the previous Strategy having been developed in 2009. BEST presents detailed analysis of the current status of the subsector. Detailed modelling was completed to assess supply and demand under different scenarios in the medium term. The identified biomass deficit (more wood being

used than is grown), along with concerns for the health and economic well-being of citizens, makes clear the requirement for change.

2.4.6 *Petroleum Achievements*

Expansion of storage

Petroleum reserves have been increased significantly since the last ESSP was published, from 30 million litres to 74 million litres by 2017. New storage facilities have been opened in Rusororo Sector, Gasabo District (22 million litres) and Jabana (21 million litres). A further 40million litres of capacity is due online in 2018, part of a 60 million litre storage facility in Kigali. Further development of storage facilities remains a key objective for the petroleum subsector.

Realigned institutional oversight

Two key developments have improved institutional oversight of the petroleum subsector. First, in May 2016 responsibility for regulation of downstream petroleum was transferred to RURA. This had previously sat with MINICOM (Ministry of Trade and Industry), which was performing the twin roles of policy maker and implementer. A Prime Minister's Order vested RURA with a mandate to regulate all operations, activities, installations, equipment and other facilities directly or indirectly in relation to trade of petroleum and petroleum products.

MINICOM's Petroleum Unit had been under-resourced and the role did not naturally fit with the Ministry's wider activities. Secondly, in 2016, a new institution, the Rwanda Mines, Petroleum and Gas Board (RMB) was established. RMB will focus on the development of Rwanda's upstream assets and processes, with exploration to be increased.

2.5. CHALLENGES

The major challenges of the energy sector are now set out by subsector, starting with those of the electricity subsector.

2.5.1 *Generation Challenges*

Balancing supply and demand

Rwanda's economy has grown at an average rate of 7.2% over the past five years. As a result, demand for electricity is increasing at a rate of almost 8% per year. New generation capacity must be added to the system to meet this demand. However, the majority of the costs of new power stations are fixed, and payable whether or not the available electricity purchased is consumed. Therefore, a surplus of capacity will be a costly burden on the sector, but a lack of capacity may constrain economic growth. This balance is complicated by the long lead times of large-scale generation projects (5-10 years) and the uncertainty around future demand in a high-growth economy. As a result, investment decisions must be based on sound planning, projects must be delivered to agreed timelines and flexibility must be built into commercial arrangements.

Achieving the correct mix of generation

Different generation technologies and fuels have different commercial and operational characteristics. Hydro, methane and peat are baseload capacity. They have high fixed and low variable costs and should be run constantly or almost constantly to be economically efficient. In contrast, diesel is a peaking plant. It has low fixed costs and high variable costs and should be run for short periods of time when required, such as over the evening peak or when other generation

capacity is unavailable. Operating generation outside of its intended purpose can add significant costs to meeting demand (if it is possible under technical parameters). Exacerbating this problem is Rwanda's daily demand profile, which has a pronounced evening peak, therefore necessitating a mix of baseload and peaking capacity. Investment in generation must not only focus on adding MW capacity, but on optimizing the overall technology mix of the country.

Ensuring timely maintenance and servicing of infrastructure

Power plants require regular maintenance to ensure optimum productivity. Failure to carry out regular maintenance can reduce effective capacity, necessitating investment in additional capacity, and increase the likelihood of breakdowns, threatening the reliability of supply. Significant expertise and investment is required to ensure existing and new generation capacity is maintained effectively.

Funding infrastructure investments

Building power stations requires significant investment, with average capital costs of recent new projects at around \$4 million per MW. A mixture of funding sources must be used, including Government budget, development partner support and the private sector. Even so, funding is limited and projects must be prioritized, with the most efficient option chosen.

2.5.2 Transmission Challenges

Delivering large-scale generation and transmission projects is difficult. International experience shows that delays are common. However, delays are costly and mitigating actions should be taken to reduce their impact. In Rwanda, significant costs have been incurred when electricity supplied by new generation capacity has been too great for the network to transport. In this situation, capacity charges (fixed costs) are still paid for the new generation, and additional generation – often expensive diesel generators – is required to meet the shortfall. This challenge requires improvement of, and cooperation between, planning, project management and commercial and management teams. Further complications are experienced when building interconnections with neighboring countries.

Ensuring timely maintenance and servicing of infrastructure

As with generation assets, maintenance and servicing is a costly, challenging and ongoing process. Transmission networks are complex, with large infrastructure and large numbers of smaller pieces of equipment dispersed across wide, sometimes remote areas. In Rwanda, much of the existing equipment is decades old. Regular, planned maintenance is required in order to ensure that performance remains efficient. Without such interventions, significant losses can be incurred, with electricity lost as it is transported. Further, failures on the network can cut off electricity to households and industry. Significant expertise and investment is required to ensure existing and new generation transmission lines are maintained effectively.

Funding infrastructure investments

After new capacity, expanding the transmission and distribution networks are the largest capital expenditure in the electricity subsector. A mixture of funding sources must be used, including Government budget, development partner support and the private sector. Even so, funding is limited and projects must be prioritized and the most efficient option chosen.

2.5.3 Access Challenges

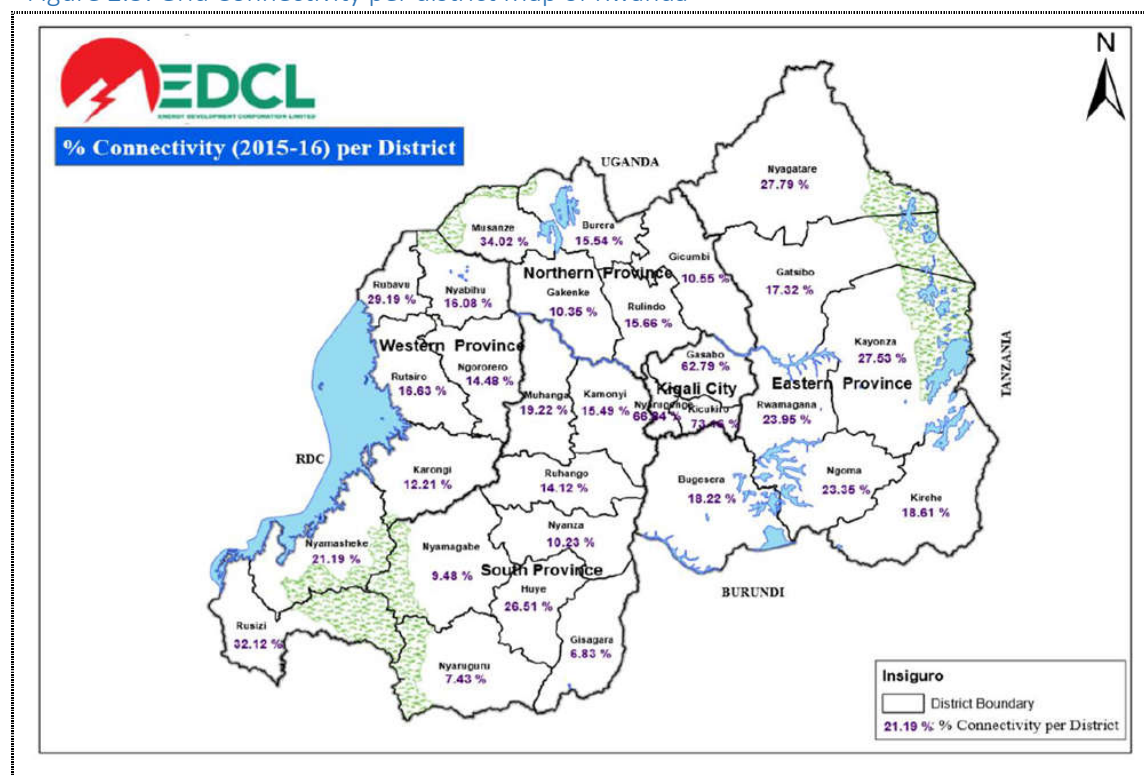
Expanding access to remote areas

Although off-grid solutions are being increasingly utilized, it is the grid that will drive industrial growth and ultimately deliver a high level of electricity access to consumers as incomes increase (See Figure 2.5 overleaf for the grid connectivity between 2015-16 per district). Expanding the network to reach more remote households presents two important issues: grid expansion brings in increasingly scattered households in difficult terrain, and these households tend to be low income, with low consumption of electricity. As a result, the marginal cost of grid expansion is increasing, which increases the cost of delivering on-grid access targets.

Consumption of newly connected households is not high enough to cover the costs of being connected. The average annual cost of each connected consumer is around \$50. Under the January 2017 tariff structure, a consumer would need to use approximately 130-140 kWh per month in order to fund the cost of their own connection, far higher than current average consumption of 29kWh⁴.

This means that many grid connected customers do not pay for the ongoing cost of their connection. Grid expansion, and the social and indirect economic benefits it brings, therefore must be balanced against the financial sustainability of the utility and sector.

Figure 2.5: Grid Connectivity per district Map of Rwanda



Ensuring on- and off-grid access is aligned

⁴ World Bank, 'Rwanda: Energy Access Diagnostic Results Based on Multi-Tier Framework', 2017

Clear, well-communicated, regularly updated plans are vital in ensuring that on- and off-grid technologies do not overlap. The grid moving into areas that have previously been targeted for off-grid access (SHS or mini-grids) results in wasted investment and damages private sector confidence. Similarly, the correct division of on and off-grid areas should be made to ensure that costs are minimized and the speed of connections remains high. Short, medium and long-term plans must be in place and published so that investments can be planned and the most suitable access methods delivered.

Maintaining off-grid solutions

Preventive maintenance and proper technical support are fundamental to the sustainability of off-grid electrification projects. Off-grid solar systems require minimal maintenance to maintain on-going functionality. However, failure to carry out this maintenance can result in failure and the need for expensive rehabilitation. Previous initiatives have resulted in lanterns and SHS quickly becoming unusable. There is a need to establish suitable maintenance and support procedures for all projects, incorporating sustainability into the design of programs and strategy. Guidelines and standards are required to ensure that private sector companies sell high-quality products and adhere to warranty obligations.

Accessing consumer finance

Achieving a large scale-up in electricity access hinges upon greater household access to finance. Due to their low purchasing power, consumer finance and credit mechanisms are pivotal to assist rural households to switch to solar lighting over kerosene, or to pay off new electricity connections over time. Significant progress has been made in this area. The up-front household payment (\$50) for connection via the EARP has been removed for those who cannot afford to pay, with the amount now amortized over a number of years. Further, Programme 2 of the RES will distribute \$50 million via financial institutions to support financing of off-grid technologies.

2.5.4 Energy Efficiency Challenges

Developing individual and institutional capacity

Although some ad-hoc initiatives have been carried out by REG, no large-scale, strategic programmes have been implemented. As such, energy efficiency remains a relatively new policy area. Further, energy efficiency requires a wide range of specialist skills and knowledge (for example, energy audits, standards and labelling, demand-side response). Individual and institutional capacity must be developed as a priority to enable the development, implementation and roll-out of initiatives. This capacity should be developed within REG, Government and the private sector.

Raising awareness and removing barriers to uptake

Many energy efficiency initiatives require changes to consumer behaviour and/or the purchase of new technologies. Such initiatives will not succeed if consumers are not educated on their benefits, both financial and environmental. In particular, financial benefits must be understood in terms of lifecycle savings. Up-front costs may deter uptake, even though financial savings are provable. Even if the potential pay-back period is not especially long, disposable income in Rwanda is very low. There are few sources of financial support for meeting the up-front costs of efficiency technologies. Government and development partner funding should be used to reduce financing costs.

Coordinating the implementation of initiatives

Although MININFRA, REG and the RSB will lead the design, implementation and monitoring of the Strategy and its initiatives, the input of other institutions will be required (for example, RURA, MINICOM). Further, the nature of end-user efficiency programs will require significant involvement at the local level (MINALOC). This has the possibility to result in duplication, gaps and misaligned allocation of responsibility and accountability. Coordination, including clear roles and responsibilities, will be required to ensure the efficient design, implementation and monitoring of initiatives.

Ensuring the sustainability of initiatives

Energy efficiency initiatives can be derailed by poor quality technologies being supplied. These technologies may fail or perform so badly they are rejected by consumers. In Rwanda, previous initiatives to distribute efficient light bulbs have suffered from poor quality bulbs being supplied. Failure or reduced impact of initiatives has the direct impact of wasting resources through reduced environmental and economic benefits. Further, such incidents damage confidence in efficient technologies, reducing consumer demand. Appropriate standards, backed up by testing procedures and strict enforcement, must be used to ensure minimum standards of all items on the market.

2.5.5 Biomass Challenges

Maintaining wood supplies in the medium term

Analysis prepared for the Biomass Energy Strategy shows that there is currently a deficit in the supply and demand of wood. Under current trends, wood stocks will be depleted in the medium term. Interventions will be needed to bridge this supply gap and this is a major driver of reducing the use of firewood for cooking. Further analysis is required to improve the accuracy of projections and model the impact of interventions.

Ensuring roles and responsibilities are clear

Biomass is a complex, cross-cutting subsector which involves a number of institutions, both Government and non-Government, central and local. These institutions play different roles, from regulatory and supervisory, to implantation and support. This complexity, and the subsector's diverse resource base, gives the opportunity for unclear allocation of responsibility, duplication of roles and gaps in action and decision making. A distinct institutional framework is important in achieving sustainable biomass energy and ensuring efficiency and clean biomass energy along the value chain. It is therefore imperative that institutional mandates and responsibilities align with legal and legislative frameworks governing their respective sectors. BEST has identified policy and institutional gaps and proposed interventions to tackle them.

Identifying and promoting economically and culturally acceptable alternatives

A previous policy target aimed for a reduction in the share of woody biomass, from 85% to 50% of total energy consumption. However, little progress has been made on this and biomass continues to be the primary source of energy consumption. The lack of alternatives to biomass for cooking, such as LPG, biogas or electricity, has contributed significantly to this lack of progress. Similarly slow progress has been seen internationally over a number of years.

Many rural households have a low incentive to switch away from traditional biomass fuels, such as firewood, as they pay little to nothing for them or simply cannot afford cleaner alternatives. In addition, changing predominant cooking fuel use is a behavior adjustment that is deeply culturally conditioned. As a result, programs focusing solely on disseminating new technologies without accompanying behavioral change or social marketing campaigns are likely to fail. Further, barriers must be overcome to grow the use of alternative technologies. Currently, LPG is imported, with the supply chain acting as a bottleneck, and, like electricity, LPG is expensive. Affordable, practical alternatives must be available if large-scale change is to be achieved.

2.5.6 Petroleum Challenges

Managing price volatility

Rwanda has very low security over petroleum-based energy products and the global market for petroleum products can be volatile. Although international oil prices have been exceptionally low in recent years compared to other periods of time, price volatility and shocks are a cause of concern due to Rwanda's extremely high vulnerability.

Ensuring quality of supplies

Uneven product quality results from a lack of clear standards, quality control mechanisms, and capacities to carry out adequate quality control.

Developing required infrastructure

In order to meet national policy objectives, additional investment in infrastructure development, which has been lagging over recent years, is required. The storage capacity for petroleum imports is insufficient to cope with rising demand and existing infrastructure does not all comply with international environmental, health and safety risk management standards. Significant resources are required to upgrade existing infrastructure and build new infrastructure to increase storage. Infrastructure development strategies must be closely aligned to anticipated market demand and appropriate reserve levels.

Accessing and sharing data

Petroleum is imported and sold by private companies and used in a range of industries. This, coupled with the split roles of government institutions such as RURA and MINICOM, has resulted in limited data being available and shared. Lack of clear consumption figures reduces the potential to monitor and improve the subsector's performance, or to plan appropriately. Efforts are underway to improve data collection and sharing across institutions. These improvements must be delivered if expansion of the petroleum subsector is to be achieved.

3. PROGRAMME DESCRIPTION AND COMPONENTS

The Scaling Up Energy Access Programme (SEAP) II will geographically upscale the components of the earlier AfDB funded SEAP I project nationwide. Under the SEAP I which is an Investment Operation, the Bank provided US\$46M for upgrading two major distribution substations and constructed 1365 km of MV and LV network to provide access for 152,000 people in Rulindo, Gicumbi, Ngororero, Rusizi, Nyamasheke, Nyabihu and Karongi districts of Rwanda. The project is 90% completed and ahead of schedule. When the last energy meter is fixed, 30,636 households will be added to the grid including 32 health centres, 210 schools and 52 sector administration facilities. The SEAP II programme will increase access by extension of the distribution network and upgrading of existing substations in nearly all the regional provinces.

3.1 PROGRAMME DESCRIPTION

The proposed SEAP II programme to be supported by the Bank will seek to improve the power supply reliability and increase on and off grid access in Kigali city and nationwide. The GoR has an ambitious plan to reach universal access by 2024 and improve the system reliability. The expansion and rehabilitation of the distribution network as well as the improvements in reliability will contribute to make more electricity available for consumption by consumers in the region. The areas of focus submitted by the GoR were discussed with AfDB and are in line with the high-level target set in the ESSP. The program will be implemented over 3 years, from 2018/19 to 2020/22. There are 4 key areas which include 4 HLTO of the ESSP.

3.2 PROGRAMME COMPONENTS

The proposed RBF program to be supported by the Bank will seek to improve the power supply reliability, increase on-grid access in Kigali city and countrywide and increase off grid access in the Southern and Western Provinces. The GoR has an ambitious plan to reach universal access by 2024 and improve the power system reliability. The expansion and rehabilitation of the distribution network as well as the improvements in reliability will contribute to make more electricity available for consumption by consumers in the region. It is anticipated that 318,166 new customers, including 193,000 on-grid and 124,800 off-grid, will have access to electricity through the RBF program.

The RBF will cover a time slice in that it covers the first three (3) years of the ESSP (2018-2024) implementation period. The cost of the RBF program is US\$270M or about 8.2% of the ESSP financing.

The SEAP-II is a 3-year RBF program starting in 2018 with 28% of the loan allocated to improving power system reliability, 65.4 % of the loan amount will be directed to increasing on-grid access, 3.8 % of the loan for increasing off-grid access, while 2.8% for strengthening the institutions, capacity building and technical assistance. The four areas supported are closely intertwined, as follows. The programme has four key components corresponding to the four selected areas which are closely intertwined and detailed as follows:

Results Area 1: Improve reliability of electricity supply: Decreases in the frequency and duration of outages and in voltage fluctuations in areas supported by the program will measure the improvement of reliability and quality of services. The indicative amount allocated to this area is USD 76 million. The activities under this component will involve distribution system expansion

and upgrading of the 30/15kV lines, upgrade of substations and installation of Scada DMS system. This improvement will help reduce outages and voltage fluctuations. The relevant indicators for the frequency and duration of outages are the System Average Interruption Frequency Index (SAIFI) and the System Average Interruption Duration Index (SAIDI).

Results Area2: Increase on-grid Access for household and productive usages: The main objective is to increase on-grid customer base by connecting additional 51,254 customers in Kigali city to reach the 100% access by 2019, connecting 2,112 productive-use customers, and 140,000 other customers with prepaid meters countrywide. The indicative amount allocated to this area is 177 USD million. The activities under this component will involve constructing medium voltage (30 and 15kV) distribution lines, constructing additional LV lines, installing distribution transformers, procuring and installing prepayment meters. The number of customers connected to the network would measure the degree of additional access achieved by the program. The expansion and rehabilitation of the distribution network as well as the improvements in reliability will contribute to make more electricity available for consumption by consumers in the Kigali city and other regions of the country.

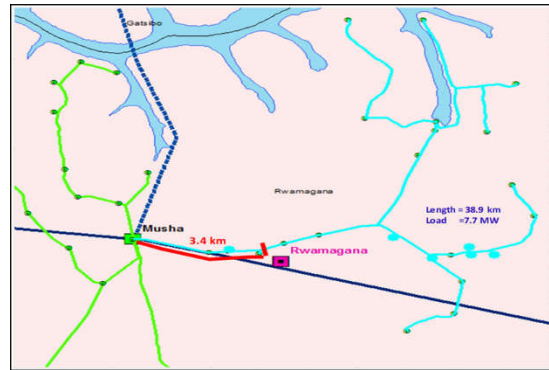
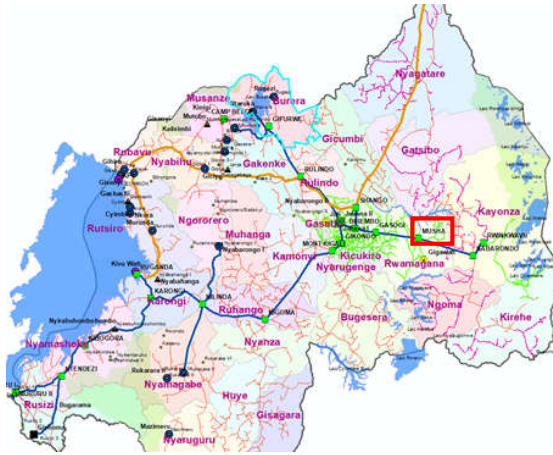
The specific subcomponent activities proposed under Results Areas 1, 2 and 3 are summarized overleaf;

Table 3.1: Planned Substations upgrades for the SEAP II Programme

#	SUBSTATIONS	District	Amount US\$
1	Upgrade of Musha Substation		1,597,500
2	Upgrade of Camp Belge substation		1,597,500
3	Nyabarongo 110/30kV 20MVA Substation and Lines		7,640,630
4	Replacement of Karongi transformer with different vector group		958,500
5	Split 15kV Busbars in Kigali North and South for operational flexibility		85,200
6	Kilinda Transformer Upgrade from 1.6MVA to 6MVA		639,000

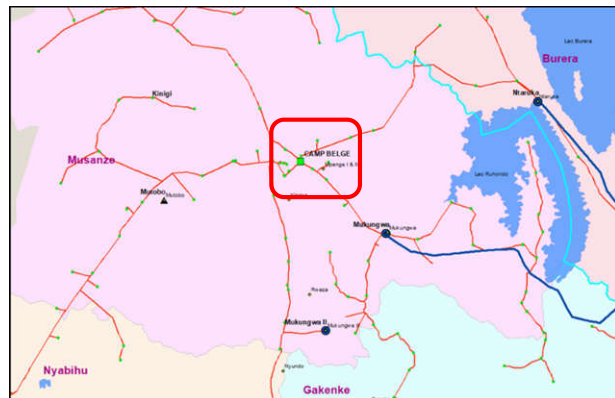
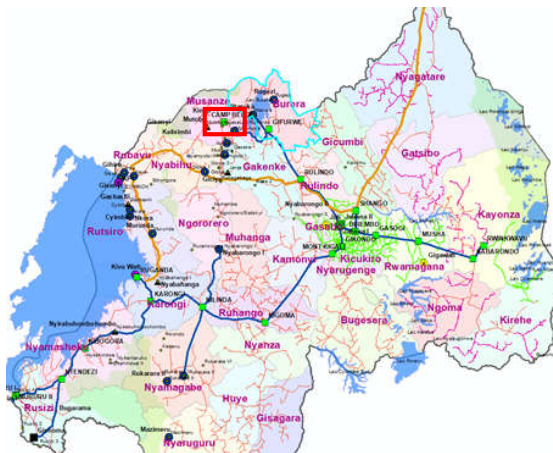
(i) Musha Substation

The Musha - Rwamagana Feeder with a total length of 38.9km is overloaded and a proposed plan to ensure its reliability was elaborated. It was proposed to build a new feeder (Double circuit line) from Musha to Rwamagana Industrial area. Only residential load will remain on the original Feeder. Musha substation transformer is overloaded and connection of productive users in Rwamagana Industrial Park cannot be done until this is upgraded. The 10MVA Transformer must be replaced with a 20MVA transformer.



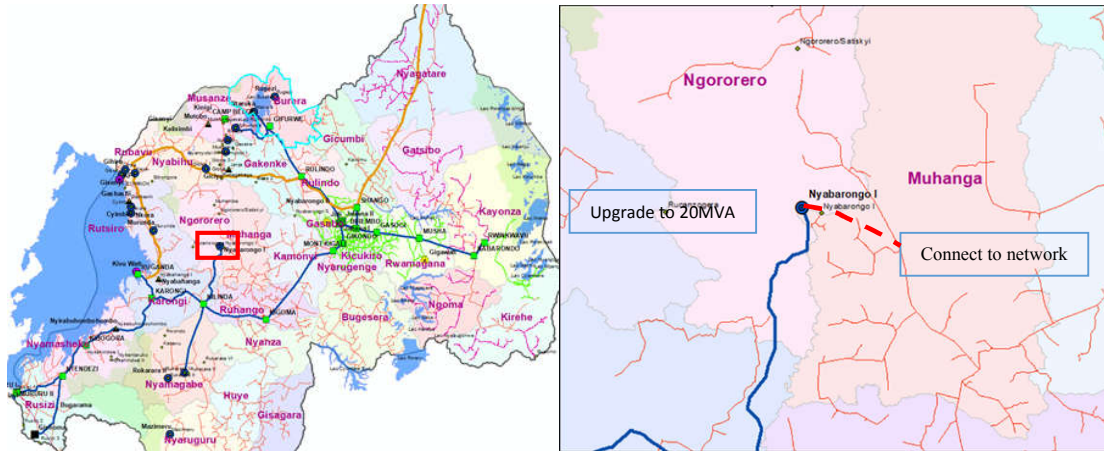
(ii) Camp Belge Substation

Improvement of quality of supply to Musanze town. Split supply from Mukungwa and Ntaruka to have more flexibility and independent supply to Musanze (Ruhengeri) and isolate faults from long Gisenyi feeder from Musanze Town

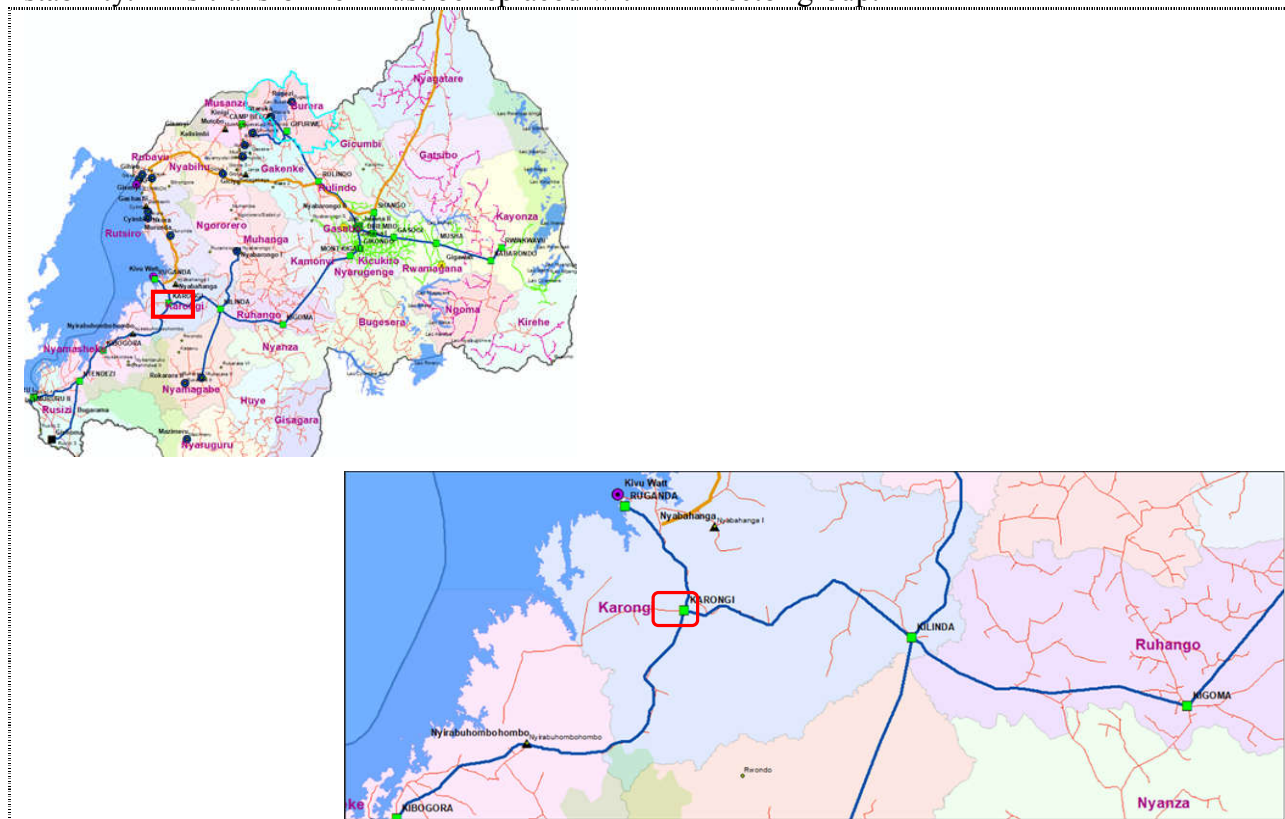


(iii) Nyabarongo 110kV substation and Distribution Lines

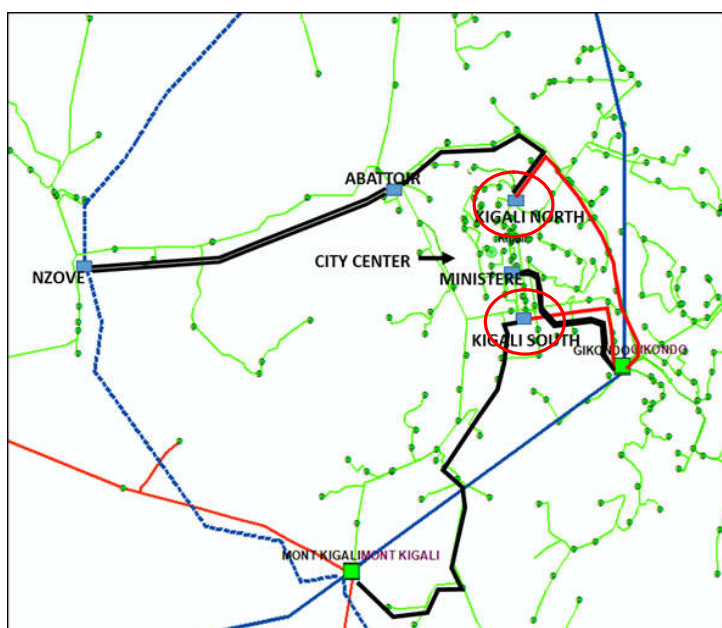
Nyabarongo has only a small transformer for auxiliary supply, and is not connected to the distribution network. Upgrade transformer to 20MVA and interconnect to Distribution network. This provide interconnection and back-up to Nyabihiu substation, Kigoma Substation as well as Mont Kigali Substation.



(iv) Replace Karongi Transformer with different vector group.
The YY vector group is making protection coordination difficult and affects national network stability. This transformer must be replaced with DY vector group.



(v) Split busbars in Kigali North and Kigali South for more operational flexibility.
Kigali North: – Two feeders are available from Abattoir and Gikondo but cannot be operated both due to single busbar. Busbar in Kigali North must be split with coupler to enable independent supply from both Gikondo and Abattoir.
Kigali South: - Existing feeder from Gikondo and planned feeder from Mont Kigali cannot be operated both as the busbar in K-South is solid. With a split busbar, both sources can be used to supply Kigali South for much increased reliability.



(vi) Upgrade Kilinda transformer from 1.6MVA to 6MVA
Load growth in the area is causing the very old, small transformer to overload. This needs to be upgraded to supply new access planned in the area.

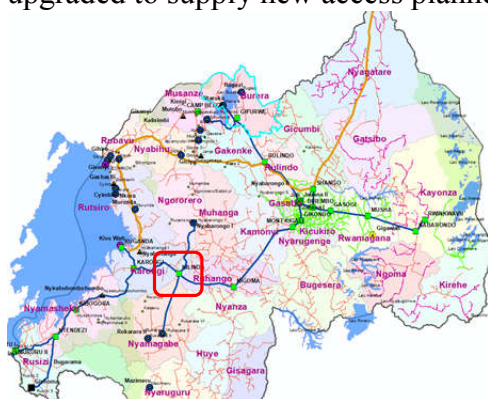
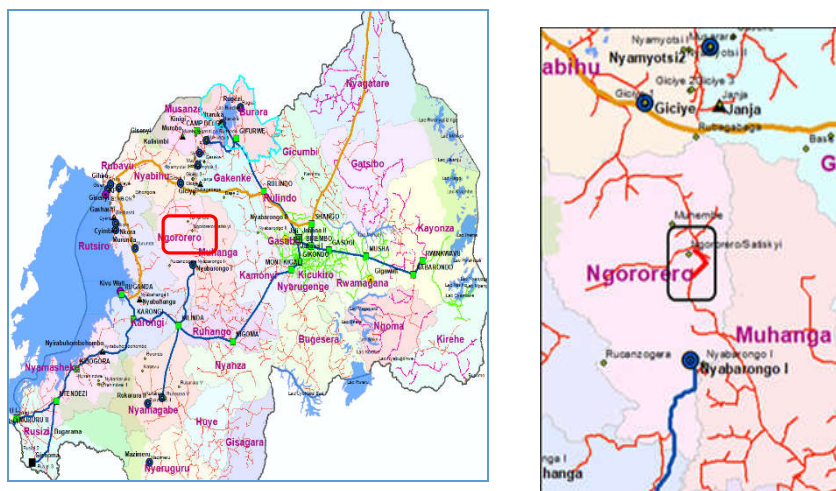


Table 3.2: Planned Distribution network upgrades for the SEAP II Programme

#	Upgrade of distribution networks	District	Amount
1	Reconducting of the last section (35mm ²) of Ngororero T-Off with 120mm ²		264,839
2	Reconducting Byumba – Kageyo line (35mm ²) with 120mm ²		117,706
3	Reconducting Musasa main feeder with 120mm ² .		588,532
4	Upgrade of STEG Network		6,390,000
5	Re-conduct the part of Kanazi Feeder from Nyamata to Nemba 70mm ² with 120mm ²		308,850
6	Reconducting the existing 70mm ² conductor for 30kV Transmission lines Mukungwa - Camp Belge – Camp Belge with 120mm ²		382,545
7	Upgrade of Gahanga- Gikondo distribution line		1,014,882
8	Upgrade 110kV line from Mukungwa to Rwinkwavu		10,065,897

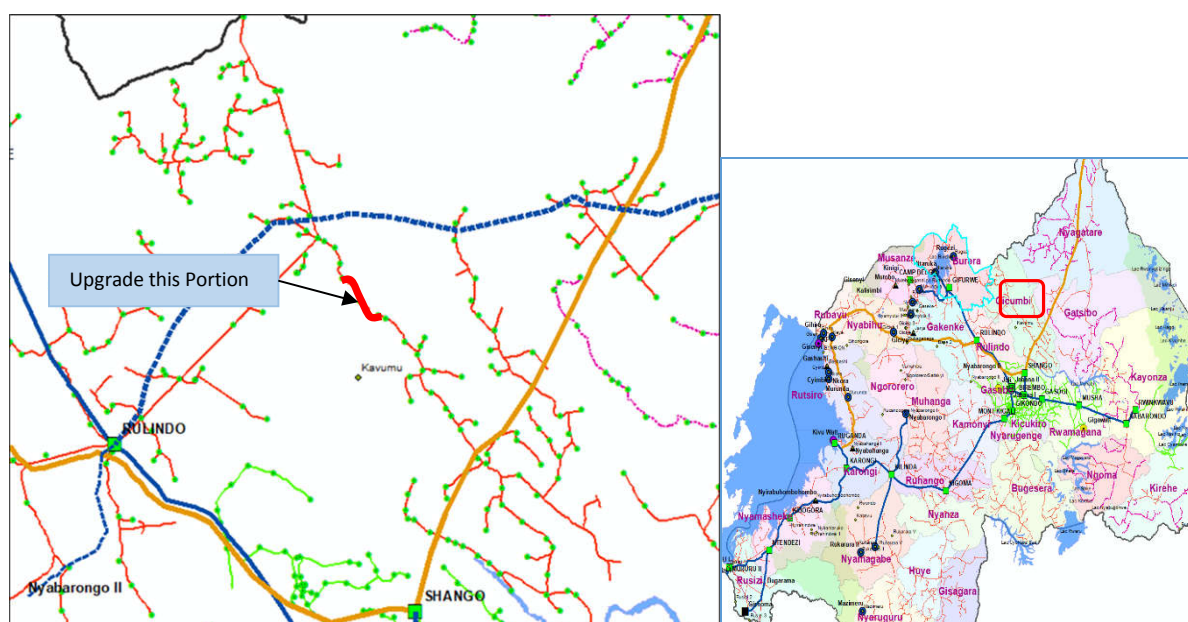
(i) Reconducting of the last section (35mm²) of Ngororero T-Off with 120mm².

Strengthen line to allow for interconnection with Nyabarongo 1 network. This will allow supply of the Ngororero line from Nyabarongo as well as Nyabihu for better reliability.



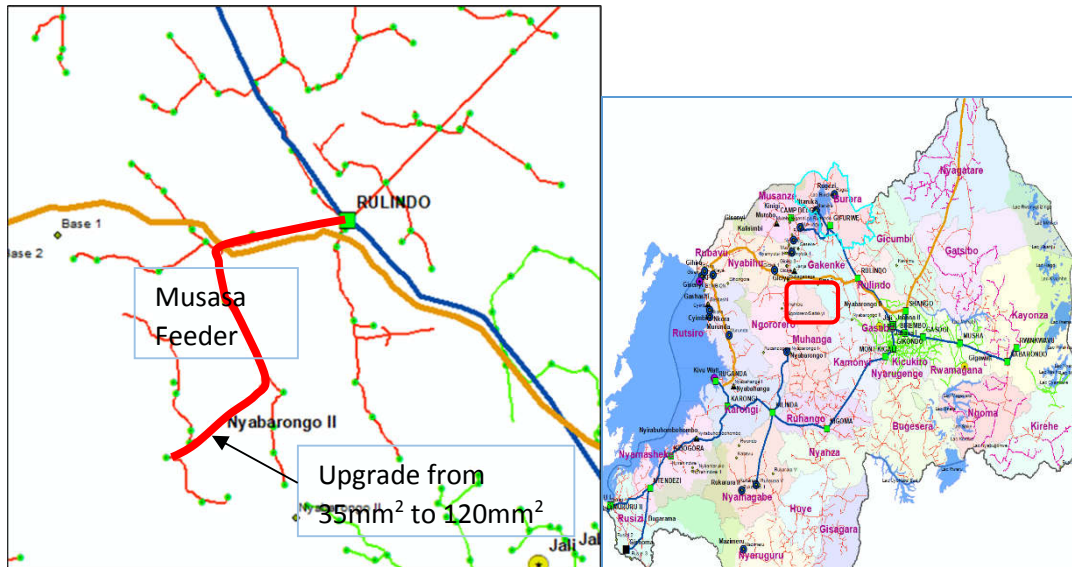
(ii) Reconducting Byumba – Kageyo line (35mm²) with 120mm²

A portion of this line was constructed with 35mm² conductor which is now forming a weak link in the line. The rest of the line is 70mm² or 120mm² conductor. This portion should be upgraded to 120mm².



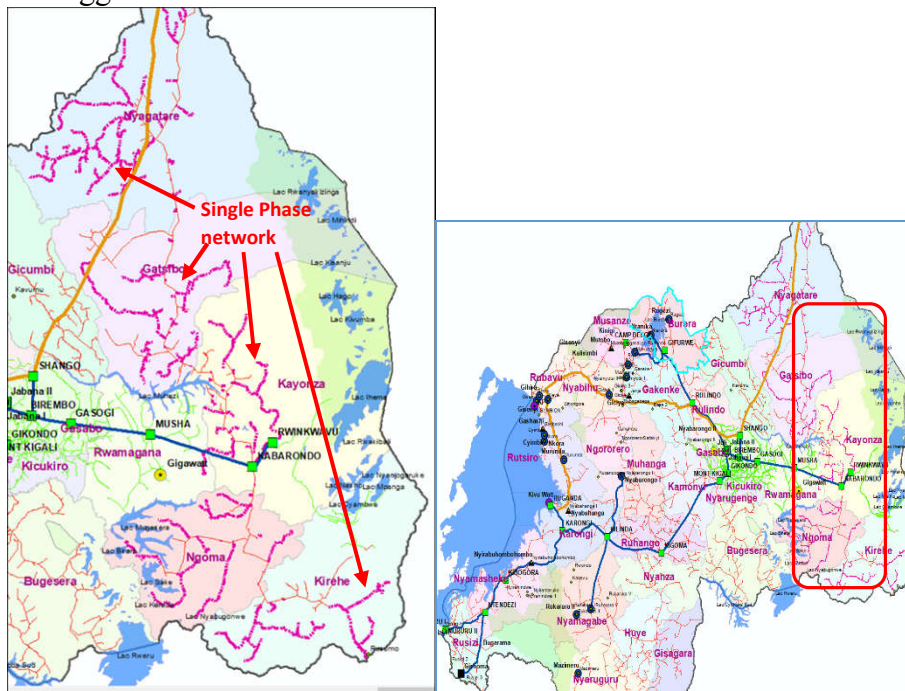
(iii) Reconducting Musasa main feeder with 120mm².

Musasa feeder from Rulindo substation is supplying the Gakenke District which is fast growing. The 35mm² conductor has restricted capacity and high losses. This must be upgraded to 120mm²

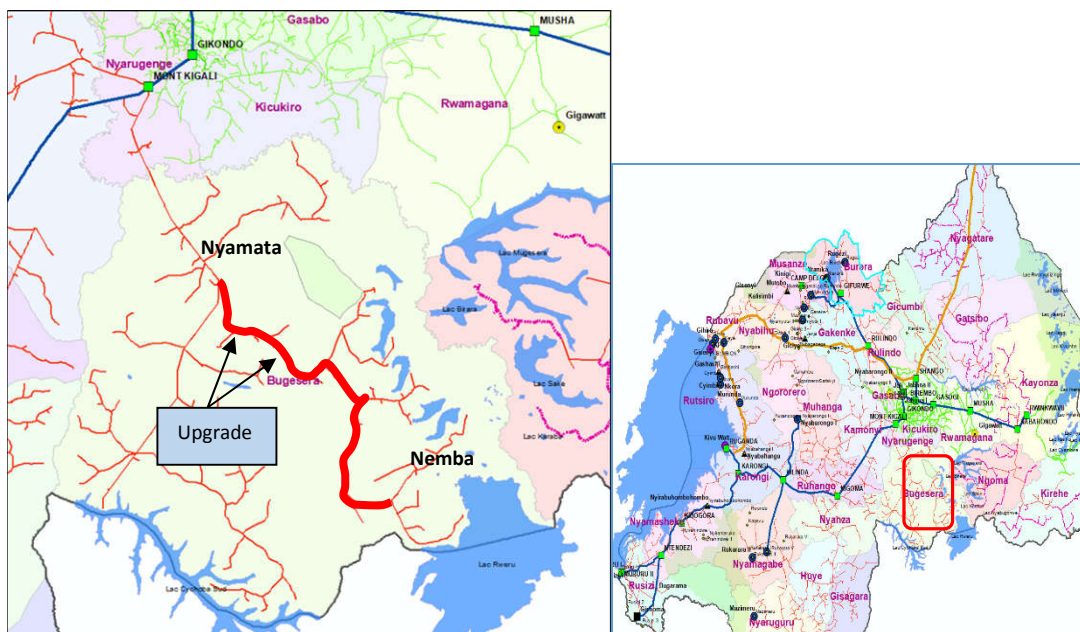


(iv) Upgrade of STEG network

A vast area in East Province has been electrified with single phase 17.35kV network instead of the normal 30kV single or three phase. This 17.35kV network is limiting expansion and is one of the biggest causes for losses on the Distribution network. This should all be upgraded to 30kV.



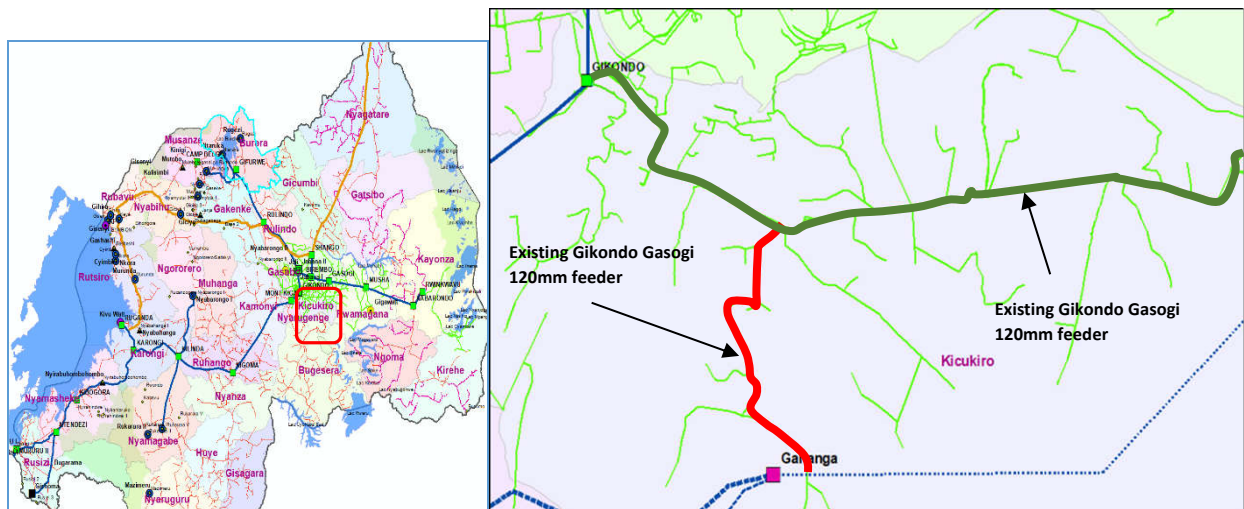
(v) Re-conduct the part of Kanazi Feeder from Nyamata to Nemba 70mm² with 120mm². This part of the feeder is supplying the Steel factory and Bugesera Industrial Park. The line is over loaded and voltage below acceptable limits. The line must be upgraded as a matter of urgency.



(vi) Re-conduct the part of Kanazi Feeder from Nyamata to Nemba 70mm² with 120mm². The line from Mukungwa substation to Camp Belge is 70mm, while the rest of the line is 120mm. This is a weak link and is supplying Musanze which is a major town in the North. This upgraded line will be a firm supply to the upgraded Camp Belge substation.



(vii) Upgrade Gahanga – Gikondo Distribution Line
New Gahanga substation has capacity to support heavily loaded Gikondo - Gasogi feeder. The existing line from Gahanga to Gasogi feeder is 70mm² and must be upgraded to 120mm² to be able to support and reduce the load on the Gasogi feeder.



(viii) Upgrade 110kV line from Mukungwa to Rwinkwavu

The generation Mukungwa and Ntaruka is in the north, the 110kV line to Kigali load center is small diameter and causes voltage drop. The substations in the east of the Country (Kabarondo and Rwinkwavu) has voltage below acceptable limit due to voltage drop on the small capacity line. This line capacity must be upgraded to give quality supply and backup supply to Kigali, as well as improved supply to the east of the country.

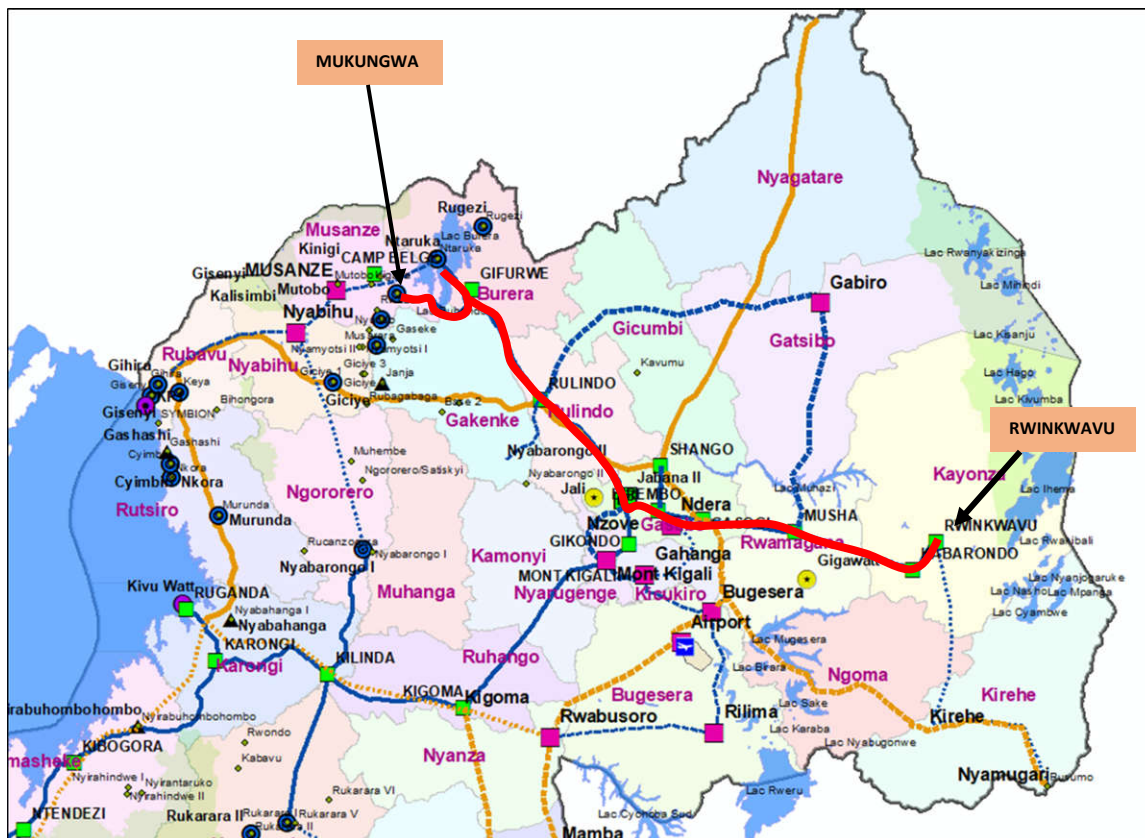
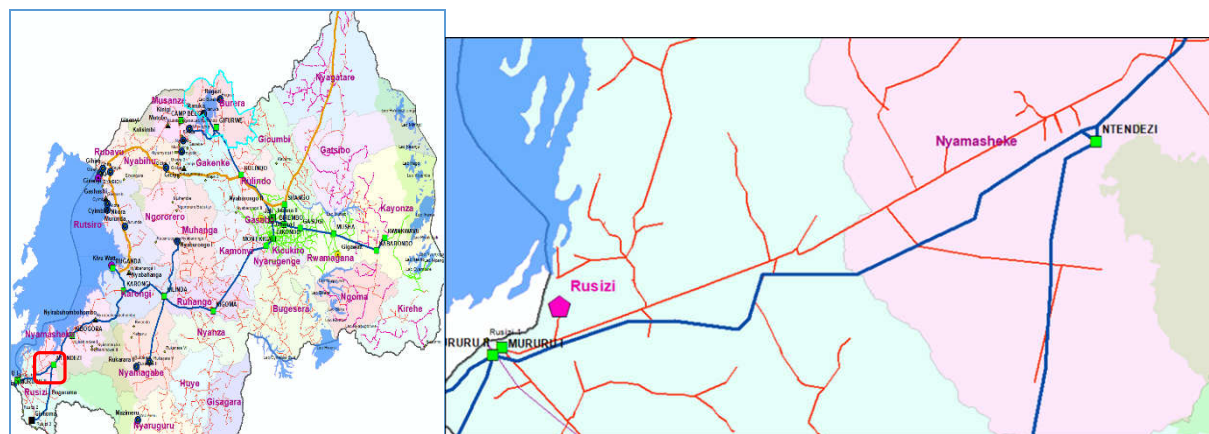


Table 3.3: Planned new distribution lines for the SEAP II Programme

	Construction of new distribution networks	District	Amount
1	Construction of a 15kV Double circuit line to supply industrial bulk loads at Rwamagana		660300
2	Feeder interconnection between Ntendezi and Mururu 1		176559
3	Feeder interconnection between Kibogora and Karongi		441399
4	Feeder interconnection between Kilinda and Kigoma		912224
5	UTEXRWA (load transfer to DW)		213000
6	Gikondo to Ministere Feeders (underground 2x240mm ²)		2130000
7	Mont Kigali to Kigali South 120/20 ACSR		925613
8	30kv Airport to Nyamata (back up line)		1125908
9	30kv double circuit line Kabarondo to Nasho and 30/15kv Stepdown transformer		4879725
10	New 30kv line from Mukungwa to Ngororero and Mukungwa II switching station.		2715750
11	Reduce stress on Kigali (Jabana) a short term solution using Base Feeder		767865
12	Interconnection of Byunba feeder with Shango Substation (30kv distribution line)		1029930
13	Interconnection of Byunba feeder with Gabiro Substation		1380240

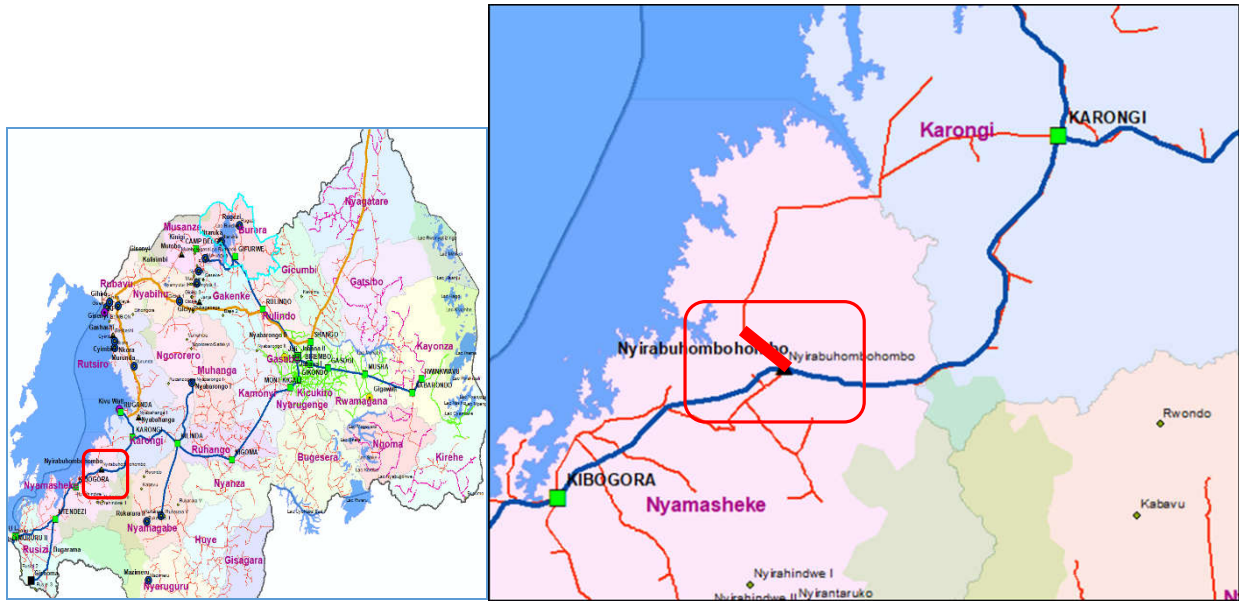
(i) Interconnect Ntendezi with Mururu 1 feeder.

Interconnect 30kV feeders from Mururu and Ntendezi with 1.2km line to enable supply of this line from both sides (contingency supply).

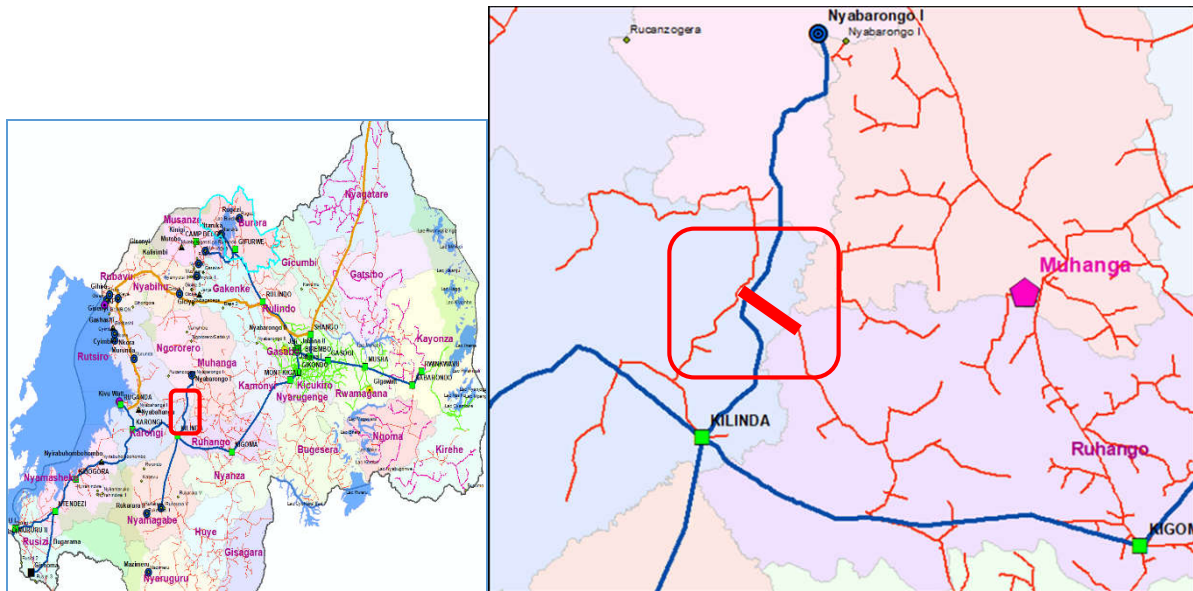


(ii) Feeder interconnection between Kibogora & Karongi

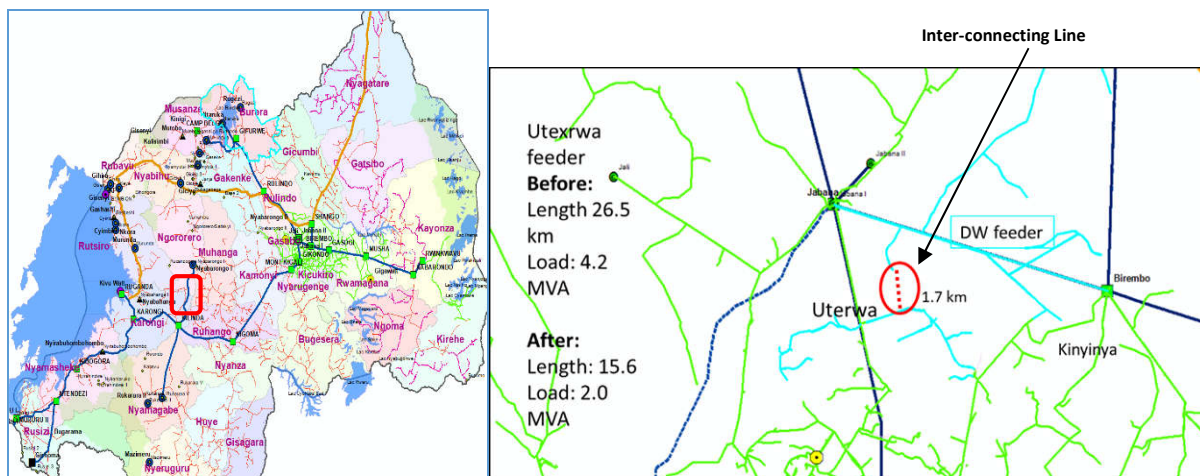
Interconnect 30kV feeders from Kibogora and Karongi to enable supply of this line from both sides (contingency supply).



(iii) Feeder interconnection between Kilinda & Kigoma
Interconnect 30kV feeders from Kilinda and Kigoma to enable supply of this line from both sides (contingency supply).

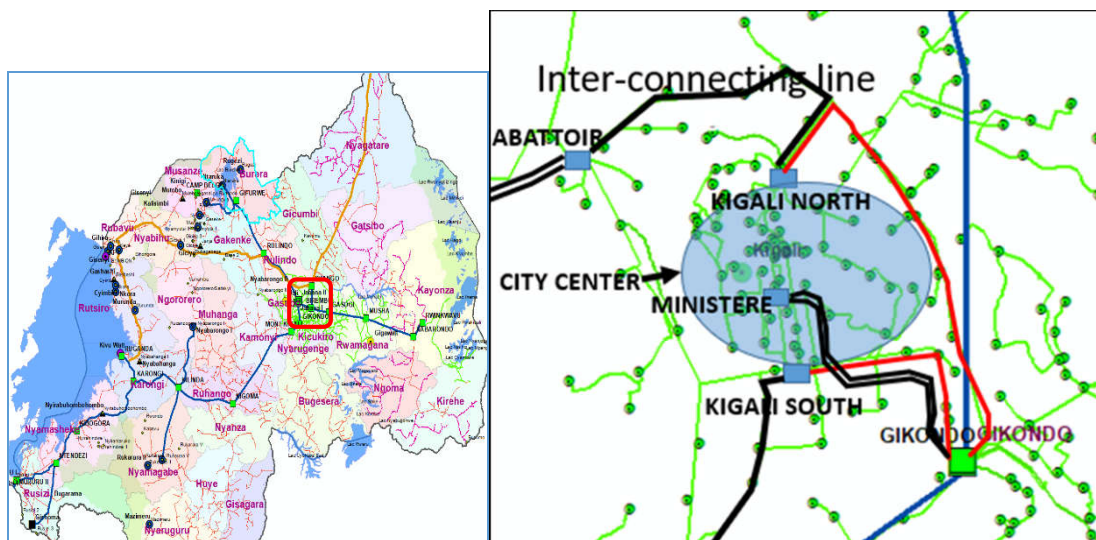


(iv) UTEXRWA (load transfer to DW)
Interconnect 15kV Utexrwa and DW (Duitsche Welle) feeders so load can be transferred from heavy loaded Utexrwa feeder to DW feeder which has very little load.



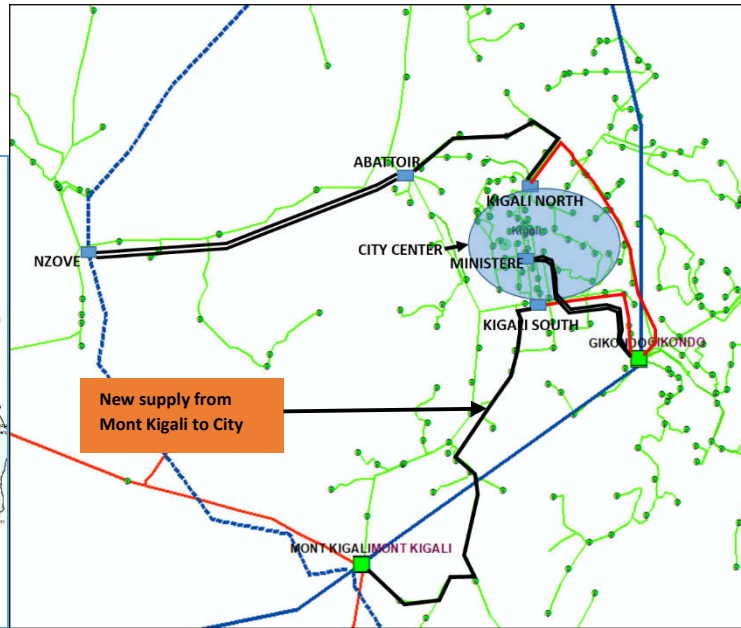
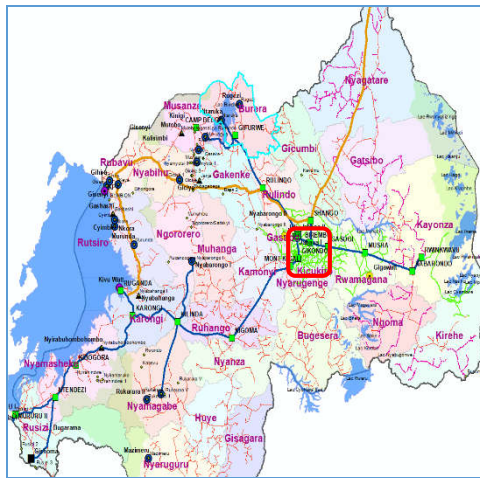
(v) Gikondo to Ministere underground cables.

These two parallel cables will become the main supply to the City Center. The two existing lines (in red in the picture) are both over loaded and not reliable. Very high losses are experienced. They will act as back-up in future.

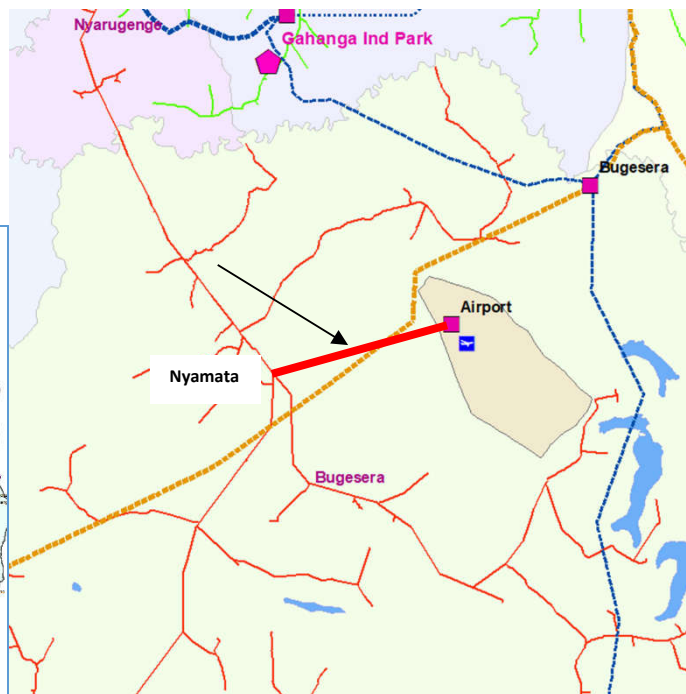
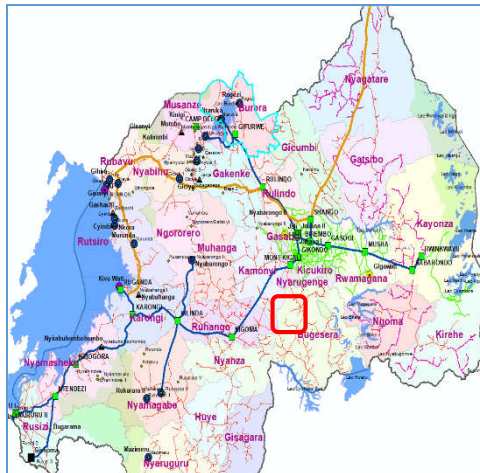


(vi) Mont Kigali to Kigali South 120mm² Feeder.

Kigali city is at present only supplied from Gikondo which is high risk. With upgrade of Mont Kigali, a new supply from here can be installed to have supply from more than one source. This is linked with the project to split of busbar in Kigali South.

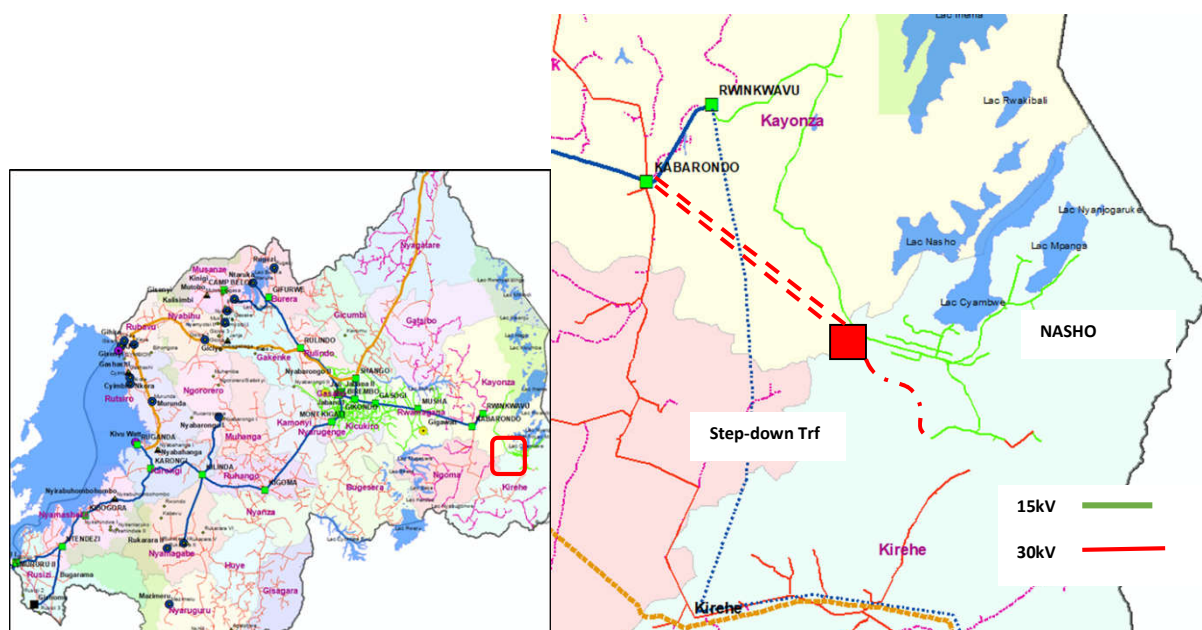


(vii) Airport to Nyamata back-up line
REG wants to ensure a firm supply at the airport by having a back-up supply. This can be installed from Nyamata on the Kanazi 30kV feeder from Mont Kigali.

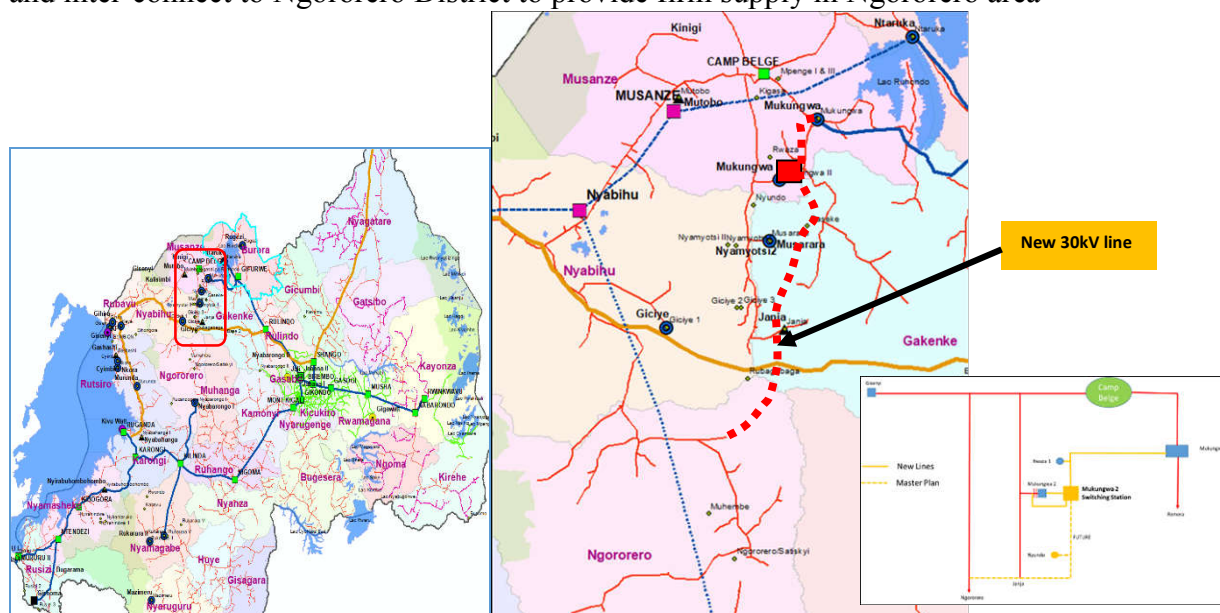


(viii) 30kV Double Circuit to Nasho

The 15kV line from Rwinkwavu cannot supply big irrigation schemes in East province and Nasho. A new 30kV line must be constructed from Kabarondo, with a 30/15kV step-down transformer at Nasho.

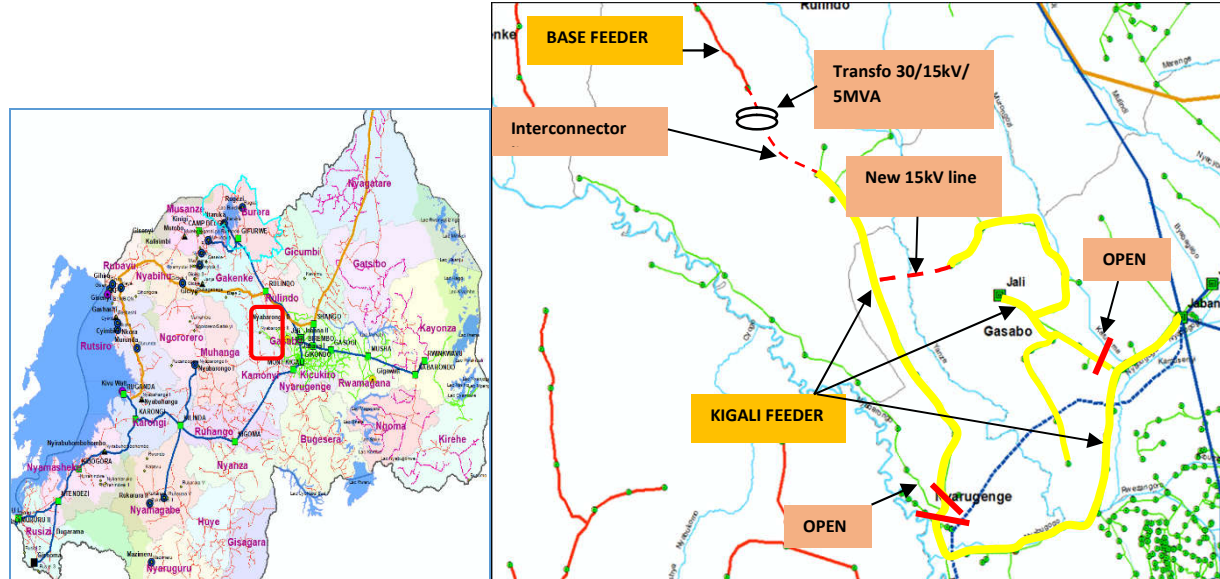


(ix) New 30kV line from Mukungwa to Ngororero and Mukungwa II switching Station
A New 30kV line will evacuate power from Rwaza Muko, Mukungwa 2, Musarara, Giciye III and inter-connect to Ngororero District to provide firm supply in Ngororero area



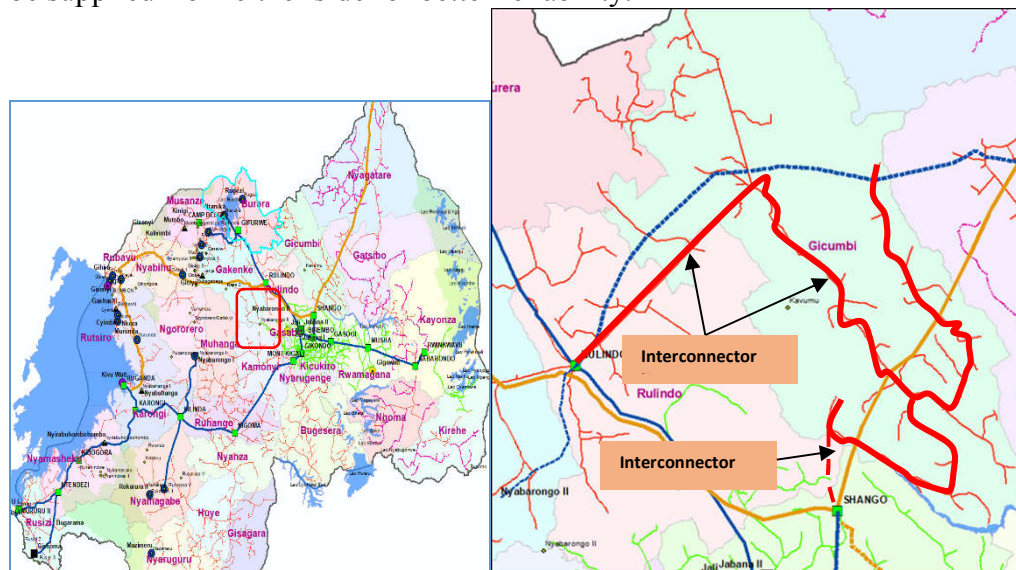
(x) Reduce stress on Kigali (Jabana) short term solution using Base Feeder
The Kigali feeder (from Jabana) is very long and loaded over capacity. A long term plan is to install Nzove substation to supply the industries in the area, but a short term solution is required to

supply WASAC pumping and other industries. An inter-connector from Base with step-down transformer can be installed in a short time.



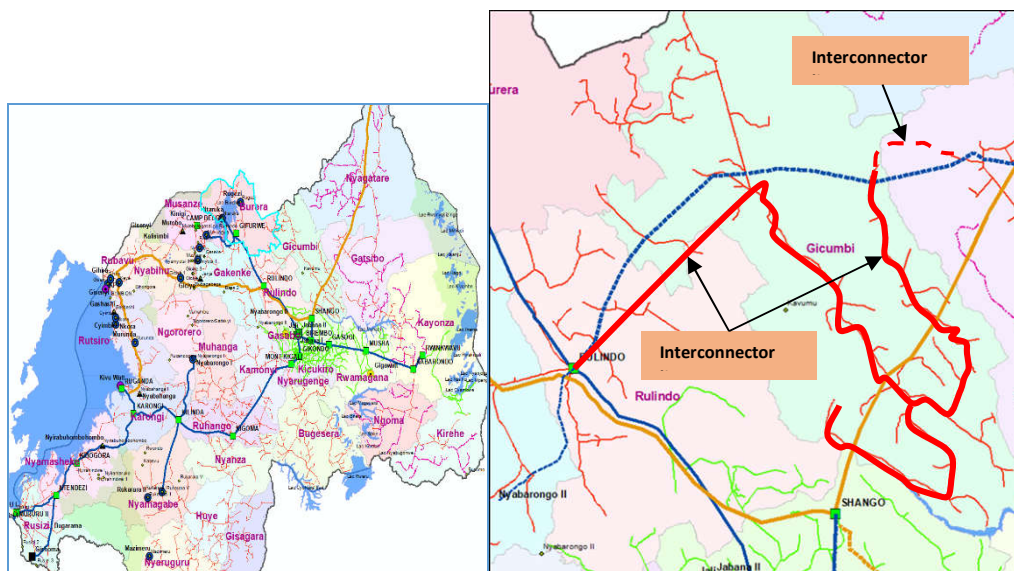
(xi) Interconnect Byumba feeder with Shango Substation

The Byumba feeder from Rulindo substation is extremely long. The far end is close to Shango Substation which will be completed soon. Connecting this end to Shango will ensure the line can be supplied from either side for better reliability.



(xii) Interconnect Byumba feeder with Gabiro Substation 9.6km

The Byumba feeder from Rulindo substation is extremely long. The one end is close to Gabiro Substation (to be commissioned soon). Connecting this end to Gabiro will ensure the line can be supplied from either side for better reliability and shorten the normal operational length of Byumba feeder.



Area 3: Increase off-grid access to renewable energy: Low-income, isolated rural households will be supported in accessing off-grid solutions such as solar home systems (SHS) in order to increase access. The indicative amount allocated to this area is 10.2 USD million. Activities under this area mainly includes SHS for remote areas of the country with terrain and scattered settlements where grid connection is difficult and neither the grid nor the private sector distribution channels will reach in the near term. In line with the National Electrification Plan (NEP), the proposed RBF will support selected off-grid service delivery activities, for 124,800 household in selected two (2) provinces (Southern and Western) where the electrification rates are currently below 50%. To date, 82% of households in the Kigali City are currently accessing electricity, followed by Eastern province with 39% access, the Western Province with 38%, Northern Province 34% and the Southern Province that has the lowest access rate of 30%. The number of SHS installed will measure the degree of additional off grid access achieved. The Bank's RBF off-grid area shall be implemented in a manner to ensure complementarity with ongoing private sector led initiative, and in line with GoR's energy sector policies.

Area 4: Institutional Strengthening and capacity building: The indicative amount allocated to this area is 7.5 USD million. A range of conventional and new skills is required to deliver the RBF program. The mission identified specific skills gaps in identified implementation entities, which will need to be strengthened. These skills include planning, procurement, program management, contract management, E&S, Engineering design etc. To address this, a capacity building and technical assistance program has been discussed and agreed with Government

3.3 SELECTED DISBURSEMENT LINKED INDICATORS (DLI)

Selected Disbursement Link Indicators (DLIs) have been agreed with the programme implementing agencies (REG/EDCL/EUCL) which will form the basis for disbursement. The DLIs are expected to enhance the focus on key results and improve the reliability of the system as well as increase on-grid and off-grid access. They are a blend of outcome, output, and process indicators. There are in total eight (8) DLIs including one (1) prior result DLI (see **Table 3-4.**)

Table 3.4: Planned DLIs for the SEAP II Programme

	Results Areas and DLIs	Unit	Indicative Loan allocation per area and per DLI	% of allocation per area and per DLI without advance	FY 2018/19 Prior amount	FY 2018/19 Advance amount
	Total RBF financing 2018-2022	US million USD	269.89		1.50	67.10
				100.00%	0.56%	25%
	Target date for disbursement				Nov-18	Oct-18
	Results Area 1: Increased power system reliability	US million USD	75.64	28.02%	0.00	18.91
	Improve System Average Interruption Duration Index (SAIDI) for 30/15 kv	US million USD	49.16	18.22%	0.00	12.29
DLI-1.1						
DLI-2	Installation of Scada DMS	Installation of DMS system	26.47	9.81%	0.00	6.62
	Results Area 2: Increase on-grid access for household and productive-use customers	US million USD	176.54	65.41%	0.00	44.14
DLI-2.1	Additional number of new household customers connected to the grid of which 52% are women	US million USD	96.92	35.91%	0.00	24.23
DLI-2.2	Additional number of productive usage customers connected to the grid	US million USD	32.15	11.91%	0.00	8.04
DLI-2.3	Additional length of MV (30/15 kV) distribution lines constructed and or upgraded	US million USD	47.48	17.59%	0.00	11.87
	Results Area 3: Increase off-grid access to renewable energy	US million USD	10.23	3.79%	0.00	2.56
DLI-3.1	Additional number of new household customers provided with SHS of which 52% are women	US million USD	10.23	3.79%	0.00	2.56
	Results Area 4: Institutional strengthening and capacity building	US million USD	7.48	2.77%	1.50	1.49
DLI-4.1	Implementation of the approved annual agreed capacity building and technical assistance program	US million USD	5.98	2.24%	0.00	1.49
DLI-4.2	Recruitment of an Independent verification agency (IVA)	US million USD	1.50	0.56%	1.50	0.00

3.4 VERIFICATION PROTOCOL AND BANK DISBURSEMENT VIA (IVA)

In line with the Bank's policy for RBF, MINECOFIN will retain an IVA on terms of reference acceptable to the Bank to verify the achievement of DLI results.

The Borrower is responsible for engaging the IVA. The indicative timelines for DLI achievement are in fiscal years (July 1 to June 30), for which the annual targets are proposed to be achieved. However, the Government can request the Bank for disbursement when significant results have been achieved. Per GoR request, the first verification for disbursement is expected to start March 2019 and for Year 1 (2018/2019). All subsequent disbursements will be on annual basis following the fiscal year, except Year 1 (2018/2019).

The IVA will verify results through Management reports, quarterly and annual reports, financial audits, procedural verification, and physical inspection that will test the accuracy and quality of results claimed by REG. In accordance with good audit practice, physical verification will take place against a sampling framework of no less than 20% and frequency. The level of calibration, which will be detailed in the terms of reference of Verification Protocol, should be satisfactory to the Bank. MINIFRA/MINECOFIN will prepare the ToR that should be in line with the agreed DLIs, the agreed activities to be implemented, the verification protocol, and timeline

The loan proceeds will be disbursed against submission to the Bank of the IVA's Program Results Verification Report on the achievement of DLIs. The verification process should not take more than six (6) weeks from the start of the process. The Bank will use the Program Results Verification Report to determine the amount of the eligible disbursements to be made based on the results achieved. The following illustration (Figure 3.1 overleaf) gives an overview of the Bank's disbursement process.

Figure 3.1: Illustration of the Verification Protocol and Bank's Disbursement under the RBF

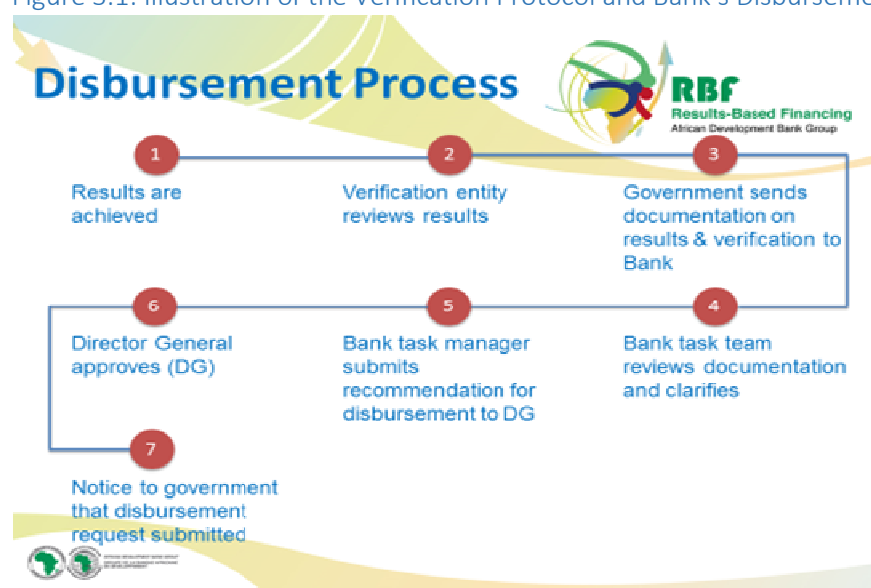


Table 3.5 provides the verification timeline to be followed to ensure that results are verified within a maximum of six (6) weeks after OAG receives the report from MINECOFIN / MININFRA and disbursement is effected.

Table 3.5: Verification Timeline

	Timeline	Action	Time frame
1	First week of July	REG CEO submit report submitted to MININFRA and MINECOFIN	1 week after end of fiscal year
2	By end of second week of July One week for review	Review of report by MININFRA and MINECOFIN and submit to IVA	1. weeks (2 weeks after fiscal year)
3	By end of second week of July	IVA receives reports	2 weeks after end of fiscal year
4	Third week July-second week of August	Verification of results	3 weeks (4 weeks after the fiscal year)
5	Second week of August-Third week August	MINECOFIN submits IVA report to the Bank	1 week (5 weeks after fiscal year)
6	Fourth week of August-second week of September	Bank verification completed and notification of disbursement amount	2 weeks (7weeks after fiscal year)
7	Third week of September	MINECOFIN prepares invoice for payment to the Bank of notified amount	1 week (8 weeks after fiscal year)
8	Fourth week September-second week October	Disbursement effected	3 weeks (11 weeks after fiscal year)
9	By end of October	Disbursed amount available in GoR Treasury account	1 week (13 weeks after fiscal year)

3.5 PROGRAMME IMPLEMENTATION

REG will be the implementing agency of the proposed RBF operation through its two (2) subsidiary entities EDCL and EUCL. MININFRA, jointly with the MINECOFIN will provide overall oversight and strategic guidance.

In its current mandate, MININFRA provides supervision of REG projects development and implementation activities and coordinates development partners'(DP) activities through the Energy Sector Working Group, providing a forum for interaction with DPs, and, ensuring that inputs from project financiers and the private sector inform the ESSP and improve project delivery. This arrangement has ensured efficiency in sector planning and use of resources. The Bank leads the critical Energy Access Technical Working Group. This is significant considering that most of the activities in the RBF will be in this sub-sector.

The physical implementation of the proposed RBF activities including planning, design, procurement and construction/installation of equipment will be carried out within the existing REG organizational framework. Component activities under Areas 1 and 2 will be implemented by EARP program under EDCL except the Scada DMS installation, which will be implemented by EUCL. The primary and social energy department under EDCL will implement activities under Area 3. The capacity building activities under Area 4 will be implemented by REG HR department.

In addition, MINECOFIN will sign a subsidiary agreement with REG, EDCL and EUCL that will include terms of proceeds of the financing made available to REG and its subsidiaries and their responsibility in carrying out activities under the Program.

REG has been carrying out similar African Development Bank funded projects over years and are experienced and capable of managing the distribution activities and associated environmental and social impacts under the RBF program. REG will also establish a Program Technical Unit to oversee the day-to-day implementation of the RBF and facilitate collection and collation of evidence of achievement of DLIs to enable verification by the IVA. The Program Technical Unit (PTU) shall comprise key specialists including REG Head of Planning as the Secretary, Head of EARP as Chairperson, EDCL Director of Primary & Social Energies Department, EDCL Director of Energy Planning, EUCL Director of Operations, REG Head of Quality Assurance, EDCL Head of Procurement, REG Head of M&E, REG Head of human resources development, and REG Financial Management.

4. SCOPE AND METHODOLOGY

The SESA process is a systematic approach to identifying, describing and evaluating the potential environmental and social impacts of the proposed programme, and to developing measures that will be implemented to manage the identified residual impacts following the mitigation hierarchy of environmental and social assessment. The objective of the SESA is identify potential adverse impacts to be avoided and/or reduced to an acceptable level and for beneficial impacts to be enhanced in the overall project design.

In outline, the SESA process involved four key stages namely scoping; baseline studies; impact assessment and development of mitigation measures and monitoring requirements; and environmental and social management. Stakeholder engagement processes are at the heart of the SESA development process and is an ongoing process from predevelopment, through programme implementation up to programme post completion impact audit monitoring. This is to ensure that Programme Affected as well as beneficiary communities can input into the Proposed Programmes development design from the very beginning and throughout its implementation for the intended development programme objectives to be achieved following completion of the programme implementation.

4.1 SCOPING

Scoping is the process of determining the content and extent of the matters (environmental and social aspects and impacts) that should be covered in the SESA and associated documentation. The purpose of scoping is to focus the SESA on the environmental and social issues/impacts, stakeholder concerns, and potential impacts which need the most thorough attention and to identify the approaches to assess their impacts. The following environmental and social issues/impacts have been scoped for the programme specifically in connection with the planned activities under Areas 1, 2 and 3:

- Traffic and Transport;
- Air Quality;
- Noise and Vibration;
- Biodiversity;
- Water Resources;
- Geology and Soils;
- Archaeology and Cultural Heritage;
- Landscape and Visual;
- Waste Management;
- Resource Efficiency; and
- Involuntary Resettlement resulting from programme related land acquisition
- Socio-economics, including Community Health and Safety.

4.2 BASELINE CONDITIONS

Following on from the scoping phase, more detailed assessments were undertaken to establish the baseline conditions prior to the Programme design and implementation. These involved desk-based studies of publicly-available information and site walkover surveys to selected planned programme sites under Areas 1 and 2 of the programme (See Annex 3 of this SESA Report for

site photos taken during visits to the selected communities). The full details of the literature surveys are summarized under Section Six (6) of this Report.

4.3 IDENTIFICATION OF RECEPTORS

Receptors are environmental and social components that may be affected, adversely or beneficially by the programme component activities. Potential receptors were identified and their sensitivity and/or susceptibility to identified impacts were determined as part of the scoping work and baseline studies and surveys.

4.4 IMPACT ASSESSMENT

The actions undertaken to determine the significance of potential programme impacts involved the following four key steps in line with the Mitigation Hierarchy of environmental assessment and management:

- **Prediction:** What will happen to the status of specific receptors as a consequence of this programme activities in particular under Areas 1 and 2 (primarily; what is the magnitude of the impact?);
- **Evaluation of significance:** How significant is the impact to the identified receptors namely, Affected Communities and the wider environment – land, air and water? What is its relative significance when compared to other impacts?
- **Mitigation:** If there are impacts of concern (adverse and/or significant), can anything be done to avoid, minimize, or offset the impacts? Or to enhance potential beneficial impacts?
- **Residual Impacts:** After mitigation, are the impacts still of concern and/or significant? If yes, the process needs to be repeated at least once before the ‘final’ determination of residual impact significance occurs.

Potential impacts arising from planned activities, cumulative impacts with other developments and unplanned events (e.g. accidents, natural disasters, etc.) were also assessed. Stakeholder engagement is undertaken throughout the development of the proposed programme to ensure that Affected and Interested Parties are aware and informed of the proposed programme and have an opportunity to provide input regarding potential proposed programme impacts and mitigation measures designed to manage the identified impacts.

4.4.1 *Impact Definition*

The final prediction of impact significance was made on the basis of a combination of factors’ which include the sensitivity/susceptibility of the identified receptors to any change which the programme may exert upon it, and the scale, frequency, duration and reversibility of the identified impact. The assessment is effectively done twice: once before any mitigation measures are applied and again after mitigation measures resulting in an overall ‘residual impact’. The process for defining the impact significance is summarized in Table 4.1 below, and the resulting description of what the defined significances mean is shown in Table 4.2 overleaf.

Table 4.1: Impact Significance Matrix

Impact Magnitude		Receptor Sensitivity		
		Low	Medium	High
Impact Magnitude	Very low	Negligible	Negligible	Minor
	Low	Negligible	Minor	Moderate
	Medium	Minor	Moderate	Major
	High	Moderate	Major	Major

Table 4.2: Impact Significance Definitions

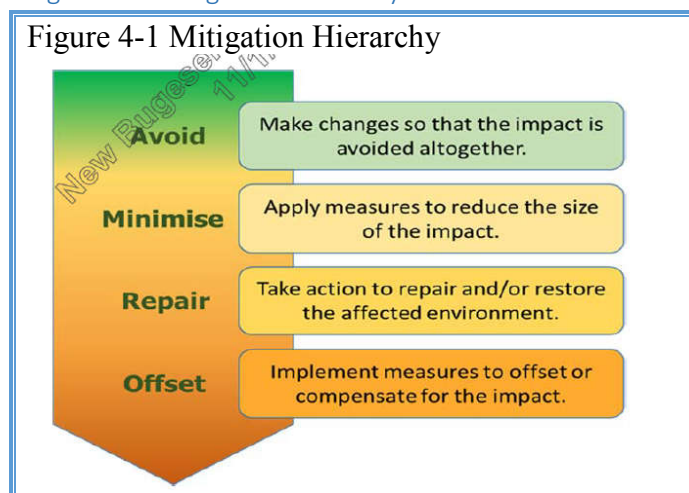
Adverse Impacts	Major	Impacts with a “Major” significance are likely to disrupt the function and value of a receptor, and may have broader systemic consequences (e.g. ecosystem or social well-being). These impacts are a priority for mitigation in order to avoid or reduce the significance of the impact.
	Moderate	Impacts with a “Moderate” significance are likely to be noticeable and result in lasting changes to baseline conditions, which may cause hardship to or degradation of a receptor, although the overall function and value of a receptor is not disrupted. These impacts are a priority for mitigation in order to avoid or reduce the significance of the impact.
	Minor	Impacts with a “Low” significance are expected to be noticeable changes to baseline conditions, beyond natural variation, but are not expected to cause hardship, degradation, or impair the function and value of receptor. However, these impacts warrant the attention of decision-makers, and should be avoided or mitigated where practicable.
	Negligible	Any impacts are expected to be indistinguishable from the baseline or within the natural level of variation. These impacts do not require mitigation and are not a concern of the decision-making process.

4.5 MITIGATION

As part of the SESA process, when adverse impacts are identified (which cannot be managed via programme design), mitigation measures are developed in line with the Mitigation Hierarchy. First, efforts are made to avoid or prevent, then minimize or reduce adverse impacts. For remaining significant and moderate residual impacts, impact specific mitigation measures (plans) are developed to minimize their impacts during the programme implementation.

Figure 4-1 overleaf shows the approach to the mitigation hierarchy used in the SESA development process.

Figure 4.1: Mitigation Hierarchy



4.6 ENVIRONMENTAL AND SOCIAL MANAGEMENT

A framework ESMP was prepared as part of the SESA, which explains how environmental and social commitments have been developed during the SESA process to ensure that the proposed programme is implemented and operated in accordance with the relevant regulatory and legislative requirements, in an environmentally and socially sustainable manner and in accordance with Good International Industry Practice (GIIP). The ESMP captures environmental and social commitments made within the SESA Report in relation to mitigation, monitoring and management systems and capacity development plans as outlined in Section 9 of this Report.

4.7 PRELIMINARY ENVIRONMENTAL AND SOCIAL ASSESSMENT

The PESA analysis was conducted using the Strengths-Weaknesses-Opportunities-and-Threats (SWOT) approach. The “weaknesses,” or gaps identified against the ISS, are considered on two levels: (i) the system as written in laws, regulation, procedures and applied in practice; and (ii) the capacity of the program institutions to effectively implement the system. The analysis focused on the strengths, gaps, potential actions, and risks associated with the systems currently in use in the Energy sector to address the environmental and social effects commensurate with the nature, scale and scope of planned programme component activities.

This is structured to examine arrangements for managing the environmental and social effects (i.e., benefits, impacts and risks) of the programme. The analysis also examined how the system as written in policies, laws, and regulations is applied in practice at the national, regional and local levels to identify any potential weaknesses and opportunities for enhancements. In addition, the analysis examines the efficacy and efficiency of institutional capacity to implement the system as demonstrated by performance thus far with implementation of other similar AfDB and MDB funded programmes/projects in the country. The analysis examined the questions of whether the current system and institutional arrangements: (i) mitigates identified residual adverse impacts; (ii) provides transparency and accountability; and (iii) performs effectively in identifying and addressing environmental and social risks overall at both national and local levels. The overarching objectives are to ensure that the risks and impacts of the programme component activities are identified and mitigated, and to strengthen the system and build capacity to deliver

the intended programme development outcomes in a sustainable manner.

5. ANALYSES OF PROGRAMME ALTERNATIVES

This Chapter describes the alternatives of the proposed programme that were considered as part of the programme development design before focusing on the current programme proposal. The nature and scope of the relevant options in this context will be determined within the range of the financing instrument (RBF) being considered for the programme.

The Rwanda guidelines for Strategic Environmental Impact Assessment do not prescribe alternatives solutions of the plan/program which will be subject to strategic environmental assessment but the options considered for assessment includes the following:

- i. The Do-Nothing or No Programme alternative
- ii. Use of a different financing Instruments such as PBO or Investment Project financing
- iii. Different programme areas selected other than the four selected.

5.1 ANALYSIS OF E&S IMPACTS FOR EACH ALTERNATIVE

5.1.1 *The Do-Nothing or No Programme Alternative*

The No-programme alternative assumes no action is taken to achieve Rwanda ESSP's objectives. Furthermore, the Do-Nothing option will mean the following programme benefits will not be realized;

- There would be no temporary employment or supply services and provisions for workers and to contractors during the construction phase,
- Within the respective project areas there would be no opportunities for petty trading and small business service provision along the power line routes,
- Potential beneficiary enterprises such as small industries and other agricultural processing businesses lacking electricity would still be affected,
- Data management with computers and communication facilities like access to internet, charging of mobile phones; electric lighting at night, extended opportunities for work and study would be evidently missed out,
- Socio-economic development would not be achieved if the project is not implemented,
- Generally, employment opportunities that would be created by the programme would be miss out.

5.1.2 *Selected Programme Areas*

The four programme areas forming the components of the Programme have been careful selected in conjunction with the different Programme Stakeholders to minimize the risk of not achieving the programme objectives. Furthermore, many of the subprogram component activities were removed because they would result in significant environmental and social impacts which are not supported using the RBF instrument. The proposed beneficiary communities will also see significant economic and social improvements as a result of the extension of the distribution lines.

5.1.3 *Comparison of Alternatives*

The selected line routes were the most feasible considering the availability of electricity network in the beneficiary communities, use of the RBF financing instrument and minimal environmental

and social impacts to identified receptors within the programs area of influence and the wider environment. The ‘do- nothing’ programme alternative is not a feasible option because the risk of not meeting the Policy objectives of the ESSP and the follow-on socioeconomic benefits far outweigh the identified environmental, social and climate change impacts of the programme.

Furthermore, there was no need for consideration of different generating power sources under the Alternative Analysis Section because regardless of the generating source of the power, the policy targets for increase in access can only be achieved if the proposed expansion in the distribution networks are considered under the Programme. The system strengthening and capacity enhancements will also ensure stability of the grid to allow those targets to be met.

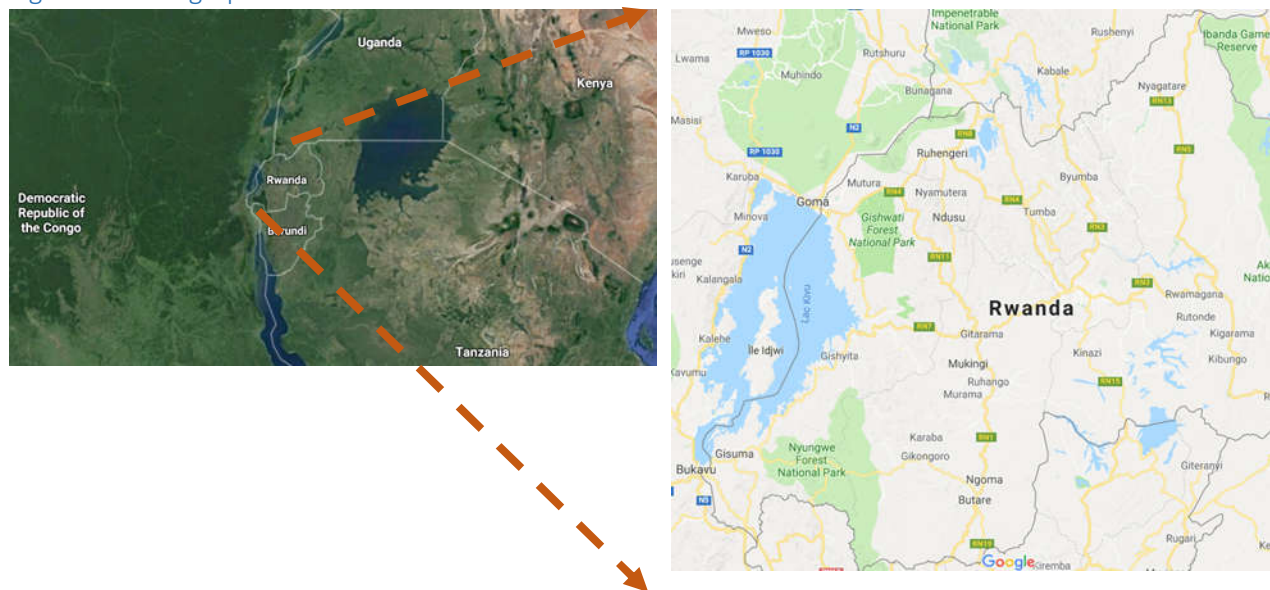
6. ENVIRONMENTAL AND SOCIO-ECONOMIC BASELINE

The scope of sub programme component activities are located within the four regional provinces of the country; Northern, Southern, Eastern and Western. This section therefore examines the state of the natural environmental and social baseline conditions in Rwanda. The Section will also describe protected areas, current land uses and trends of environmental and social products and services within the beneficiary provinces in other to assess the additional burden which could be introduced as a result of implementing the Programme.

The emphasis is on biodiversity and tropical forests, but other sectors of the environment such as topography, temperature, rainfall, watersheds, wetland ecosystems, land use (primarily agricultural uses), and energy feature into the discussion of the baseline conditions.

Rwanda, located in Central/Eastern Africa is a densely populated (507 ha/km²) compared to other African countries, with a population of about 12 million people and a total area of 26,338 km². Rwanda is bordered by the Democratic Republic of the Congo (DRC) to the west, Uganda to the north, Tanzania to the east, and Burundi to the south (See Figure 6.1 below).

Figure 6.1: Geographical Location of Rwanda



6.1 TOPOGRAPHY

Rwanda's relief can be divided into four broad categories: the Congo-Nile Ridge, the Central Plateau, the lowlands of the East and the Bugarama plains.

The Congo-Nile Ridge is dominated by eight giant volcanoes namely Nyamuragira, Nyiragongo, Mikenso, Karisimbi, Bisoke, Sabyinyo, Gahinga and Muhabura (Mehta and Katee 2005). The tallest of these Virunga volcanoes and indeed the highest point in the country is Mount Karisimbi, whose summit elevation is 4507m above sea level. The altitude of the Central Plateau ranges

between 2000-1500m. The plateau's relief largely consists of steep hills separated by valleys that plunge by depths of between 15-50m.

Owing to the ridge and the plateau's rugged mountainous relief, Rwanda is fondly referred to as 'the land of a thousand hills.'

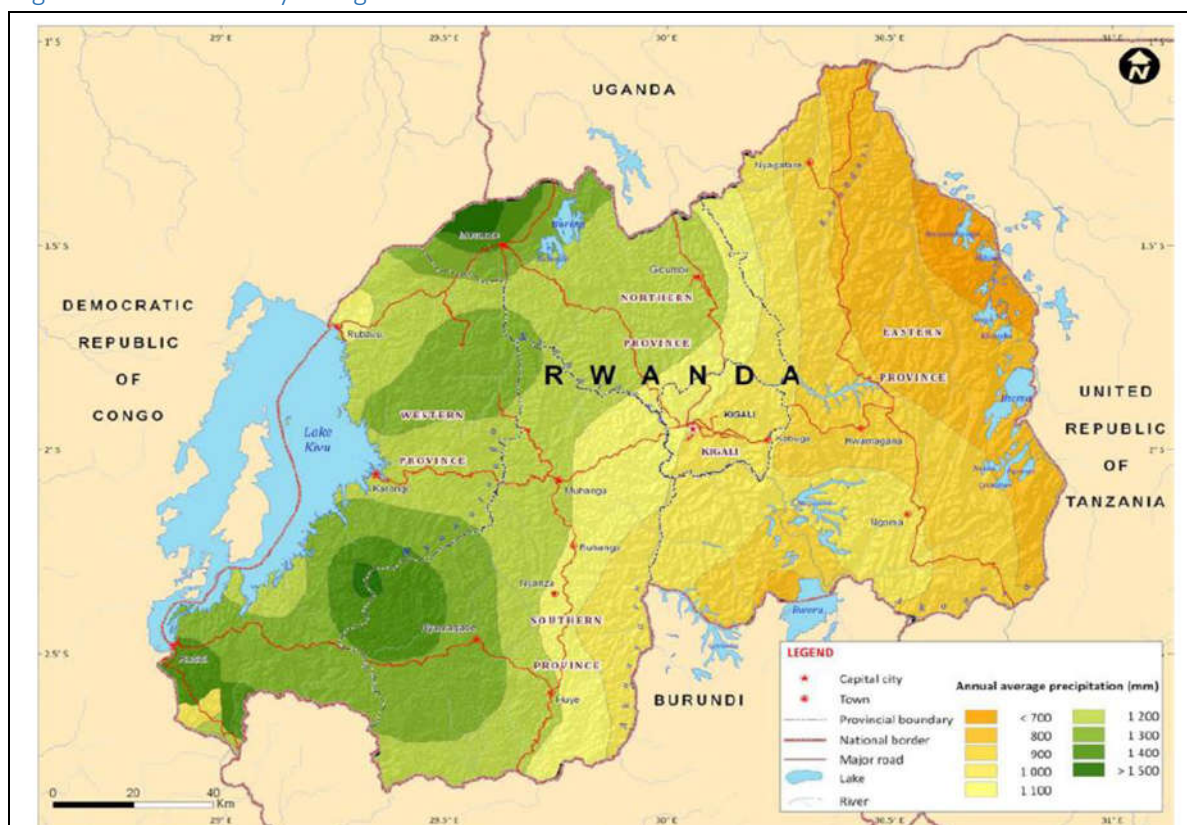
The eastern lowlands are dominated by a depressed relief, whose altitude undulates between 1500m at its highest elevation and 1 100m at its lowest. The Bugarama Plains located in the south west of Rwanda have an altitude of 900 m and are part of the Great Rift Valley.

In general, the Rwanda's topography and local climate is highly sensitive to climate change as the steep, over-cultivated hills and high rainfall give rise to high levels of run-off, erosion and flooding during intense rainfall events that have become more prevalent in the last decade especially in North-Western regions of the country. In addition, the high dependence on biomass fuels further contributes to deforestation and erosion of the hilly landscape.

6.2 CLIMATE

Even though Rwanda is entirely situated within the equatorial zone, it enjoys a moderate tropical climate due to its high altitude, and temperatures average 20°C. Rainfall follows a bimodal cycle although it is generally abundant throughout the year, Figure 6.2 demonstrates the annual average precipitation.

Figure 6.2: Rwanda's hydrological network



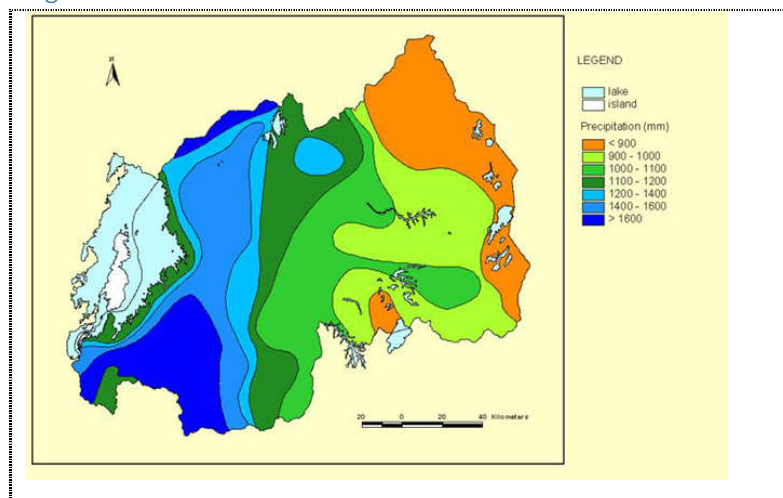
In higher regions of the Congo-Nile divide, temperatures vary between 15°C and 17°C although they are on an upward trend. The volcanoes region has lower temperatures which can dip to as low as 0°C in some areas. In the intermediary altitude zones, temperatures vary between 19°C to 29°C with an average rainfall of about 1000 mm per year. Rainfall here is however less regular, leading to frequent dry spells (RoR/MINITERE 2005).

In the low altitude zones in the east and south east of the country, temperatures tend to be higher and can top 30°C mostly in February, July and August. In fact, the highest temperature ever recorded was 32.8°C registered at Karama Plateau station in south eastern Rwanda on September 4, 1980 (RoR and EU 2006). Temperature variations are comparatively more pronounced in the rest of the country. In addition, rainfall is less abundant in these other regions and ranges between 700 to 970mm per year, considerably less than that received in the volcanoes region. Therefore, Rwanda's climatic conditions and the attendant vulnerabilities to climate change vary spatially and temporally.

6.2.1 Rainfall

The rainfall characteristics for Rwanda are known to exhibit large temporal and spatial variation due to varied topography and existence of large water bodies near the country. However, two rainy seasons are generally distinguishable; one centred on March – May and the other on October – December. For the area of concern, rainfall averages in the range of 900-1200mm/yr, as may be observed from the figure below, in the central region of the country. Figure 6.3 below shows the national rainfall distribution within the country.

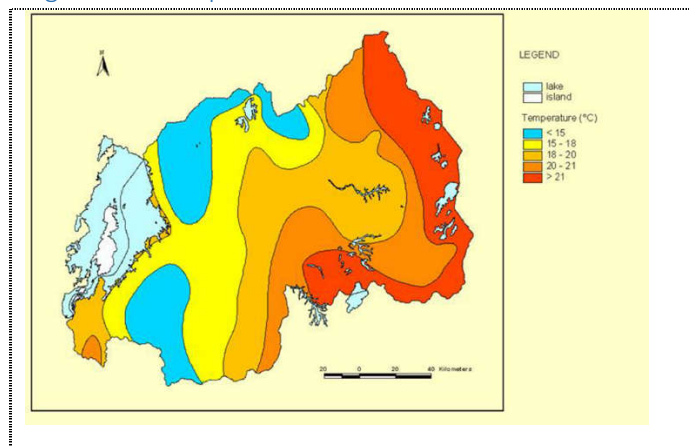
Figure 6.3: Rainfall distribution in Rwanda



6.2.2 Temperature

The average annual temperature for the intervention area of the Eastern Province will rise slightly above 18°C but not exceeding 25°C, during the dry season, while it might drop to 15°C in the wet season as the figure below indicates. Figure 6.4 overleaf indicates the temperature distribution within country and notably with the beneficiary provinces of the proposed programme.

Figure 6.4: Temperature distribution in Rwanda



6.3 WATERSHEDS AND WETLAND ECOSYSTEMS

6.3.1 Watersheds

Rwanda is endowed with abundant water resources distributed in a very dense hydrological network consisting of 101 lakes covering 149,487 ha, 860 marshlands covering a total surface of 278 536 ha and 861 rivers with a combined length of 6 462 km (REMA, 2008).

The country is split into two hydrographical basins by a landmark line of waters known as the Congo-Nile divide that runs from the north to the south of the country. The Congo-Nile divide is roughly perpendicular to the volcanoes line which serves as a natural barrier to the catchment basins of Rwanda, North Kivu and those of southwest Uganda (Harper and others, 2008). To the east of Congo-Nile divide lies the Nile basin which covers 67% of the total national territory and drains 90% of Rwandan waters through two main rivers. These are the Nyabarongo and Akagera (Harding, 2009). The latter is the main tributary of Lake Victoria with an average flow of 256 m³/s and is considered to be the main source of the White Nile. The White Nile and the Blue Nile are the main tributaries of the 6 695 km Nile River, the world's longest watercourse. The Rwandan portion of the Nile basin includes many small lakes such as Bulera, Ruhondo, Cyohoha South, Mugesera, Muhazi, Rwampanga, Mihindi and Mirayi. These lakes are mostly shallow (with depths of between 5 and 7m) except Lakes Bulera and Ruhondo which are 50 to 70m deep (RoR/MINITERE, 2005).

The Congo basin is situated to the west of the Congo-Nile divide. Although it covers the remaining 33 per cent of Rwandan territory, it only drains 10 per cent of the country's water resources. The basin comprises Lake Kivu and some smaller rivers such as Sebeya, Koko, Rubyiro, Ruhwa and Rusizi. Lake Kivu is itself shared with the DRC and covers an area of 102800 ha within Rwanda alone.

Average flows through hydrological stations are 73m³/s (Nyabarongo at Kigali), 100 m³/s (Nyabarongo at Kanzenze), 232 m³/s (Akagera at Rusumo) and 256 m³/s (Akagera at Kagitumba).

During high waters, there is a serious risk of flooding (RoR/ MINITERE 2005), a risk that is likely to increase by climate change unless effective mitigative and adaptive mechanisms are formulated.

Figure 6.5 overleaf shows the hydrological network within Rwanda.

Figure 6.5: Rwanda's hydrological network



6.3.2 Wetland Ecosystems

Rwanda's wetlands are extremely important. They act as a buffer in flood or overflow plains, reducing maximal flow rates during the rainy season and maintaining relatively high flow rates during the dry season.

Natural vegetation covers 41% of the marshes while 53% is covered by fields and 6 per cent lies fallow. The marshlands are complemented by 101 lakes which collectively cover an area of 149 487 ha and 861 rivers with a combined length of 6 462 km (REMA 2009). The best known of Rwanda's wetlands is the Rugezi-Bulera-Ruhondo wetland complex which was designated by Ramsar as a wetland of international importance in December 2005.

The wetlands' aquatic vegetation which in Rwanda mostly consists of Typha, Papyrus, Miscanthus and Cyperus, slows the flow of water, cushioning landscapes from top soil erosion and rivers and lakes from flooding during heavy rainfall. Equally important, because they serve as terrestrial carbon reservoirs, they help to stabilize the climate and attenuate climate change (Mitra and others 2005).

With more than 104 flower species, wetlands and aquatic ecosystems are rich in biodiversity but some lakes such as Kivu, Bulera and Ruhondo are poor in macrophytes (MINITERE, 2003a). The richest wetlands in term of biodiversity are Akagera and associated lakes, Akanyaru-Nyabarongo and associated lakes, Kamiranzovu (part of Nyungwe National Park) and Rugezi marshlands which is a Ramsar site (MINIRENA, 2008). Crocodiles, varans and snakes are also well represented in lakes and marshlands of Akanyaru complex, while wetlands around Nyabarongo and Akagera National Park are especially rich in fauna.

The country's wetlands are legally protected: by (1) Organic Law N° 04/2005 determining the modalities of protection, conservation and promotion of the environment, (2) Ramsar Convention, 2003, (3) Ministerial Order N° 008/16.01 dated October 13, 2010 establishing the list of Rwanda's swamps, their geographic limits and regulating their management and use. Despite their important role and the strict legal regime, Rwanda's wetlands continue to be lost to fallow fields, afforestation, pisciculture (fish-farming), human settlement and to agriculture.

6.4 PROTECTED AREAS AND FORESTS

Forests provide ecosystem services and products such as protection of water catchments, regulation of water flow, influencing climate, protection against soil erosion, water purification, food, wood for fuel and construction, tourism, non-timber forest products including medicine plants, honey and handcrafts. The role of forests in preserving ecological balance is particularly important in Rwanda. They contribute greatly to watershed protection against erosion, thus making agriculture viable and covering the daily basic needs for wood for more than 96 per cent of the country's population.

6.4.1 Status of Forestry Resources in Rwanda

Rwanda forests and woodlands can be classified into four categories: the natural forests of the Congo Nile Ridge comprised with Nyungwe national park Gishwati, and Mukura; the natural forests of the Volcanoes national park; the natural forests in the savannah and gallery forest of the Akagera national park and remnants of gallery-forests and savannahs of Bugesera, Gisaka and Umutara; and forest plantations dominated by exotic species (*Eucalyptus sp*, *Pinus sp*, *Grevillea robusta*) and trees scattered on farmlands (agroforestry) and along anti-erosion ditches.

Statistical information on forest cover in Rwanda is varied and contradicting figures are reported by several authors, mainly because no thorough forest inventory has ever been carried out in the country (SSEE & ROR, 2011; ROR, 2010; FAO, 2002, 2005, 2010; GTZ, 2008; etc.).

The first national forest inventory was carried out in 2007 by Agricultural Research Institute of Rwanda (ISAR) and Centre for Geographic Information Systems of the National University of Rwanda (CGIS-NUR) and involved only forest areas larger than 0.5 ha due to relatively low resolution of the satellite images used [Landsat (30 m), Aster (15 m) and SPOT (10-20 m)] and financial constraints (MINIRENA/CGIS-NUR, 2007).

This inventory was therefore incomplete because it left out smaller woodlots (< 0.5 ha). In a recent study, FAO (2010) reported that small woodlots and tree resources outside forest (TROF)

cover around 6.6% of the country's land area. The forest mapping also considered only forested areas with more than 10% crown cover and tree height greater than 7m (MINIRENA/CGIS-NUR, 2007). The following table shows the forest cover areas as mapped by CGIS-NUR in 2007 and Figure 6.6 illustrates the forest cover map (> 0.5 ha; 10% crown cover with trees greater than 7m height) of Rwanda in 2007.

Figure 6.6: Rwanda's forest cover map



The dominant softwood timber species is *Pinus patula*. However, there are a few plantations with other *Pinus* species such as *Pinus oocarpa*, *P. radiata*, *P. elliottii* and *P. kesiya*. The other softwood timber species (but also for household fencing) that was abundant before the attack by *Cinara cupressii* aphids in 1988 is *Cupressus lusitanica*.

Other exotic species frequently found either in pure or mixed plantations and agroforestry include: *Acacia melanoxylon* (most abundant in plantation), *Callitris robusta*, *Grevillea robusta* (mainly in agroforestry), *Casuarina equisetifolia*, *Cedrela serrata*, *Alnus acuminata*, *Maesopsis eminii*, *Acacia mearnsii* and recently in agroforestry systems *Senna spectabilis*, *Senna siamea*, *Leucaena leucocephala*, *Croton megalocarpus* and *Calliandra calothyrsus*. Some of the indigenous species in plantations include *Entandrophragma excelsum*, *Podocarpus falcatus*, *Markhamia lutea* (or *platicalyx*), *Symphonia globulifera*, *Polyscias fulva* and *Prunus africana*.

Rwanda's forests continues to be under threat from various human drivers such as agriculture, human settlement, illegal logging, charcoal production, bush fires, and climate change. Statistics show that natural vegetation, including forests, plummeted by 59.4% from 6340 km² in 1960 to

2575 km² in 2010. Akagera National Park's forest cover plunged by 53% from 2410km² in 1999 to 1121km² in 2010. This was largely because a large portion was used to resettle returning Rwandans who had lived as refugees mostly in neighboring countries for over 3 decades (Havugimana, 2009).

6.5 BIODIVERSITY

Although Rwanda is a small country, it has a remarkable variety of ecosystems and of flora and fauna. Its location at the heart of the Albertine Rift eco-region in the western arm of the Africa's Rift Valley is a contributory factor. This region is one of Africa's most biologically diverse regions. It is home to some 40 per cent of the continent's mammal species (402 species), a huge diversity of birds (1,061 species), reptiles and amphibians (293 species), and higher plants (5,793 species) (Chemonics International Inc. 2003, MINITERE 2005).

6.5.1 Ecosystem and habitats

The Albertine Rift is considered to have the highest species richness in Africa. It is considered a biodiversity hotspot containing more endemic mammals, birds, butterflies, fish and amphibians than anywhere else in Africa. Habitats supporting such an array of biodiversity are very varied. Being at the heart of the Albertine Rift, Rwanda's habitats are equally varied, ranging from afro-montane ecosystems in the northern and western regions to lowland forests, savannah woodlands and savannah grasslands in the southern and eastern regions. There are other habitats around volcanic hot springs and old lava flows, especially in the northern and western part of the country. Rwanda also has several lakes and wetlands which are rich in different species. Though not yet well surveyed, all these ecosystems host a rich variety of fauna and flora and micro-organisms.

Besides these natural ecosystems, as an agrarian country, Rwanda agro-ecosystems comprise cultivated land, agro-pastoral areas, grassland, grazing and fallow land (MINITERE 2003a).

6.5.2 Species Diversity

Flora

Rwanda harbours very diverse flora due to a considerable geo-diversity and a climatic gradient from west to east. The number of vascular plants is estimated at around 3000 species originating from the different bio-geographical regions (Fischer and Killmann 2008).

Rwanda constitutes the eastern limit for plants from the Guineo-Congolian region. An example of these plants is the *Thonningia sanguinea* (Balanophoraceae), widespread in Western and Central Africa. It is only found in the Cyamudongo forest in western Rwanda. Plants from the afro-montane region are confined to higher altitudes, such as the orchid *Disi robusta* found in Nyungwe forest. The Eastern African savannah elements comprise the Zambezi floral region, and most these plants are found in the Akagera National Park and its surroundings (Fischer and Killmann 2008).

About 280 species of flowering plants from Rwanda are considered to be endemic to the Albertine Rift. Of these endemic species, about 20 are restricted to Rwanda, 50 species confined to Rwanda and Eastern Congo and 20 species found only in Rwanda and Burundi. Twenty one species are found additionally in the forests of western Uganda, eastern Congo, Rwanda and

Burundi. Examples of these distribution types are *Impatiens bequaertii* (Balsaminaceae), *Impatiens mildbraedii* (Balsaminaceae), *Monathotaxis orophila* (Annonaceae) or *Liparis harketii* (Orchidaceae) (Fischer and Killmann 2008).

Rwanda has 56 local endemic flowering plants, out of which 47 are confined to Nyungwe National Park (including Cyamudongo forest). Examples of these plants are the recently discovered species *Impatiens nyungwensis* Eb.Fisch., Detchuvi & Ntaganda, (Balsaminaceae) *Afromomum wuertii* Detchuvi & Eb. Fisc (Zingiberaceae), *Diaphananthe delepierreana* Lebel & Geerinck (Orchidaceae) and *Ypsilopus liae* Delpierre and Lebel (Orchidaceae) all endemic to Nyungwe National Park (Fischer and Killmann 2008). The number of these newly discovered species shows that the number of plant species found in Rwanda is far from being totally known.

The afro-montane ecosystems comprised of the Volcanoes and Nyungwe National Parks, Gishwati and Mukura Natural Forests, and other small forests found at the Congo-Nile Ridge, is varied and rich in plant species.

The biodiversity in the lowlands of the eastern part of Rwanda comprises mainly savannah with grasses, bushes and trees, mountain rainforests in the Akagera National Park and gallery forests in the eastern part of Rwanda. Gallery forest around lakes and other water bodies are mainly found in the Akagera complex, where they cover almost 163 hectares (Twarabamenye and Gapusi 2000 in MINITERE 2003a). The flora of these forests comprise 66 species including *Acacia kirkii*, *Acaccia polycantha*, *Acacia sieberana*, *Albizia gummifera*, *Cordia Africana*, *Crotonmacrostachis*, *Dombeya burgessia*, *Dombeta kirkii*, *Erythria absysniica*, *Newtonia buchananii* and *Techlea nobilis*. There are also some rare or threatened species such as *Impatiens irvingii*, *Markhamia lutea*, *Eulophia guineensis* and *Pterygota mildbraedii*, considered a fossil plant (MINAGRI 1998).

Most of the plant species found in these forests are used in traditional medicine and some plants reveal important biochemical extracts. This is the case with *Blighia unijugata*, *Grewia forbesi*, *Rhus vulgaris*, *Pterygota mildbraedii* and *Ficus* species (MINITERE 2003a).

With more than 104 flower species, wetlands and aquatic ecosystems are also rich in biodiversity. Some lakes such as Kivu, Bulera and Ruhondo are poor in macrophytes (MINITERE 2003a).

About 50 species of plankton are found in these ecosystems distributed in the following families: Chlorophyceae, Cynophyceae, Pyrophytes, Bacillariophyceae, Cynophyceae

Fauna

Rwanda shelters 151 different types of mammal species, eleven of which are currently threatened and none of which are endemic. Among them are the primates (14 to 16), with half of the remaining world population of mountain gorillas (*Gorilla gorilla berengei*). The gorillas are found in the Volcanoes National Park. Others includes the owl-faced monkey (*Cercopithecus hamlyni*), the mountain monkey (*Cercopithecus hoesti*) in Nyungwe, the Chimpanzee (*Pan troglodytes*) in Nyungwe and Gishwati, and the Golden monkey (*Cercopithecus mitis kandti*) found in Volcanoes National Park.

There are also 15 species of antelope, and a wide diversity of species such as buffalo, zebra, warthog, baboon, elephant, hippopotamus, crocodile, tortoise and rare species such as the giant pangolin (Chemonics International Inc. 2003, MINITERE 2005).

Rwanda is one of the top birding countries with 670 different birds having been recorded. Four of species of birds in Rwanda are threatened with extinction: the shoebill (*Balaeniceps rex*) found in Akagera; Grauer's rush warbler (*Bradypterus graueri*) found in Volcanoes National Park in Nyungwe and in the swamps of Rugezi; the Kungwe apalis (*Apalis argentea*) found in Nyungwe; and the African or Congo barn owl (*Phodilus prigoginei*) found along Lake Kivu (Chemonics International Inc. 2003).

Animal races bred in Rwanda are mixed with native and non-native races. These include cattle (*Ankole*, *Sahiwal*, *Frison*, *Alps brown* and the *Australian Milk Zebu*), goat (*Alpine* and *Anglonubian*), sheep (*Karakul*, *Merinos* and *Dorper*), pig (*Large white* and *Landrace*, *Piétrain*), poultry (*Leghorn*, *Rhodes Island Red*, *Derco*, *Sykes* and *Anak*), fish (*Tilapia* and *Clarias*) (MINITERE 2003 a).

Fish species found in aquatic ecosystems comprise *Haplochromis*, *Synodontis*, *Barbus*, *Labeo*, *Tilapiines*, and *Clarias* species. *Raimas moorei* and *Limnothrissa miodon* were introduced into Lake Kivu at the end of the 1950s (MINITERE 2003a).

6.5.3 Status of biodiversity conservation

This rich biodiversity is mainly conserved in protected areas (three national parks, natural forests, wetlands). These cover almost 10 per cent of the national territory while the rest of the country is densely populated.

Volcanoes National Park is home to about 30 per cent of the global population of Mountain Gorilla (*Gorilla gorilla beringei*). It has other 115 mammals' species, including the golden monkey (*Cercopithecus mitis kandti*), elephants, buffaloes, 187 bird species, 27 species of reptiles and amphibians and 33 arthropod species. CITES consider *Rana anolensis*, *Chameleo rudi* and *Leptosiphos grauer* endangered (MINAGRI 1998, Chemonics International Inc. 2003). It has also 245 plants, 17 of which are threatened; and 13 species of orchids including *Disa starsii*, *Polystachya kermessia*, *Calanthes sylvatica*, *Chamaengis sarcophylla*, *Cyrtorchis arcuata*, *Habenaria praestans*, *Stolzia cupuligera*, *Eulophia horsfallii*, among others (Chemonics International Inc. 2003).

Nyungwe National Park has 75 species of mammals, including 13 species of primates with some on the IUCN Red list such as the Eastern Chimpanzee (*Pan troglodytes schweinfurthii*), owl-faced guenons, (*Cercopithecus hamlyni*) and the Angolan Colobus monkey (*Colobus angolensis ruwenzorii*). The national park is also considered an African Important Bird Area (IBA) with 285 bird species comprising 25 endemic to the Albertine Rift (Plumptre *et. al.* 2002, Fischer and Killmann 2008). Of the 1,200 plant species inventoried in the Nyungwe National Park - 265 species were trees and shrubs and of these 24 are endemic to the Albertine Rift. Among the plant species in the park, 5 species of trees and 6 species of grass are endemic to the park. These include *Oricia renieri*, *Pentadesma reyndersii*, *Pavetta troupinii*, *Psychotria palustris* and *Tarenna rwandensis*. The flora of the park also comprises 148 species of orchids, of which 19 are

endemic (MINITERE 2005). The following species of orchids found on the CITES list are also found in the park: *Diaphananthe biloba*, *Disa eminii*, *Disperis kilimanjarica*, *Euggelingia ligulifolia*, *Eulophia horsfallii*, *Polystachya fabriana*, *Polystachya hastate* and *Tridactyle anthomaniaca* (MINITERE 2005).

The wildlife in the **Akagera National Park** comprises 90 species of mammals, 530 bird species and 35 fish species. The most threatened species are rhinoceros, large carnivores, particularly lions. Many species in the Akagera National Park are protected by the CITES convention such as *Loxodonta africana* (African elephant), *Sincerus caffer* (buffalo), *Panthera leo* (leopard) and *Tragelaphus spekii* (sitatunga). (MINITERE 2003a, MINITERE 2005). The flora of the Akagera National Park is diverse and 6 species of orchids are recorded. The grass savanna is dominated by *Themeda triandra* and *Hyparrhenia* sp. accompanied with normal species like *Sporobolus pyramidalis* and *Botriochloa insculpta*. Acacias are the most trees found in the forest savannah, and the following species are recorded: *Acacia senegal*, *A. Sieberiana*, *A. polyacantha campylacantha*, *A. gerardii* and *A. brevispica*. Species of *Combretum* are also found in the park (MINITERE 2005).

Gishwati forest includes species such as *Pan troglodytes schewinfurthii*, *Colobus angolensis ruwenzorii*, *Potamochoerus porcus*, *Cephalophus nigrifrons*, *Dendrohyrax arboreus*, *Felis serval* and *Felis aurata* (MINAGRI, 2002 in Munanura et. al, 2006). The Tree squirrel (*Funisciurus pyrropus*), Rwenzori sun squirrel (*Heliosciurus ruwenzori*), Ground hog (*Thryonomys swinderianus*) and the jackal species (*Canis spp.*) are found in Mukura forest. Makura is also rich in birds with 59 species recorded, among them 7 Albertine Rift endemic species: *Tauraco johnstoni*, *Apalis personata*, *Apalis Ruwenzori*, *Cynnyris regia*, *Zoothera tanganjicae*, *Bradypterus graueri* and *Parus fasciiventer* (Munanura et. al. 2006).

Rugezi wetland is habitat to an endangered bird and hosts 60 per cent of the global population of Grauer's swap-warbler (*Bradypterus graueri*). It is also habitat to 19 bird species, including two species of *Threskiornithidae*, protected by CITES. Apart from *Clarias liocephalus* and *Haplochromis sp.*, the wetland is not rich in fish species. A low number of mammals are also identified: several species of *Muridae*, *Tragelaphus spekei* and *Aonyx capensis*. (MINITERE 2003a). The orchid *Disa stairsii*, a specie protected by CITES is also found in Rugezi wetland (MINITERE 2003b).

With the highest population density in Africa, coupled with its dependence on agriculture, the major threats to the biodiversity and genetic resources in Rwanda are mainly linked to population pressure and the problem of land scarcity. Other threats to the biodiversity are linked to human activities such as loss of habitat by conversion of natural habitats, mining, agriculture and the introduction of alien species.

Meanwhile, recent programmes and initiatives of afforestation, soil erosion prevention and wetlands protection will contribute to Rwanda biodiversity protection. Rwanda has set up strategies to improve Rwanda's biodiversity like: Improvement of the policy, legislation and institutional framework for biodiversity conservation and Improvement of the biodiversity knowledge base.

6.6 AGRICULTURE AND FARMING SYSTEMS

Although Rwanda aims to become a service-led economy, the agricultural sector is expected to keep contributing significantly to the country's long term development process.

Because so many livelihoods depend on agriculture, factors linked to agriculture such as lack of adequate land or non-productive soils are widely seen as a major cause of poverty and hindrance to economic development.

The main food crops are bananas, beans, sorghum, sweet potatoes, Irish potatoes, cassava, maize, and rice. Vegetable crops are mainly tomatoes, cabbages, and peas. Crop yields are generally low, but the agro-diversity present in Rwanda is greater than in many other parts of Africa. Commercial crops such as coffee, tea, pyrethrum, and cut flowers also provide important cover and protection functions.

Animal husbandry, especially cattle raising, is an important component of the farming systems in the country. The main areas are the eastern province and southern province. The use of animal manure from cattle and other livestock figures prominently into the farming systems and are important for fallow (when there is that opportunity) and for returning nutrients to soils that become exhausted due to the cultivation intensity.

For the most part, agriculture lands do have a fairly continuous cover, and crop rotation is widely practiced. Without it, the soils would produce even less, and the steep slopes would erode more quickly and more severely than they do today. Over-cultivation, rather than erosion, appears to be a main factor in declining soil fertility (IISD, 2005) and agricultural productivity. Rwanda has recently embarked on a nationwide program to improve and retain its agricultural soils through an active terracing campaign and trees planting.

6.7 LAND USE

Rwanda is a small country with total arable land of about 1.4 million ha. In addition, lands in Rwanda are used for pasture or exploited as arable marshlands. Given a growing population combined with strong reliance on agriculture, it is clear that land is one of the scarcest resources in Rwanda.

The average size of land cultivated per rural household has decreased in five years in all provinces except the Southern Province, where it was already lowest out of all provinces five years ago. The important point to note here is that, in provinces other than the Southern Province, land cultivated per household has reduced between surveys, but it is now on average around 0.5ha across all provinces except Eastern Province – exactly the level at which no further reduction was observed in the Southern Province over the last five years.

If the interpretation holds that below this level no further land sharing is possible, Rwanda might see a lot more young individuals without access to land in the Southern, Western and Northern provinces in the coming years. This possibility is further supported by the fact that the proportion of households cultivating less than 0.3ha has not changed much between the surveys, suggesting that there is a minimum amount of land under which no further sharing is possible if households wish to sustain themselves through agriculture.

It is of course clear that all data on land must be interpreted carefully in the light of the various government programmes of land consolidation, rehabilitation and registration that have been implemented over the past years.

6.8 DEMOGRAPHY

Rwanda has a fast-growing population which totaled 10,515,973 people in 2012. It is obvious that population growth is contributing to environmental degradation, putting increased pressure on the assimilative capacity of the environment

Rwanda has one of the highest population densities in Africa with 414 inhabitants per square kilometer. By Province, Kigali City is the most densely populated with 1,552 inhabitants per square kilometer, followed by the Northern Province with 527 inhabitants per square kilometer. The Eastern Province is the less densely populated Province with 274 inhabitants per square kilometer.

Population density is high in all Districts but varies tremendously from one District to another. The least densely populated Districts are found in the Eastern Province (178 in Kayanza, 280 in Bugesera). The most densely populated Districts are the Kigali City's ones: Nyarugenge (2,124), Kicukiro (1,911) and Gasabo (1,234). Rubavu in the Western Province has the highest population density outside Kigali City with 1,039 inhabitants per square kilometer. The population density which was already high in 1978 (183 inhabitants per square kilometer) has more than doubled in 34 years, reaching 414 inhabitants per square kilometer in 2012.

6.9 HOUSING AND URBANIZATION

The most common type of habitat in Rwanda is the clustered rural settlement (known as Umudugudu). Overall 46.5% of the private households are of that type. It is followed by dispersed/isolated housing (34%) and spontaneous/squatter housing (14%).

The type of habitat varies a lot across Provinces. The clustered rural settlement is more prevalent in the Eastern Province (76%) with more than 90% of the housing being of that type in the Districts of Ngoma (91%) and Kirehe (98%). It is least common in Kigali City (2.5%). The dispersed/isolated housing is more frequently found in the Western Province (47.5%) and rarer in the Eastern Province (15%). As for the spontaneous/squatter housing, it is more common in Kigali City (66%) and rarer in the Northern Province (5.4%).

The type of habitat varies according to the area of residence. The spontaneous/squatter housing is more common in urban areas (58%) with percentages slightly exceeding 10% for clustered rural settlement (17%), planned urban housing (11%) and dispersed/isolated housing (11%). Rural areas are dominated by clustered rural settlement (53%) and dispersed/isolated housing (38%).

6.10 WATER, SANITATION AND ENERGY IN THE HOUSING UNITS

6.10.1 Water

In Rwanda 72% of the private households use water from improved sources (Internal pipe born water, protected spring/well) vs. 27% resorting to unimproved sources (Unprotected spring/well, other).

At the Province level, the proportion of the private households using water from improved sources is higher in Kigali City (89%), in the North (77%) and in the South (76%). It is the lowest in the Eastern Province (59%).

Variation by District is associated with the level of urbanization. Access to improved sources of water are better in most urbanized Districts (in Kigali City for instance) and poorer in the most rural Districts (in the East for instance).

The main source of water used by the private households varies according to the area of residence. In urban areas, the main sources of water supply are the public tap out of the compound (45%), the pipe-born water in the compound (35%) and the protected spring/well (11%). In rural areas, the main sources of water supply are the protected spring/well (43%), the public tap out of the compound (25%) and the unprotected spring/well (15%).

6.10.2 Sanitation

At the national level the main types of toilet facility used by the private households are private pit latrine (82%) and shared pit latrine (12%). Only 0.8% of the households are equipped with flush toilet/WC system.

At the Province level, the proportion of households using private pit latrines is the highest in all provinces of the country. It is 50% in Kigali City and varies between 84% and 91% for all other Provinces. In Kigali City the proportion of households using shared pit latrines is the highest (41%) as compared to other Provinces where it varies between 5% and 10% only.

The type of toilet facility used in the private households varies according to the area of residence. In urban areas, the most used types of toilet are private pit latrine (58%) and shared pit latrine (37%). In rural areas, the main type of toilet used is the private pit latrine (89%) and to a lesser extent the shared pit latrine (8%).

6.10.3 Energy

In Rwanda the main sources of energy for lighting used by the households are kerosene lamp (40%), electricity (17.4%), candle (10%) and firewood (8%). However a high percentage of the households (24%) use an unspecified source of energy for their lighting.

At the province level, the percentage of the private households that use kerosene lamp for lighting is higher in Eastern (53%) and Southern Province (47%), and lowest in Kigali City (16%). The percentage using electricity for lighting is higher in Kigali City (67%) than in other provinces where it varies between 8% (in the South) and 13% (in the East).

The percentage of the private households using firewood for lighting is higher in the Southern Province (11%), especially in the Districts of Nyaruguru (35%) and Nyamagabe (23%); and in

Western Province (17%), especially in the Districts of Ngororero (27%), Rutsiro (24%) and Nyabihu (23%).

The sources of energy for lighting vary by area of residence. In urban areas, the main sources of energy for lighting are electricity (68%), kerosene lamp (18%) and candle (10%). In rural areas, the main sources of energy for lighting are kerosene lamp (44%) and other unspecified sources (28%). Other sources of energy are used by non-negligible percentages of the rural households: candle (10%), firewood (9%) and electricity (7%).

At the national level the main sources of energy for cooking used by the private households are firewood (82%) and charcoal (13%), and to a lesser extent grass/leaves (3%).

At the Province level, the percentage of private households using firewood for cooking is higher in all provinces of the country with proportions varying between 88% (in the Northern Province) and 92% (in the Southern Province). It reaches its lowest level in Kigali City (27%).

The percentage of the private households using charcoal for cooking is higher in Kigali City (67%) than in the other Provinces where it varies between 5% (in the Southern, Northern and Eastern Provinces) and 8% (in the Western Province). There are significant percentage of private households using grass/leaves for cooking, especially in the Districts of Burera (13%), Gicumbi and Gatsibo (6% respectively) and Rulindo (5%).

The main sources of energy used by the private households for cooking vary by area of residence. In urban areas, private households use more charcoal (63%) and firewood (32%). In rural areas, households use mainly firewood (93%) for cooking.

At the national level, one third of the households (34%) have and use energy-saving stove. Possession and use of energy-saving stove is much more common in rural areas (37%) than in urban areas (19%).

Male-headed households use slightly more energy-saving stoves than female-headed ones (35% vs. 32%).

Use of energy-saving stove varies a lot by Province; from 10% of the households in Kigali City to 42 in the West. The percentage is similar in the three remaining Provinces (33% to 37%).

Within the Provinces, the use of energy-saving stove varies a lot by area of residence and slightly by the sex of the household head as at the national level.

The variation by District is linked to the level of urbanization of the Districts; the less urbanized the Districts are, the higher is the percentage of their households using energy saving stoves.

6.11 EDUCATION

6.11.1 Highest level of education

Results from the RPHC4 show that about 57% of the resident population aged three and above, had attended primary school, 12% had attended either post-primary or secondary school and

about 2% had tertiary education. While about 26% of the resident population had never attended school, a comparison of the RPHC4 results with previous censuses indicates that the general picture of access to education is improving in Rwanda, in terms of expanding it as well as reducing disparities at the sub-national level, most notably gender disparities.

The percentage of the population aged seven and above who had never attended school decreased from 61% in 1978 to 19% in 2012.

In the same period, the percentage of the population aged seven and above with higher levels of education (post-primary, secondary and university) also increased from about 3% in 1978 to about 16%.

The gender gap has been diminishing consistently. For instance, among those with no education, the gender gap stood at 17% (70% among females and 53% among males) in 1978 as compared to just 7% (22% among females and 15% among males) in 2012. Similarly, among those who had attended primary school, the gender gap stood, in 1978, at 17% (45% among males and 28% among females) compared to just 4 % (66% among males and 62% among females) in 2012.

6.11.2 Literacy

About 68% of the population aged 15 and above is able to read, write and understand in at least one language. About 49% is literate in Kinyarwanda only. 7% of this population is literate in both Kinyarwanda and English while about 6% is literate in Kinyarwanda, English and French. Overall, adult literacy rates are higher among urban residents (about 82% in urban areas versus 65% in rural areas) as well as among males (about 72% among males versus 65% among females).

7. NATIONAL ENV & SOCIAL POLICIES AND SYSTEMS

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

7.1 NATIONAL LEGISLATION AND STANDARDS

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

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

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

7.1.1 National Policy on Environment (NPE)

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

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

- It is every person's right to live in a safe and stable environment, but on the other hand, they must keep it salubrious;
- The national economic growth must be based on rational use of resources and take into account environmental dimensions;
- Active and effective participation of the whole population for environment protection and management;

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

7.1.2 Energy Policy

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

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

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

1. Have affordable and reliable energy supplies country wide;
2. Reform the market for energy services and establishes an adequate institutional framework, which facilitates investment, expansion of services, efficient pricing mechanisms and other financial incentives

3. Enhance the development and utilization of indigenous and renewable energy sources and technologies,
4. Adequately take into account environmental considerations for all energy activities,
5. Increase energy efficiency and conservation in all sectors; and
6. Increase energy education and build gender-balanced capacity in energy planning, implementation and monitoring.

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

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

7.1.3 Regulatory Framework of Rwanda

Constitution of Rwanda

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

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

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

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

Organic Law on Environment

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

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

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

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

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

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

Other national environmental related regulatory instruments

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

7.1.4 Environmental Assessment Procedures and Guidelines in Rwanda

EIA Guidelines

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

identification phase, based on REMA's guidelines projects are categorized in one of the following three categories:

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

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

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

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

7.1.5 Law n° 32/2015 of 11/06/2015 relating to expropriation in the public interest

This Law determines procedures relating to expropriation in the public interest and provides that only the Government shall order expropriation in the public interest. Expropriation as provided for under this Law shall be carried out only in the public interest and with prior and fair compensation.

The law defines the activities or projects that can be classified as public interest and process and requirements for expropriation activities as well as the cost for goods and other infrastructure to be expropriated. Electrification and construction of transmissions lines are among the project defined as being of public interest.

The law states that the approved fair compensation shall be paid within a period not exceeding one hundred and twenty (120) days from the day of its approval by the District or City of Kigali Council or the relevant Ministry. If fair compensation is not paid within the period provided under Paragraph One of this Article, expropriation shall become null and void unless otherwise agreed upon between the expropriator and the person to be expropriated.

7.1.6 Environmental Impact Assessment Regulations, 2006

REMA has now developed the EIA regulations which provide a guide and requirements for EIA in Rwanda. According to these new regulations, Article 1 makes it mandatory for all the projects listed under schedule I to be subjected to a full scale EIA.

The Article further states that no environmental authorization shall be granted by the Authority for any project in Schedule I to these Regulations if no environmental impact assessment has been submitted to the Authority in accordance with the provisions of these Regulations. The Article states that any project listed under Impact Level III of Schedule I to these Regulations shall

require a full environmental impact assessment by preparation of an environmental impact report, unless the Authority refuses permission.

7.1.7 Ministerial order N° 003/2008 of 15/08/2008 relating to the requirements and procedure for Environmental Impact Assessment

Article 1 stipulates that Environmental Impact study is a systematic way of identifying environmental, social and economic impacts of a project before a decision of its acceptance is made. In article 3, the developer submits an official application which includes a project brief of the proposed project to the authority. Article 4 specifies that within thirty (30) calendar days after receipt of the project brief and after its analysis, the Authority shall submit the Terms of reference to the developer for the Environmental impact study.

7.1.8 Ministerial order N°008/MINIRENA/2015 of 18/06/2015 establishing a list of protected trees

This order establishes a list of protected trees in a state, district or a private forest and isolated species of trees. It further provides a list of protected trees that are composed of trees that should not be cleared due to one (1) of the following reasons: being a disappearing tree species, being trees that are rarely found in a few parts of the world, endemic trees of Albertine rift and rare trees endemic of Rwanda, being a medicinal tree; being trees used in the development activities and which takes above twenty (20) years to reach the harvesting maturity; being cultural related trees; being a tree protected at the international level; any other reason that may be determined.

7.1.9 National Land Law

Land ownership in Rwanda is determined by the Organic law N°08/2005 of 14/07/2005 determining the use and management of Land in Rwanda. It also institutes the principles that are respected on land legal rights accepted on any land in the country as well as all other appendages whether natural or artificial. The Law provides the definitions of some key words:

- Construction area is an area purposely for human settlement, trade and industries, an area reserved for recreation and other basic activities of public utility.
- Area not for construction is an area reserved for agriculture, afforestation, grazing, reserved tourist places and recreational gardens.
- The ownership of Land is determined by article 4, which announces that, any person or association with legal personality has the right over the land and to freely exploit it as provided for by this organic law in article 5 and 6

7.1.10 National Policy on EIA

The Constitution of the Republic of Rwanda, adopted in June 2003, ensures the protection and sustainable management of environment and encourages rational use of natural resources. Organic Law (No. 04/2005 of 08/04/2005) and various socioeconomic development policies and strategies such as “Rwanda Investment and Exports Strategic Action Plan, 2005-2007” and “Vision 2020” call for a well regulated environment management system that takes into account principles of sustainable development while at the same time contributing to poverty reduction.

The Organic Law (Article 67) requires that projects, programmes and policies that may affect the environment shall be subjected to environmental impact assessment before obtaining

authorization for implementation. Article 69 gives REMA legal authority to oversee the conduct of EIA.

EIA is an invaluable tool for environmental management in a trans-boundary context, playing role in information dissemination between Rwanda and neighboring countries and widening the scope of understanding of impacts beyond its borders. EIA process in Rwanda provides a pretext and basis for future international cooperation and conflict resolution concerning environmental impacts at a regional level.

7.1.11 Land Policy

Apart from a few scattered land regulations, most of which date back to the colonial period, Rwanda has never had a proper land policy nor has it ever had a land law, a situation that enhances the existing duality between the very restrictive written law and the widely practiced customary law, giving rise to insecurity, instability and precariousness of land tenure.

The Rwandan Government, therefore, found it compelling and necessary to establish a national land policy that would guarantee a safe and stable form of land tenure, and bring about a rational and planned use of land while ensuring sound land management and an efficient land administration.

Currently, the land tenure system in Rwanda operates in a dual legal system: On one hand, there is: the customary law, which governs almost all the rural land and promotes the excessive parceling out of plots through the successive father-to-son inheritance system. And on the other, there is the written law, which mostly governs land in urban districts and some rural lands managed by churches and other natural and legal persons. This law confers several land tenure rights to individuals such as land tenancy, long term lease and title deeds (particularly in towns).

7.1.12 Rwanda building control regulations

The Rwanda Building Control Regulations serves as a standard reference for the regulation of planning and design of all buildings in Rwanda. The regulations will facilitate professional practice in the construction sector and reduce the emergence of informal developments so as to ensure well planned and safe building and housing facilities which are environmental friendly in the country. The document also provides regulations in the different areas including electrical installations; Safety: equipment, escape routes and fire alarm; Site activities: construction and site operations etc.

7.2 REGIONAL AND INTERNATIONAL & MULTILATERAL AGREEMENT

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

- United Nations Convention Framework on Climatic Changes of June 10, 1992 ratified on August 18, 1998. This convention takes into account the fact that climate change has transboundary impacts. The basic objective of this convention is to provide for agreed limits on the release of greenhouse gases into the atmosphere so as to prevent the occurrence of climate change. It also aims to prepare countries to minimize the impact of climate change should it occur.

- United Nations Convention on Desertification Control of June 17, 1991 and ratified on October 22, 1998. The objective of the Convention is to combat desertification and mitigate the effects of droughts in countries experiencing serious drought and/or desertification, particularly in Africa.
- Vienna Convention on Ozone layer Protection of September 22, 1987 and Montreal Protocol on substances impoverishing Ozone layer of September 16, 1987, ratified on December 6, 2000. The basic objective of the Convention is to combat the negative impact on the environment and human beings resulting from ozone depleting substances by reducing the amounts released and eventually banning their commercial use through internationally agreed measures. The Montreal Protocol entered into force in 1989 to facilitate the implementation of the Convention.
- Stockholm Convention on Persistent Organic Pollutants (POP) adopted and ratified by the Presidential Order No 78/01 of July 8, 2002.
- Basel Convention on Dangerous Wastes, adopted on March 22, 1989 in Basel and by the Presidential Order No 29 /01 of August 24, 2003 establishing Rwanda adhesion. The objective of the Basel Convention is to control and regulate the transboundary movement of hazardous wastes. The Bamako Convention of 1991 plays a similar role at the level of the African continent.
- Kyoto Protocol to the Convention Framework on Climatic Changes of March 16, 1998

7.2.1 Regulatory requirements of international Financial Institutions

The programme component activities shall be financed by the African Development Bank and as such the Bank's Integrated Safeguard System (ISS) are applicable. The applicability of the ISS (in particular the five Operational Safeguards shall be evaluated within

7.3 NATIONAL INSTITUTIONAL FRAMEWORK

7.3.1 Institutional framework for environmental management in Rwanda

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

In Rwanda, the implementation of natural resources management and environment policies and sectoral strategies involves several stakeholders, including government state institutions, NGOs, civil society, the private sector, decentralized entities and donors.

Likewise, at regional levels, many actors in the five member countries are involved in carrying out environmental management interventions at different levels, using different modalities and applying different standards. In order to co-ordinate and harmonize different management approaches besides policies, laws, regulations, agreements and standards.

Ministry of Natural Resources (MINIRENA)

MINIRENA is a multi-sectoral ministry covering five sectors: Lands, Water Resources, Forest, Mining and Environment. Environment is a cross cutting sector because it covers the four other sectors. MINIRENA is responsible for the development of policies, laws and regulations as well

as coordination of all activities in the management of land, water resources, forest, mining activities and environment, as well as their follow up and evaluation.

OTHER KEY MINISTRIES AND INSTITUTIONS

MININFRA: is responsible for setting policies related to energy including electricity; urbanization and settlements; road and communication infrastructure; Meteorology, Urban Water supply. MININFRA oversees the resettlement and housing of people. The Ministry is also charged with constructing infrastructures that protect the environment where different assessments are prioritized. Besides organizing human settlement MININFRA has the mandate for town planning, public infrastructure and transport; the management of water supply as well as actions to encourage water harvesting in the settlement and housing sector.

MINALOC: Under the framework of decentralization, MINALOC oversees the implementation of the decentralization process as well as relevant community and social protection programmes. This Ministry is also responsible through the districts for environment governance and therefore for mobilizing the public to participate in the management and protection of natural resources. Districts are responsible for production and protection of water, tourism, and the environment. Similarly, cities, towns, and municipalities are responsible for land and environmental management, urban planning, road maintenance, maintenance of protected and recreational areas, and providing drinking water, sanitation, and waste treatment and disposal. MINALOC is over-seeing various community environment management related programmes in the districts. These include: Vision 2020 Umurenge, HIMO, Ubudehe and CDF which involve poor communities to participate in various initiatives aimed at enhancing their income.

MINECOFIN: is responsible for Macroeconomic policy instruments, resource mobilization, and coordination of development partners and allocation of budgets to different Ministries and sectors. MINECOFIN is also charged with overseeing and advising on the formation of various Funds (including the Environment and Forestry Funds). It is also concerned with mainstreaming natural resources and environment concerns in the budgetary, PRSP and DDP processes.

MIGEPROFE: sets policies and guidelines for mainstreaming gender in formulation and implementation of central and local governments' programmes. The Ministry is mandated to guide MININERA and local governments to mainstream gender related issues in natural resource and environment management and mobilize communities (women, men and youth) in the activities of natural resource and environment protection and management.

MINEDUC: is responsible for training human resources in the management and protection of natural resources; It oversees the implementation of environmental education programmes in schools (by supporting Environmental Clubs), as well as initiating the process of mainstreaming environmental assessment into schools.

Rwanda Environment Management Authority (REMA): in 2002, Rwanda Environment Management Authority (REMA) was established to act as the implementation organ of environment-related policies and laws. REMA is also tasked to coordinate different environmental protection activities undertaken by environmental promotion agencies; to promote the integration of environmental issues in development policies, projects, plans and

programmes (due to the implication of EIA and SEA); to coordinate implementation of Government policies and decisions taken by the Board of Directors and ensure the integration of environmental issues in national planning among concerned departments and institutions within the Government; to advise the Government with regard to the legislation and other measures relating to environmental management or implementation of conventions, treaties and international agreements relevant to the environment as and when necessary; to make proposals to the Government in the field of environmental policies and strategies.

Rwanda Natural Resources Authority (RNRA): RNRA is an authority under the Ministry of Natural Resources that heads the management of promotion of natural resources which is composed of land, water, forests, mines and geology. It is entrusted with supervision, monitoring and to ensure the implementation of all issues relating to promotion and protection of natural resources, Implementing national policies, laws, strategies, regulations and government resolutions in matters relating to the promotion and protection of natural resources; Making follow up and to implement international conventions Rwanda ratified on matters relating to natural resources management, Advising the Government on appropriate mechanisms for conservation of natural resources and investments opportunities; establishing cooperation and collaboration with other regional and international institutions with an aim of harmonizing the performance and relations on matters relating to management of natural resources. RNRA is coordinate and supervise activities of its 3 child agencies, which are: National Land Centre (NLC), OGM, Integrated Water Resources Management (IWRM) and National Forestry Authority (NAFA).

Rwanda Energy Group (REG): REG has as mission to create conditions for the provision of sufficient, safe, reliable, efficient, cost-effective and environmentally appropriate energy services to households and to all economic sectors on a sustainable basis. REG has a vision of contributing effectively to the growth of the national economy and thereby improve the standard of living for the entire nation in a sustainable and environmentally sound manner.

RDB (Rwanda Development Board): The Rwanda Development Board is evidence that Rwanda is open for business. It is truly a “one stop shop (Centre) for all investors”. Rwanda Development Board was set up by bringing together all the government agencies responsible for the entire investor experience under one roof. RDB is responsible for approval of EIA reports by issuing an EIA certificate.

Rwanda Utilities Regulatory Agency (RURA)

The RURA energy sector's mission is to control and regulate an efficient, sustainable and reliable energy sector in a transparent and fair manner for the benefit of all stakeholders.

Provincial, District and Lower level Environmental Committees

The Rwandan National Environment Policy of 2003 also proposed the establishment of provincial, district and lower level environmental committees beside the establishment of REMA responsible for environmental protection at districts levels.

8. INSTITUTIONAL AND COUNTRY SYSTEMS ASSESSMENT

The RBF Policy promotes the use of Country Systems in screening, assessing and managing the environmental and social risks and opportunities of the programme. In this Section, the capacity of Rwanda's country and institutional systems to screen, assess and mitigate the identified environmental and social impacts associated with the programme components has been assessed against five Operational Safeguard Policies.

The Analysis presented in this Section is organized by each of the five Operational Safeguards of the ISS and synthesizes the main findings using the SWOT (Strengths-Weaknesses-Opportunities-Threats) approach, which is adapted and applied to the RBF context in the following way:

- Strengths of the system, or where it functions effectively and efficiently and is consistent with the requirements of the ISS;
- Inconsistencies and gaps ("weaknesses") between the principles espoused in ISS and capacity constraints
- Actions ("opportunities") to strengthen the existing system.
- Risks ("threats") to the proposed actions designed to strengthen the system.

8.1 SUMMARY OF COUNTRY AND INSTITUTIONAL SYSTEM ASSESSMENT

The assessment has established that Rwanda has the legislative/regulatory provisions and the institutions to ensure consistency with the requirement of the ISS. However, implementation is not consistently effective in the areas of Environmental and Social Management Plan (ESMP) implementation, field supervision, monitoring and enforcement; and stakeholder consultation. The SESA includes measures to mitigate these underlying risks/gaps to the programme, which primarily relate to the lack of personnel for field supervision in EDCL and EUCL.

The most significant social findings are that Rwanda has land laws and land acquisition procedures which if judiciously followed, would result in outcomes generally in line with the requirements of Operational Safeguard 2. However, additional attention is given to livelihood restoration and to the rights of project-affected people who cannot prove ownership of the land. In practice, acquisition of rights of way for 33-kV and 11-kV distribution lines relies heavily on voluntary contributions of land and land based assets (crops and trees), while it avoids personal and public structures. The process has lacked proper documentation of the processes when land was provided voluntarily. The SESA includes recommended measures to bring the land acquisition up to national standards, as well as additional steps to meet the requirements of OS 2.

The main thrust of the measures is for REG to develop systematic procedures to guide its staff in acquiring land and rights of way, using, as a resource, the guiding principles of the OS 2. The assessment also found that Rwanda does not have any laws specifically aimed at protecting the rights of indigenous peoples. However, Rwanda does recognize vulnerable groups as a category of potentially affected people, and various processes such as environmental impact assessments do consider potential impacts on them.

The measures identified in the assessment to achieve the objectives of OS 2 are mainly for REG (EDCL and EUCL) to strengthen its existing policy and procedures to ensure that the possible presence of vulnerable groups is considered when potential investments are appraised and if any are likely to be affected, the principles of free prior informed consultation are applied.

In the following, Sections, the Country Systems assessment against each of the five (5) applicable Operational safeguards triggered are summarized. Key gaps and opportunities for enhancement are also proposed for consideration to ensure compliance with the applicable standards.

8.1.1 OS1: Environmental and Social Assessment

Applicability OS1 is considered in terms of environmental and social management (ESM) for the Areas 1, 2 and 3 of the RBF based SEAP II Programme, as a key component of good service delivery (i.e. measures included under the Program's system-strengthening measures for enhanced accountability and oversight mechanisms).	
Summary Findings There is an adequate national regulatory framework in Rwanda and technical guidelines exist for environmental and social due diligence with respect to the potential impacts of the Program. There are also environmental and social procedures under existing AfDB-funded energy projects with REG that have been deemed satisfactory. However implementation has not been consistently up to standards, and the assessed weaknesses are systemic, related to insufficient resources – financial, personnel, and skills - for preparing and implementing ESIA's and overseeing and monitoring implementation of impact management measures.	
Actions and Opportunities Technical Guidance and Implementation Capacity: There is opportunity to strengthen capacity for EIA preparation, review, and approval through: (a) supporting EDCL and EUCL to recruit two additional dedicated environmental and social safeguard specialists, (b) supporting REG to develop an ESMS programme and formalize through documentation the current processes used by the E&S Team in screening, assessing and monitoring projects in conjunction with the Planning Team. There is also opportunity to strengthen capacity for monitoring, supervision and enforcement of impact management implementation through: (a) provision of capacity development programme on Construction Health and Safety and mainstreaming of Gender outcomes through the SEAP II programme.	Risks Last mile distribution extensions will not receive adequate environmental and social assessments, supervision and monitoring. Social benefits of last mile distribution extension may be curtailed by insufficient power, or non-payment for service to government facilities (schools, clinics, etc.). Stakeholder concerns will not be consistently taken into account in environmental and social assessments.

8.1.2 OS2: Involuntary resettlement: land acquisition, population displacement and compensation

Applicability The planned activities under Areas 1, 2 and 3 could require land or could affect livelihoods and some community infrastructure or cultural features such as cemeteries, shrines or other sacred sites. The recommended Right of Way as proposed by REA (Rwanda Utilities Regulatory Authority) for the LV and MV extension works are 3m 0.4kV and 12m for $15 \leq V \leq 30$ kV respectively. EDCL AND EUCL will have to secure these RoW for the proposed LV and MV works via either voluntary donation and/or payment of compensation via ARAP. It is expected that the impact shall be minimal given that these lines are passing mainly through already established areas and members of the communities are happy to allocate areas for erection of the poles and transformers for the last mile distribution lines to enable their own connection. Nonetheless, given the sensitivity of the matter on land acquisition and potential reputational risk to all the development partners this is one of the risks that need mitigation.
Summary Findings Review of the experience on similar projects is that physical relocation of households and businesses has been avoided or

minimal. Most impacts have been related to trees and crops, land (agricultural and residential), and some small structures. The practice used by EDCL and EUCL 33 and 11 kV lines has been that the actual area where the pole is going to be put is purchased and compensated and although it could be given voluntarily by land owners and these are documented. This is mainly because utmost care is taken not to affect residential houses or businesses, and even though there is an official restriction on cultivation under these lines, in practice people have not been stopped unless they plant trees or build houses. Nonetheless, there are people who could lose part of their livelihoods in forms of fruit-bearing trees but the overall impact is moderate.

Furthermore, the reconducting of the HV lines will require no further land acquisition resulting in either physical and/or economic displacements. The work methodology of the reconducting of the HV lines is designed to avoid any destruction of assets (including crops) and/land between the existing towers.

Information collected during stakeholder consultations indicates that most PAPs who resist volunteering their land are those losing a significant fraction of their land or permanent crops such as cashew nut trees, or are not direct beneficiaries of the project, or both. Loss of access to natural resources is a low risk, given that the lines do not constitute a barrier to passage and the fact that protected areas and sensitive natural features will be avoided as part of adoption of planned mitigation hierarchy for the project.

System Strengths

Land laws and acts and clear staff roles and responsibilities.

Law N° 32/2015 of 11/06/2015 Relating to Expropriation in the Public Interest

This Law determines procedures relating to land acquisition and compensation in the public interest in Rwanda. Expropriation, is defined, as the taking of private property in the public interest aimed at development, social welfare, security and/or territorial integrity for public good or State interest. An expropriator is a government entity with responsibilities and powers conferred by law to carry out expropriation in public interest. The Expropriation Law provides for listing of affected persons, their right to be informed and consulted on certain issues, valuation of assets to be expropriated, payment of fair compensation for these assets. It also establishes procedures whereby affected persons can contest decisions such as the valuation results for assets.

Grievance management procedures The law provides a mechanism whereby a land owner or the owner of property incorporated on land can appeal against the valuation of his/her land/property. However, it also contains a prohibition on opposition to expropriation if it is considered to arise from the 'self-centred' interests of those opposing expropriation. Where required, the ARAP shall include grievance redress mechanisms which will be consistent with the ISS requirements under OS 1 and 2.

Consultations: The law requires that an Application for Expropriation in the Public Interest must be submitted by the expropriating agency and that the Application must contain Minutes indicating that the concerned population was sensitized about the project and its importance. Also, following the submission of the valuation report to the expropriating agency, the agency shall approve the report and publish it for the information of relevant parties

Gaps

While the content of the screening and analysis for Environmental and Social Impact Assessment (ESIA) by RDA are comprehensive with respect to the principles of OS1 and 2, there are gaps in the land acquisition requirements as follows;

Project Design

No explicit requirement for a project design mechanism to avoid or minimize physical and/or economic displacement and for paying attention to poor and vulnerable.

Managing land acquisition

The applicable laws makes no provision for use of dedicated planning tools such as a RAP or LRP for managing land acquisition and resettlement issues/impacts.

General

EDCL and EUCL in practice consults with the residents that are demanding electricity, and land is normally provided voluntarily for the wayleave in recognition of the benefits of electricity. The 12 meter wayleave for 33kV is cleared for the construction, but once construction is done the communities can use the wayleave for gardening and short crops. While there are policy gaps between OS 2 and the Rwandan system for land acquisition and resettlement (in particular livelihood restoration), there are no direct conflicts between the Rwandan land laws and OS 2, which indicates that gap-filling measures in the Program will not be contrary to the law.

Tenure: Currently, the land tenure system in Rwanda operates in a dual legal system: customary law, which governs almost all the rural land and promotes the excessive parceling out of plots through the successive father-to-son inheritance system and on the other, there is

<p>When a land owner or the owner of property incorporated on land is satisfied with the valuation, he/she shall sign or fingerprint the approved fair compensation reports. The law provides a mechanism whereby a land owner or the owner of property incorporated on land can appeal against the valuation of his/her land/property</p> <p>The law contains a prohibition on opposition to expropriation if it is considered to arise from the ‘<i>self-centred</i>’ interests of those opposing expropriation. The law sets out a process of public notification for different steps in the land acquisition process, but there is no systematic procedure for information disclosure and consultations</p>	<p>the written law, which mostly governs land in urban districts and some rural lands managed by churches and other natural and legal persons. This law confers several land tenure rights to individuals such as land tenancy, long term lease and title deeds (particularly in towns, etc.).</p> <p>Market value: <i>Law No.17/2010 of 12/05/2010</i> establishing and Organising the Real Property Valuation Profession in Rwanda provides that only a certified valuer can undertake the valuation of expropriated property, and that the value given must be in accordance with the market price and with full participation of the affected person and preferably in the presence of the local leaders.</p> <p>Property can only be acquired by payment of ‘fair compensation’ (defined as, “<i>An indemnity equivalent to the value of land and the activities performed thereon given to the person to be expropriated and calculated in consideration of market prices as well as compensation for disturbance due to expropriation</i>”). In practice, this ‘disturbance allowance’ provides an additional amount of 5% to the total compensation paid. Only compensation in terms of cash or ‘in kind’ are possible (the law does not mention compensation ‘in kind’, but in practice it can be offered).</p> <p>Lost Assets and Livelihood Restoration: The law focuses, primarily, on land and land-based features such as crops and structures. It does consider loss of access or impeded access to common property or natural resources that contribute to maintaining livelihood status. However these impact is designed out because the LV and MV lines do not result in restriction on access to common property or natural resources.</p> <p>Wayleave: With respect to the wayleave, as noted above, even though there is not much of a policy gap on paper, in practice land for 33kV and 11kV, lines is given voluntarily in recognition of the benefits of receiving electricity. EDCL tries to avoid any structures, rerouting the wayleave when necessary to do so. As a result the principles discussed in the Actions and Opportunities section need to be followed.</p> <p>Consultation and Disclosure: No specific provisions for preparing and implementing ARAP or LRP based on a sequence of focused consultations (including options where applicable) with Affected communities and PAPs, including the poor and other vulnerable categories of people.</p> <p>Measures to be taken to meet the spirit of OS 2 with respect to voluntary provision of the land for the wayleave are presented in the Action column. There is no</p>
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	clear budget or source of finance stipulated for paying compensation and hence a Challenge when it comes to project implementation.
<p>Actions and Opportunities</p> <p>Technical Guidance and Implementation Capacity:</p> <p>During programme implementation, if land is given voluntarily the following principles should be followed: The land given should not be more than 10% of the land own or used by the PAPs; the remaining land should be variable for whatever use it had before the project; the voluntary contributions of land should be documented by EDCL/EUCL and available in the communities affected; EDCL/EUCL will take actions to restore livelihoods affected by loss of structures, valuable trees, and crops; people who provided land should be able to continue gardening, cropping and grazing activities in the wayleave as long as they will not plant tall trees or build structures; and finally the grievance mechanisms should be established in each affected village to address any complaints affected people may have. In addition, a phone number should be provided to all PAPs and communities to voice their concerns to EDCL/EUCL through phone calls or text on all issues. EDCL and EUCL should inform the PAPs of the grievance mechanisms that will be established in the affected villages and also should ensure that the Village Land Committees are informed about and follow the procedures detailed in the manual. Any grievance mechanisms at the village level should include at least one affected person.</p> <p>The country systems assessment defines the needs for (a) improved and updated technical guidance for better implementation of the existing land laws, (b) greater transparency when land and livelihoods are involved, (c) special care in managing voluntary land contributions, including well-defined and transparent criteria and clear documentation of transactions when land is provided voluntarily and attention to livelihood restoration; (d) strong and readily accessible grievance redress mechanism, (e) provisions for community participation; and (f) development of a standard form to be signed with each district involved to ensure the provision of the budget for payments of the bills for the social infrastructure under that district. These needs can be met through the preparation of ARAP for each work package and recruitment of dedicated environmental (1 no) and social (1 no) safeguard specialists for the Programme.</p>	<p>Risks</p> <p>The risk of not taking the proposed Actions to address the gaps identified described above could result in noncompliance issues with the requirements of OS 2.</p> <p>However, this risk is relatively low, since the overall Programme related land acquisition will be low with relatively moderate impact. That notwithstanding impact on individual livelihoods could be moderate and requires mitigation through the recommended action plan.</p>

8.1.3 OS 3: Biodiversity and Eco-system services

<p>Applicability</p> <p>From the baseline studies, this OS is deemed not to be triggered by the planned programme activities because none of the planned activities under Areas 1, 2 and 3 are likely to impact any natural resources of significant conservation value (natural, modified or critical habitats) or source of ecosystems services to surrounding communities.</p>	
<p>System Strengths</p> <p>The Rwandan ESIA process considers physical cultural resources, including screening for archaeological, historical</p>	<p>Gaps</p> <p>There are no significant inconsistencies between OS 3 and Tanzania's policies, laws, and regulations</p>

<p>and cultural sites. The assessment shows that impacts on cultural sites are taken into account in program design and implementation and appropriate mitigation measures adopted.</p> <p>Provisions with the Organic Law (No. 04/2005 of 08/04/2005), Ministerial order N°008/MINIRENA/2015 of 18/06/2015 establishing a list of protected trees among other relevant regulatory activities. The GoR has revised its National Biodiversity Strategy and Action Plan on 6th February 2017 to be to meet the UN Aichi Biodiversity Targets agreed in 2010, which will set the parameters for conservation and natural habitats – aquatic, terrestrial and agro-biodiversity. This has also been strengthened by the establishment of a national coordinating body that will oversee all aspects, from environmental safeguards to information dissemination.</p>	<p>related to natural habitats.</p>
<p>Actions and Opportunities</p> <p>The project will adopt the Chance Find Procedure developed in this SESA as a first line of mitigation to minimize potential impact on physical cultural resources.</p>	<p>Risks</p> <p>The risks identified for strengthening the system for OS 1 are applicable to OS 3 in particular for Physical Cultural Resources.</p>

8.1.4 OS4 Pollution prevention & control, hazardous materials and resource efficiency

<p>Applicability</p> <p>The provisions in OS 4 are considered as part of the ESIA process analyzed under OS 1. The proposed distribution lines extension works under Areas 1, 2 and 3 of the Programme shall not involve major construction activities susceptible to pollution from the release of hazardous substances.</p>	
<p>System Strengths</p> <p>The Rwandan ESIA process considers assessment of pollution from the release of hazardous substances. The assessment showed that impact from this source is moderates to low and of localized nature.</p>	<p>Gaps</p> <p>There are no significant inconsistencies between OS4 and Tanzania's policies, laws, and regulations related to natural habitats</p>
<p>Actions and Opportunities</p> <p>The project will utilize the pollution prevention and emergency response plan drafted as part of the SESA to mitigate any potential source of pollution from the planned activities under Areas 1, 2 and 3.</p>	<p>Risks</p> <p>The risks identified for strengthening the system for OS 1 are applicable to OS4.</p>

8.1.5 OS5: Labor conditions; health and safety

<p>Applicability</p> <p>The provisions in OS 5 are considered as part of the ESIA process analyzed under OS 1. Complementing that analysis the review found that OS 5 is applicable to the Program but the scope of construction activities are of a lower scale and involves less workforce for the works of the MV and LV distribution extension.</p>	
<p>System Strengths</p> <p>The Labour Code of Rwanda contains provisions in relation to occupation safety and health, and more details can be found in Acts such as provisions on welfare health and safety committee, organization and functioning of labour inspection, Act on safety and health at work, functioning and election of staff delegates and the functioning of the National Council of Labour, which are consistent with OS 5 requirements. The ESIA process contains robust procedures</p>	<p>Gaps</p> <p>Public and worker safety are adequately covered in the Labor Code of Rwanda, the OSHA Act, and other relevant safety instructions and there are no major inconsistencies between the system and OS 5. However, the worker and public safety provisions are not always included in civil works contracts and contractor adherence to and enforcement of safety rules such as use of personal protective equipment is weak or non-existent.</p>

<p>for worker safety, requiring plans for accident prevention as well for health and safety of workers and communities, which are also part of contracts for civil works. The Occupational</p> <p>Electricity Law (2011): The main legal instrument for the power sector is Law N°21/2011 of 23/06/2011 governing electricity activities in Rwanda, which is progressive and forward looking. The Rules of Conduct require that contractors must maintain accident registers, provide workers with protective gear, and standards for construction sites and post warning signs visible to the public and workers about requirements for personal protective equipment.</p>	<p>Other gaps identified in OS 1 are also applicable to OS 5.</p>
<p>Actions and Opportunities</p> <p>The opportunities and actions identified for strengthening the system for OS 1 are applicable to OS5 Capacity-building for REG in particular EDCL and EUCL staff, environmental consultants, and district environmental officers will include training in workplace health and safety procedures and enforcement and in preparing and enforcing health and safety provisions in construction and operating contracts.</p>	<p>Risks</p> <p>The risks identified for strengthening the system for OS 1 are applicable to OS 5.</p>

9 ENVIRONMENT SOCIAL IMPACTS ASSESSMENT & MANAGEMENT.

In this section the potential environmental and social impacts associated with the programme component activities will be assessed at the programme level specifically for the Sector based improving and increasing Access Policy.

Overall, the project will lead to significant environmental and social benefits. Environmental benefits will be derived from substitution of electricity for other household and business energy sources and increased reliance on renewable energy sources. Social benefits will result from increased access to electricity for beneficiary communities improving security and social lives within the communities.

Potential adverse environmental impacts of the Program are likely to be associated with installation of medium- and low-voltage distribution lines and MV-LV transformers. None of the impacts are expected to be significant or difficult to avoid or mitigate, and few will be of short-term and localized in extent. The potential adverse social impacts are likely to be associated with acquisition of the way leaves (rights of way) for the 33 and 11 kV distribution lines. These are also not anticipated to be of large scale but could adversely affect individual project-affected persons (PAPs) that lose assets including structures, crops and trees, and restrict the use of portions of their land.

The programme will not finance any single work package that results in the physical and/or economic displacement of more than 200 persons.

9.1 SUMMARY ENVIRONMENTAL BENEFITS AND RISKS

Overall, the environmental impacts scoped and assessed to be associated with the planned programme component activities are deemed to be of ***Low to Moderate in magnitude and limited and/or localized in scope*** requiring site specific mitigation.

Some of the **Program's Environmental Benefits** which are substantial and long-term are listed as follows;

9.1.1 Benefits from provision of electricity to households and businesses:

- Reduction in use of diesel or gasoline-powered generators and other equipment such as grain mills, pumps, leading to reduced emissions of air pollutants, greenhouse gases (GHG), and noise
- Reduction in consumption of kerosene for lighting and other uses, resulting in improved indoor air quality.
- Improvements in the social life and general security of the beneficiary communities especially during the night.

9.1.2 Risks from clearing of way leave for distribution lines that cannot be located in the road reserve (10m width for 33 kV, 5m width for 11 kV)

- Loss of vegetative cover and habitat
- Increase in soil erosion until revegetation
- Plant material removed from site causes GHG emissions and air pollution if burned
- Obstruction of bird movements

9.1.3 Workplace and health and safety risks

- Electrocution hazard during operation of generating plants and installation and maintenance of power distribution lines
- Injury from falls when working at heights, or from falling objects
- Injury or fatality from heavy construction equipment
- Injury or fatality from explosion and fire at gasification plants

9.1.4 Air Quality;

The impacts of the programme scope of works under Areas 1, 2 and 3 on local air quality is localized but moderate in magnitude due to the ground works involved which could generate dust within densely populated areas for the planned distribution lines. The following mitigation measures should be considered in line with the mitigation hierarchy;

- The construction contractor shall inspect dust generation from stockpiles of soil, aggregates and vegetative debris.
- Stockpiles shall be covered or watered when necessary. The monitoring, including appropriate actions to prevent dust generation shall be recorded on sheets designed for that purpose.
- The construction contractor shall inspect daily if stockpiles not in use are covered with waterproof nylon material as required in the ESMP.
- EDCL and EARP shall monthly inspect vehicles and engines maintenance to ensure that they are in a fully serviceable conditions to minimize gaseous pollution.

9.1.5 Noise and Vibration;

Impact from the noise and vibration to local residents within the beneficiary communities for the last mile distribution lines could be moderate but localized in nature. Prolong noise from site workers and equipment such as pole mounting trucks and idling of lorry engines could impact residents especially the vulnerable such as the elderly, sick and infants. The following mitigation and monitoring recommendation should be included in any work package in line with the mitigation hierarchy;

- Noise levels along the perimeters of any worksite area shall be monitored periodically or following complaints and recorded to ensure that activities at the site are not exceeding applicable international standards⁵. EDCL and EARP E&S staff of the PIU are responsible for the execution of the monitoring and reporting.
- Each on-site contractor shall daily inspect the use of personal protective equipment and record the results on sheets for that purpose. EDCL and EARP will do bi-weekly inspection to ensure this is executed according to the ESMP.

⁵ World Bank Group General and Sector Specific EHS Guidelines

- EDCL and EARP shall daily inspect that all minor construction work associated with the activities under Area 2 are only carried out during day-time hours.
- EDCL and EARP shall monthly inspect vehicles and engines maintenance of any appointed contractors to ensure that they do not generate excessive noise.

9.1.6 Biodiversity;

The impact of the planned works under Areas 1, 2 and 3 of the programme is unlikely to impact any areas of significant biodiversity conservation and/or ecosystem services as defined by Operational Safeguard 3. The overall impact on biodiversity is deemed as low to Moderate as most of the beneficiary communities are within urban and peri-urban areas with very limited presence of and requirements for biodiversity conservation. However the following precautionary measures are recommended within the work specific method statements for each contractor's attention;

- Prior to ground breaking works, contractors shall inform their workers of the importance of limiting vegetation clearance. Actions to avoid clearance of native mature trees shall be emphasized. This shall be documented to EDCL and EARP and reported in the quarterly or annual monitoring report and within the ARAP where payment of compensation is required as approval to approve cutting.

9.1.7 Waste Management;

Impact from site derived wastes from the planned activities could pose low to moderate risk to the beneficiary communities and general environments. Waste streams could include packaging materials including plastics, wire strips and other similar waste streams from electrical materials. The following mitigation measures shall be included in any work specific method statement for the appointed contractor;

The waste management plan will include, but is not limited to the following:

- Required training for workers.
- Identification and segregation of types and quantities of waste.
- Proposed waste management sites.
- Waste management options, with an attention to hazardous waste. The plan will emphasize the use of licensed disposal contractors if available.
- Monitoring and reporting measures.

9.1.8 Emergency Response

Emergency response arising from spillage of hazardous substances from minor construction related works could pose a low to moderate impacts to identified receptors including surrounding environments but localized in nature. The following mitigation measures (Spill Response Plan) shall therefore be included in the work specific method statement; the spill response plan will include, but is not limited to the following:

- Identification of hazardous materials used on the construction- and drilling sites.
- Storage of hazardous materials in a safe environment (secondary containment).
- Availability of spill kits.
- Action in case of spills.
- Monitoring measures.

- Responsible persons.
- Required training of workers.

Conclusion on environmental risks

Nearly all of the identified environmental impacts and risks can be easily managed through the development of project specific and robust ESMP, best practice Occupational Health and Safety mitigation measures and application of good design and construction practices. The key to managing workplace health and safety risks is supervision and enforcement of adherence to rules and procedures. All construction contracts must include workplace health and safety requirements and compliance monitoring and reporting.

REG's safeguard team in EDCL's and EARP have developed several Environmental and Social Impact Assessments (ESIAs) for the Phase I of the SEAP Programme which broadly complied with the Bank's ISS requirements. All the ESIAs have been reviewed and approved by the RDB via the issuance of EIA permits for the sub projects. However this SEAP II programme requires national coverage and therefore EDCL and EARP will require capacity support in personnel and periodic health and safety training to effectively implement the programmes safeguard arrangements including preparation of several ESIAs and ESMPs for the various work packages and supervision of their implementation by the successful contractors. One (1) dedicated FTE environmentalist position have been proposed to help with the staff capacity for the SEAP II programme to ensure effective implementation of the ESIA and ESMPs.

9.2 SUMMARY SOCIAL BENEFITS AND RISKS

The anticipated negative social impacts from the planned Programme component activities are not expected to be significant provided that land and way leave acquisition process are conducted in a manner consistent with the AfDB's Operational Safeguard 2. However, the Social benefits, on the other hand will be significant and of long term in nature.

The main low to moderate **Social impacts** from the extension of the MV and LV distribution lines of the programme are listed as follows;

9.2.1 Risks from land and way leave acquisition:

- PAPs might lose part of their livelihoods in the process of clearing the wayleave, such as their cash crops, mainly cashew nuts, banana, mango, coconuts and other fruit bearing trees.
- PAPs are unable to replace land or assets that were acquired, because of inadequate amounts of compensation, or pressure to "contribute" land voluntarily
- PAPs experience diminished quality of life following completion of the last mile extensions.
- Physical cultural resources may be damaged or encroached on

9.2.2 Risks from provision of electricity to households and businesses:

- Risk of electrocution from substandard internal wiring, meter tampering, illegal connections, or lack of knowledge of electrical systems
- Risk of fire from faulty internal wiring, meter bypass, or illegal connections

9.2.3 *Risk that community benefits ('productive uses') are not sustainable*

- Electric service for social services such as schools, health centers, and water pumps under management of the Local Authority may be interrupted if central government has not budgeted for payment to REG (EUCL).
- Demand may exceed supply, especially in some of the peri-urban and small towns that will eventually grow into big urban centers due to several government policies including large scale infrastructure development such as road and railways.

9.2.4 *Cultural Heritage;*

Impact to cultural heritage from the planned programme works especially under Areas 1, 2 and 3 could be moderate in high in magnitude but limited in scope. The ground breaking works for the erection of the distribution poles could unintentionally be sited on sites of significant historical/cultural importance (such unmarked grave/tombs and idols for worship or shrines) to families within the beneficiary communities. The following mitigation measures shall be included as part of the work specific method statements for the works;

Change Finds Procedure

The main objective of the *Chance Find Procedure* is to ensure correct action is taken to minimize damage or loss in case unknown features/objects are encountered during programme activities. In case unknown features or objects are encountered especially during ground breaking works, the procedure should stop the work and require investigation by an qualified and approved archaeologist.

Procedure upon discovery

- Upon discovery of features or objects that may be of archaeological or historical interest, the responsible contractor shall stop any work that may damage or alter the position of the observed feature or object.
- When work has been stopped, the contractor shall immediately report to a named contact in EDCL/EARP who shall seek advice from an archaeologist on the next steps.
- The contractor shall submit a Chance Find Report within one day from the find to EDCL/EARP. The report shall include the following information:
 - Date and time of discovery
 - Location of the discovery
 - Description of the observed feature or object
 - Temporary protection measures
- EDCL/EARP shall send local cultural authorities the report immediately.
- The contractor shall follow guidelines from local cultural authorities. In case cultural authorities fail to give guidelines within two days from the finding, EDCL/EARP may have the authority to instruct the contractor to remove objects that were found or undertake other mitigation measures and resume work. Such additional work can be charged to the contract.
- All delays caused by decisions of local cultural authorities cannot be charged to the contract. In such cases, the contractor can claim compensation according to Rwandan laws. The contractor will be entitled to establish an agreement with the cultural authorities for additional services.
- EDCL/EARP can issue an instruction to recommence the work following a written approval from cultural authorities.

9.2.5 Traffic and Transport

The overall impact from road traffic and transport impacts is deemed to be low to negligible due to the small number of work gang involved. Standard road safety management procedures in line national and international best practice will suffice mitigation of the potential risks.

9.2.6 Landscape and Visual

The overall impact to landscape and visual is low.

The main significant and long term **Social benefits** from the extension of the MV and LV distribution lines of the programme are listed as follows;

9.2.7 Benefits from provision of electricity to households:

- Reduction in respiratory diseases caused by indoor air pollution from kerosene lighting
- Electricity for refrigeration, water pumping, entertainment, communication, and computers.
- Lighting for students doing homework
- Generally improved quality of life
- Reduced time and energy spent by women at water pumping stations and rivers/streams
- Opportunities for women and youth to open new business
- Reduction in time in the girl child fetching fire wood for cooking and lighting.

9.2.8 Benefits from provision of electricity to businesses:

- Improved workplace health conditions because of reduction in use of diesel or gasoline-powered generators and other equipment such as grain mills, pumps, leading to reduced emissions of air pollutants, greenhouse gases (GHG), and noise
- Higher productivity
- Longer business working hours
- Reduced cost of doing business

9.2.9 Benefits from provision of electricity to communities:

- Improvements in operation of schools, clinics, and government offices
- Street lighting improves convenience, safety and security
- Electric pumps reduce effort needed to fetch water.

9.3 GENDER

This project has been categorised as Category 3 as according to the Bank's Gender Marker System. The 2010 National Gender Policy promotes gender equality and MININFRA developed the Infrastructure Gender Mainstreaming Strategy in 2017. Under the SEAP II, gender-differentiated considerations will be mainstreamed as part of the utility operations and increased access to electricity. Women, girls and children will disproportionately benefit from these provisions as well. There is no readily available information to estimate the exact number of female headed households that will be connected under the SEAP-II Programme. However, it is estimated that 52% of woman will have access to electricity under the program. SEAP II will ensure results are disaggregated where relevant and capacity development activities target female and male staff. The project will also dedicate resources for the development of gender mainstreaming program, guidelines and action plan to strengthen procedures within REG to promote equitable access allocation of benefits and impacts of rural electrification.

Women, girls and children will disproportionately benefit from these provisions as well. Supply of electricity in the health posts and clinics translate to better hygiene, safer deliveries, and better care of sick children. In schools it makes it possible for children (especially the girl child) to have access to computers or other devices that will not work without electricity.

Women and girls are the primary fetchers of water and firewood. Electric pumps will make their daily tasks less strenuous; moreover, it will allow for access to more water, helping the health of the family in general. Street lighting makes walking at night safer for women and girls. Access to power eliminates the time spent by the Girl Child in looking for firewood.

The above benefits notwithstanding, the following risks to equitable access to the planned programme benefits requires attention:

9.3.1 *Risk that vulnerable groups will not share equitably in project benefits provision of electricity to communities:*

- Female-headed households may be disadvantaged in obtaining access to electricity (statistics show that this normally happens in urban areas)
- Persons with low income – the poor, elderly, or handicapped – may not be able to afford the cost of connections or of proper internal wiring
- Vulnerable groups may not be able to benefit fully from the provision of electricity due to their life style (for instance pastoralists).

Conclusion on social risks

Most of these social risks can be mitigated, through education on hazards of electricity, house wiring inspections, education on environmental conservation and management of catchment areas, and programs to assist the vulnerable groups. Particular care will be needed to carry out acquisition of land and wayleaves in accordance with the national system and AfDB's Operational Safeguard 2 through the preparation of ARAPs. Project designs should take into consideration sensitive cultural and spiritual places, with full consultation and participation of the affected communities and, where possible, avoid them. Finally, there should be an official commitment from districts for provision of budget for the electrical bills for social infrastructures called productive usage under the programme. All of these mitigation measures shall be followed by a quarterly monitoring programme and ARAP Completion Audits to assess their compliance with the applicable legislation and their implementation effectiveness.

9.4 COST FOR ESMP IMPLEMENTATION

Adequate budget allocation is a critical requirement for effective implementation of the environmental and social management plans listed in Sections 9.1 and 9.2 to address identified moderate to low negative impacts associated with the programme component activities in particular those under Areas 1, 2 and 3.

Additional capacity support via recruitment of two dedicated environmental and social safeguard specialists (1 no. Environmentalist and 1 no. Sociologist) for the EDCL and EARP teams shall be required to strengthen the existing capacity to ensure effective implementation of the ESMP as

detailed below in Table 9.1. An estimated budgetary allocation of US\$ **2,059,600** will be required to ensure effective implementation of the ESMP and compliance with the both Rwandan laws and Bank's ISS.

Table 9.1: ESMP Cost and Implementation

Item #	Mitigation Measure	Responsible Entity	Deadline	Monitoring Frequency	Budget
3. REG Develop and Implement an ESMS					
1.1	Develop E&S Policy for REG	REG management	During first year of RBF Implementation	Quarterly monitoring and Verification Report	US\$ 30,000
1.2	Set objectives and targets consistent with E&S Policy.				US\$ 30,000
1.3	Define roles and responsibilities for persons responsible for implementation of the EMS and provide the necessary awareness training to develop and build capacity.				US\$ 50,000
1.4	Develop document control procedures and templates to ensure quality of data entry for the EMS system.		During second year of RBF Implementation		US\$ 50,000
1.5	Develop operational control procedures for operations that are associated with the identified environmental and social aspects of TANESCO's daily operations and those of their approved contractors and suppliers.				US\$ 50,000
1.6	Develop a monitoring programme and system which will allow performance evaluation and review of the EMS for continuous improvement.				US\$ 50,000
1.7	Define performance monitoring indicators and how to measure them to assess performance of the EMS.				US\$ 40,000
1.8	Carry out environment awareness trainings on EMS for both Senior and operational staff of EDCL/EARP and EUCL and other relevant staff of approved contractors and suppliers.				During 3 rd Year of RBF Implementation
4. Road Traffic Impact Management					
2.1	Develop and implement a road	EDCL and	Prior to	Quarterly	US\$

Item #	Mitigation Measure	Responsible Entity	Deadline	Monitoring Frequency	Budget
	traffic and community safety management plan as part of each work package contract prior to commencement of the works under Areas 1, 2 and 3.	EARP safeguard teams assisted by Contractor.	commencement of installation of the distribution units on site	monitoring and Verification Report	40,000
12. Waste Management					
3.1	Develop and Implement waste management plan as part of each work package contract. Special attention will be taken to minimize and reduce the quantities of solid waste produced during site preparation and construction. Restriction of burning any vegetation and combustible waste at the site. Reusable inorganic waste (e.g. excavated sand/soils) will be stockpiled away from drainage features and used for in filling where necessary and/or possible. Unusable construction waste, such as damaged pipes, formwork and other construction material, must be disposed of at an approved dumpsite. Provision of solid waste receptacles and storage containers, particularly for the disposal of plastic bags and boxes, so as not to block drainage system and to prevent littering of the site. Other measures for management of hazardous wastes shall include Collection, storage and disposal of hazardous wastes under a strict regime in line with Government requirements for management of such wastes. , The plan will emphasize the use of licensed disposal contractors if available.	EDCL and EARP safeguard teams assisted by Contractor.	Prior to commencement of the works under Areas 1, 2 and 3.	Quarterly monitoring and Verification Report	US\$ 40,000
13. Emergency Response Plan					
4.1	Develop and implement an emergency response management plan as part of each contract work	EDCL and EARP safeguard	Prior to commencement of the works	Quarterly monitoring and Verification	US\$ 40,000

Item #	Mitigation Measure	Responsible Entity	Deadline	Monitoring Frequency	Budget
	package. Maintaining spill response kits with each work gang and at the site office (where applicable), Preparation and display on site spill response procedures and Training of workers on spill response and management.	teams assisted by Contractor	under Areas 1, 2 and 3.	Report	
14. Impact to cultural heritage					
5.1	Implement the Chance Find Procedure as part of each work package contract.	EDCL and EARP safeguard teams assisted by Contractor	Prior to commencement of the works under Areas 1, 2 and 3.	Quarterly monitoring and Verification Report	US\$ 40,000
15. Impact from Air Quality, Noise and Vibration					
6.1	Implement standard dust suppression methods as part of each contract work package for works under Areas 1, 2 and 3.	EDCL and EARP safeguard teams assisted by Contractor	Prior to commencement of the works under Areas 1, 2 and 3.	Quarterly monitoring and number of complaints against dust and noise	US\$ 30,000
6.2	Implement standard Noise and vibration abatement methods as part of each contract work package for works under Areas 1, 2 and 3. These shall include but not limited to Restrict noisy construction activities to normal working hours (8am - 5pm). Inform local residents beforehand, via notices and advisories, of pending noisy periods and solicit their tolerance well before the commencement of piling works. Workers operating equipment that generate noise should be equipped with noise protection gear including ear muffs and plugs. Workers operating equipment generating noise levels greater than 80 dBA continuously for 8 hours or more should use earmuffs whereas those experiencing prolonged noise levels of 70 - 80 dBA should wear earplugs. Limit pickup trucks and other small equipment to an idling time of five minutes, observe a				US\$ 30,000

Item #	Mitigation Measure	Responsible Entity	Deadline	Monitoring Frequency	Budget
	common-sense approach to vehicle use and encourage workers to shut off vehicle engines whenever possible. All construction equipment should be regularly inspected and serviced.				
16. Vegetation Clearance					
7.1	Minimize vegetation clearance especially within peri-urban and rural areas through selection of sites for the poles of the last mile distribution line works.	EDCL and EARP safeguard teams assisted by Contractor	Prior to commencement of the works under Areas 1, 2 and 3.	Quarterly monitoring and Verification Report	US\$ 40,000
17. Water Pollution					
8.1	Deposition of excavated materials away from all watercourses and rivers. Storage of bulk fuel, drums and other chemicals in secured storage areas to prevent oil pollution. Provision of drip-pans for catching oil to vehicles being fueled or repaired, and stationery machinery. New and waste oil and fuel to be stored carefully and safely on-site until used, or removed from site to an appropriate facility for its safe disposal, or re-used in an environmentally safe and sound procedure. Except in an emergency, no vehicle will be fueled, lubricated or repaired except within the bounds of a project camp or depot. Similar precautions will be applied to paint or other chemicals or potentially toxic materials of any sort. Prohibition of washing vehicles in any watercourses. Prohibition of disposal of any waste material in an uncontrolled manner and especially into the rivers. Providing adequate sanitary facilities for workers located in carefully selected areas to avoid underground water contamination	EDCL and EARP safeguard teams assisted by Contractor.	Prior to commencement of the works under Areas 1, 2 and 3.	Quarterly monitoring and Verification Report	US\$ 40,000

Item #	Mitigation Measure	Responsible Entity	Deadline	Monitoring Frequency	Budget
18. Worker occupational and Community health and Safety					
9.1	Engage only those workers that are trained to operate specific machines and equipment. Proper signs on site to warn workers of safety requirements as regards machines with moving parts and other equipment at site. Provide a First Aid box and have a trained person to handle site emergencies and incidences. Provide safe scaffoldings and railings for workers working at heights. Proper specialized training should also be provided for such workers. Provide washing (enclosed bathroom) and toilet facilities at site with both drinking and washing water. The number of workers engaged determines the number of the toilets and bathrooms provided. Providing personal protective equipment (PPE) such safety helmets, safety masks, safety boots, uniforms and hand gloves to the workers. Using well-maintained equipment by qualified personnel. Train workers on work site safety issues Monitor and control illegal connection of electricity. The substation site shall be fenced and provided with safety signs. Emergency assembly points will be appointed at the substations site prior to commencement of construction work. Educate local populations to safe behavior in the presence of high voltage power lines. Ensure the developments of local and regional emergency plan and local major outbreaks in case of infrastructure breakdowns, especially near roads or residential areas.	EDCL and EARP safeguard teams assisted by Contractor	During implementation but Prior to commencement of the works under Areas 1, 2 and 3.	Quarterly monitoring and Verification Report	US\$ 40,000

Item #	Mitigation Measure	Responsible Entity	Deadline	Monitoring Frequency	Budget
9.2	Conduct Training on construction health and safety, first aid, fire fighting, emergency response drills, use of PPE including HIV (estimated to cover 1749 persons over 3yr @ US\$400 per head)				US\$ 699600
19. Recruit Dedicated safeguard staff to improve on capacity for SEAP II Implementation					
10.1	Recruit one (1) FTE Environmental safeguard specialist for the EDCL/EARP team	REG Management	Before end of first Quarter following Programme approval by the Bank	Verification Report	US\$ 300,000
10.2	Recruit one (1) FTE Social safeguard specialist for the EDCL/EARP team				US\$ 300,000
20. Develop Gender Policy					
11.1	Develop Gender Policy to mainstream gender outcomes into the SEAP II Programme	REG Management	By November 2019	Study Report approved by the Board	US\$ 20,000
Grand Total					(US\$) 2,059,600

10 STAKEHOLDER CONSULTATIONS

Rwandan EIA legislation and implementing guidelines⁶ contain specific provisions regarding stakeholder engagement and the EIA process. In the guidelines, it is stated that, “...*from a social standpoint, EIA incorporates interests of public and private stakeholders, residents and communities in the planning and approval process of projects.*” The guidelines are not detailed, but the intent is clear. Stakeholders, including communities, are to be consulted early in the EIA process; especially during the scoping phase when a project brief is to be prepared by the developer for submission to RDB for review and for them to develop a Terms of Reference for the EIA. Stakeholders can also be consulted at other times during the EIA process and, particularly, play a role, in advising, “.... *project developers and Rwanda Environment Management Authority on approaches to avoid, minimize or compensate for adverse environmental impacts.*”

EIA Reports and accompanying Environmental Management and Monitoring Plans (EMMPs) are submitted to the Rwanda Environment Management Authority (Rwanda Development Board (RDB/ REMA), which are mandated to consult with other government entities (by providing them with copies of the EIA Report and ESMP for review and comment). RDB/REMA are also responsible for organizing and implementing public hearings as an input to the ‘approval’ process for a project. Public hearings are thus the main mechanism for community stakeholders to be involved as part of the EIA process.

Local governments also play an important role in the local-level aspects of managing the public hearings and in conveying local stakeholder comments on both the project and the disclosed EIA Report and ESMP to RDB/REMA. Few details are provided on how this should be done by local governments. Project developers do not play a lead role; however, they are expected to participate in all public hearings.

The public participation process for this Limited SESA is a crucial mechanism to inform the public, interested and potentially affected people not only about the need for, purpose and aims of the SEAP II Programme, but also served to elicit the issues, concerns, needs and requirements of interested and affected people as input into the SESA. The objectives of the stakeholders and public participation process included:-

- Provides an opportunity for people involved to obtain clear, accurate and comprehensive information about the program, its alternatives or the decision and the environmental impacts thereof;
- Provides people involved with an opportunity to indicate their viewpoints, issues and concerns regarding the program, alternatives and /or the decision;
- Provides people involved with the opportunity of suggesting ways of avoiding, reducing or mitigating negative impacts of an activity and for enhancing positive impacts;
- Enables the applicant to incorporate the needs, preferences and values of affected parties into the activity;

⁶ Rwanda Environment Management Authority, 2006. General Guidelines and Procedure for Environmental Impact Assessment

- Provides opportunities to avoid and resolve disputes and reconcile conflicting interests; and
- Enhances transparency and accountability in decision making

10.1 STAKEHOLDER IDENTIFICATION AND ANALYSIS

In order to develop an effective stakeholders' engagement, it was necessary to determine who the stakeholders are and understand their priorities and objectives in relation to the SEAP II Programme. The SESA identified the following three main groups of stakeholders (Government and other development partnering agencies and project level affected communities and NGO/CSOs) as shown in Table 10.1 below. The first stakeholder consultation mission for the SESA has been conducted with the;

Table 10.1: Group consulted during stakeholder consultation

S/L	STAKEHOLDER GROUPS	STAKEHOLDER IDENTIFIED
1	Government authority (Central and Local) and other Development Partners	Regional and District offices in all the beneficiary communities across the three Zones
		Relevant Ministries;
		1. MINECOFIN,
		2. MININFRA,
		3. Office of the Auditor General (OAG).
		National Environmental Management Council (NEMC)
		REG (EDCL and EUCL)
		RURA
		REA
		RDB
		REMA
2	Local Communities	Ward Development Committee in project affected areas within the three Zones.
		Affected communities defined as any people or communities located in a project's area of influence, particularly those close to the existing or proposed project facilities.
		Ethnic groups

S/L	STAKEHOLDER GROUPS	STAKEHOLDER IDENTIFIED
		Traditional leaders such as village chiefs and religion leaders
		Vulnerable group such as elders, widows, disabled, single headed household
3.	Non-governmental organizations (NGOs) and community Based Organisation (CBOs) (national and international)	Environmental NGOs: Wildlife Conservation Society (WCS) – Bird life International, IUCN Pastoralists Indigenous Non-Governmental Organizations Forum and associated groups working with ethnic groups within the beneficiary communities/regions.

10.2 CONSULTATION MEETINGS

Stakeholder consultation and participation has been initiated mainly with the government programme development partners during the SEAP II Programme design. This includes REG and its subsidiary members EDCL and EUCL, MININFRA, MINICOFIN, RDB, REA, OAG, RURA, RDB and REMA (See Annex 2 for details of consultation). EDCL and EUCL shall develop project level Stakeholder Engagement Plan to steer the project level stakeholder engagement project for each work package awarding to the successful bidding contractor. This will allow provision of updates, changes and receipt of new concerns where necessary from both the project proponent and affected people such that both parties have a common perception as to what the project entails.

EDCL and EUCL plan to continue with consultation and participation of stakeholders during implementation of the works under Areas 1, 2 and 3 of the Programme. EDCL and EUCL with any selected sub-consultant will conduct a monitoring exercise on the implementation of ESMP whereby regular communication to community on what risks/impacts are mitigated will be undertaken to gauge its effectiveness and level of compliance.

10.3 THE GRIEVANCE/COMPLAINT REDRESS MECHANISM

EDCL and EUCL shall develop a work specific Grievance Redress Mechanism (GRM) that will be used to facility receipt and management of programme work specific complaints prior to commencement of the programme works especially for the proposed works under Areas 1, 2 and 3 of the programme development works.

EDCL's existing GRM which it has used for management of other similar last mile distribution works shall be enhanced and sustained on this Programme to address all potential concerns of both Affected and Interested parties for especially for the planned scope of works under Areas 1,2 and 3.

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ANNEXURE

ANNEX 1: PHOTOS OF SITE VISITS

Annex 2: Photos from sampled site visits with EDCL (June, 2018)



Plate1: Planned Substation upgrade works within Musha Substation



Plate 2: Proposed site for construction of a new substation



Plate 3: Planned Substation upgrade works within Camp Belge Substation

ANNEX 2: LIST OF PERSONS MET AND CONSULTED

Consultations were held in Dar es Salaam during SESA preparation with the following stakeholders and persons:

Name	Position	Institution	Email	Phone
Development Partners				
Enagnon Ernest Eric Adda	Sr. Financial Management Specialist	WB Governance	eadda@worldbank.org	+250787769790
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Marcel Mukeshimawa		MINECOFIN	marcel.mukeshimawa@minecofin.gov.rw	+250788314034
Alexis Kamuhire		MINECOFIN	alexis.kamuhire@minecofin.gov.rw	+250788674737
MININFRA				
Peace Kaliisa	Donor Coordinator	MININFRA	peace.kaliisa@mininfra.gov.rw	+250788312898
Tom Rwahana	ESWAP Coordinator	MININFRA	tom.rwahana@mininfra.gov.rw	+250780302994
Ngangure Diana	Energy Policy Analyst	MININFRA	Diana.ngangure@mininfra.gov.rw	+250785803426
Mukeshimana Olivier	Senior Engineer, Power Transmission and Distribution	MININFRA	olivier.mukeshimana@mininfra.gov.rw	+250788538593
RURA				
Patrick Nyirishema	Director General	RURA	patrick.nyirishema@rura.rw	+2507(8/3)8305154









Dr. Benjamin Rutimirwa	Economic Regulation Director	RURA	benjamin.rutimirwa@rura.rw	+250733445550
Helene Rask Gron	Development Economist		baobabconsult@mail.dk	T+4555385536 M+4540438670 M+250782730840
OAG				
Grace Rwakarema	Assistant Auditor General	OAG	grrw@oag.gov.rw	+25078830759
Biaroro R. Obadiah	Auditor General	OAG	obbi@oag.gov.rw obiraro@yahoo.co.uk	T +250788189801 M +250788308036

Date: 18/06/2018
Venne: MINECONFIN
Starting Time: 11:30 AM

List of Meeting Attendees						
No.	Name	Position	Institution	Email	Phone	Signature
1	Jos U. DUKOZE	Private Sector Finance Director	MINECONFIN	jos.dukoze@mineconfi.rw	0788742653	
2	Peace Kalisa	Donor Coordinator	Mininfra	Peace.Kalisa@mininfra.gov.rw	0788212898	
3	Ann Kins Kabungu	Investment officer	AFDB	a.kabungu@afdb.org	+255 06360793	
4	Humphrey Richard	Power Eng	AFDB	h.richard@afdb.org	033559728	
5	Elvis Okudze	Principal Governance officer	AFDB	e.okudze@afdb.org	+254 746621333	
6	Felix Oku	Environmental Specialist	AFDB	f.oku@afdb.org	+25471487856	
7	Wendyehu & Tekaliga	Energy Specialist	AFDB	w.tekaliga@afdb.org	82575753256	
8	Felipe Gato	Principal energy economist	AFDB	f.gato@afdb.org	+2577 3031 29	
9	NKusi Ronald	DM/ES	MINECONFIN	ronald.nkusi@mineconfi.rw		
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Attendance list

RBF-AFEE mission - 19 June 2018

No	Names	Institution	Position	Signature
1	Olatemi Salau	AFDB	Legal Consultant	
2	Peace Kabisa	Mininfra	Donor Coordinator	
3	Kabungo Arkins	AFDB	Investment officer	
4	Wendayehu D. Tekaliga	AFDB	Renewable Energy Expert	
5	Felix Oku	AFDB	Environmental specialist	
6	Eline Okudze	"	Governance officer	
7	Hamphrey N. Ruhundwa	AFDB	Power Engineer	
8	Fatiha Gaba	AFDB	Energy economist	
9	Ron Weiss	REG	CEO	Ron Weiss






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Tel.: +(250) (0) 78 818 1224, email: info@reg.rw, website: www.reg.rw

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RBF - AFDB Mission

Attendance list

19 June 2018

No	Names	Institution	Position	Signature
10	Kogus van Zyl	REG	Dir Planning	
11	Patrick Murkiziye	REG	Project Manager	
12	Amable Habimana	REG	Tech Co	
13	Geoffrey Zawadi	REG	Director HR	
14	Clémentine Umugwaneza	EDCL	EARP Coordinator	

KN82 ST3, Nyarugenge District, Kigali City, P.O. Box 537 Kigali, Rwanda
Tel.: +(250) (0) 78 818 1224, email: info@reg.rw, website: www.reg.rw

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Date: 20/06/18

Venue: REG Meeting Room

List of Meeting Attendees						
No.	Name	Position	Institution	Email	Phone	Signature
1	Namanny Abalo	Policy Officer	AFDB	n.abalobalhasse@afdb.org	+225 54642136	
2	Ehine Okudze	Governance officer	AFDB	e.okudze@afdb.org	+254 746620333	
3	Olatemi Salau	Legal Officer	AFDB	o.salau@afdb.org	+225 67195751	
4	Felina Gaba	Energy economist	AFDB	f.gaba@afdb.org		
5	Humphrey Rindwa	Power Eng	AFDB	h.rindwa@afdb.org	0735399788	
6	Roselyne Ndimwe	GIS specialist	EDCL/REG	r.ndimwe@edcl.gov	0788470224	
7	Kobus van Zyl	DR PARTNERING	REG	vanzyl.wjw@gmail.com	0784406305	
8	Patrick Mwasigi	Policy Manager	REG	pmwasigi@reg.or.ke	+254 735526932	
9	Kabungu A	IO	AFDB			
10	GAKWAMU CLAU	Diplom	Eucl	epakwamu@eucl.rp.mw	+250 788605760	
11	Felix Olcu	Environment Spec	AFDB	f.olcu@afdb.org	+254 709375256	
12	Wendayehu D. Tekalign	Energy Expert	AFDB	w.tekalign@afdb.org	+225 75753256	
13						
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Date: 20/06/2018

Venue: AFDB OFFICE
MEETING WITH DEVELOPMENT PARTNERS

Purpose: Inclusion of off-grid scope in RBF

List of Meeting Attendees						
No.	Name	Position	Institution	Email	Phone	Signature
1	Arkwins Kabungu	Fin Analyst	AFDB	a.kabungu@afdb.org	+225 66367998	
2	Olatemi Salau	Legal Counsel	"	o.salau@afdb.org	+225 67195751	
3	Ehine Okudze	Governance officer	AFDB	e.okudze@afdb.org	+254 6621333	
4	Wendayehu D	Env. Energy Expert	AFDB	w.tekalign@afdb.org	+225 75753256	
5	Simon Roland	Manager	GI2/EnDev	simon.roland@gi2.de	0729004913	
6	Clare Nelson	Lead	PowerAfrica	claire.nelson@usaids.gov	0788316622	
7	Lenie GORGULU	Team leader Infrastructure	EU	lenie.gorgulu@ec.europa.eu	0788388665	
8	Felix Olcu	Environment Spec	AFDB	f.olcu@afdb.org	+254 714810886	
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Date: 22/06/2018 Time: 10:30 AM

Venue: Energy Development Corporation Limited

List of Meeting Attendees						
No.	Name	Position	Institution	Email	Phone	Signature
1	Wendayehu D Tekalign	Ren. Energy Expert	AFDB	w.tekalign@afdb.org	+225 7575 3256	
2	Ngangure Diana	Energy Policy Analyst	MININFRA	diana.ngangure@mininfra.gov.rw	+250 785803426	
3	IMESIGYE James	Head of grid	EDCL	jtwesigye@edcl.rw	0782133225	
4	MUKESHIMANA Olivier	Senior Engineer Power Transmission Distribution	MININFRA	olivier.mukeshimana@mininfra.gov.rw	0788138593	
5						
6	Arkins Kabungu	Fin Analyst	AFDB	a.kabungo@afdb.org	+225 06305793	
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Date: 25/06/18 Time: 9:30 AM

Venue: REG

Purpose: Meeting with CFO of REG

List of Meeting Attendees						
No.	Name	Position	Institution	Email	Phone	Signature
1	Felix Oku	Environment Specialist	AFDB	f.oku@afdb.org	+254 714876856	
2	Nanawu Abilo	Policy Specialist	AFDB	n.abilovalters@afdb.org	+225 54642136	
3	Olatemi Sabu	Legal	AFDB	o.sabul@afdb.org	+225 67195151	
4	SEKOU KEITA	Fin Mgt Coord	AFDB	S.KEITA@afdb.org	+254 717497373	
5	Humphrey Richard	Power Eng	AFDB	humphrey-richard@afdb.org	+235 599728	
6	Vincent Nyumu	CFO	REG	vobegij@reg.rw	07267511370	
7	Arkins Kabungu	Fin Analyst	AFDB	a.kabungo@afdb.org	+225 06305793	
8	Wendayehu D. Tekalign	Ren. Energy Expert	AFDB	w.tekalign@afdb.org	+225 7575 3256	
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Date: 25/06/2018 Time: 11:30
 Venue: MINCOFIN

List of Meeting Attendees						
No.	Name	Position	Institution	Email	Phone	Signature
1	Jeanette Rugamba	Dir. Budget Management & Reporting Unit	MINCOFIN	jeanette.rugamba@mincofin.gov.rw	078 850 1367	
2	Christophe	Budget Policy Formulation and Reform Officer	MINCOFIN	christophe.ganzinga@mincofin.gov.rw	07882 12 502	
3	Joel DUKUZE	IFAD Staff	MINCOFIN	joel.dukuzi@mincofin.gov.rw	0788 793859	
4	* AGDS Team					
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ita, Namawa, Felix, Arkins, Fatimata, Wendyehn, Eline, Humphrey, Salau Olakemi

Date: 27th June, 2018
 Venue: Accountant General's Office
 MINCOFIN

List of Meeting Attendees						
No.	Name	Position	Institution	Email	Phone	Signature
1	Vincent NKURANGE	PFM Reforms Manager	MINCOFIN	vincent.nkuranga@mincofin.gov.rw	1250 788 509518	
2	Narcel MUKESHANA	AG	MINCOFIN	narcel.mukeshana@mincofin.gov.rw	0788 314034	
3	Alexis KAMUKIRE	GCIA	MINCOFIN	alexis.kamukire@mincofin.gov.rw	1250 788 674737	
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ANNEX 3: PICTURES OF STAKEHOLDER CONSULTATION MEETING WITH REG, OAG, MININFRA AND MINICONFIN



Plate1: Consultation meetings with REG and OAG in June 2018



Plate 2: Consultation meetings with MININCOFIN and other Development partners

