ASIAN INFRASTRUCTURE INVESTMENT BANK

October 30, 2025

Results-Based Financing

Approval Project Document

P001016 Rwanda: Rwanda Energy Sector Result-Based Financing Project

Indicative approval route: Board

Exceptions to delegation triggered:

- The first project involving AfDB in which AIIB proposes to apply one or several policies of AfDB
- A project in a non-regional Member

Currency Equivalents

As at September 30, 2025

Currency Unit – Rwandan Franc (RWF)
USD1.00 = RWF1,417.70
RWF1.00 = USD0.00070
USD1.00 = EUR0.87
EUR1.00 = USD1.15
USD1.00 = JPY148.025
JPY1.00 = USD0.0068

Fiscal Year

July 1 – June 30

Conversions

Abbreviations

AfDB	African Development Bank
AIIB	Asian Infrastructure Investment Bank
DLIs	Disbursement Linked Indicators
EAs	Executing Agencies
EDCL	Rwanda Energy Development Corporation Ltd
EIRR	Economic Internal Rate of Return
ENPV	Economic Net Present Value
ESSA	Environmental and Social System Assessment
ESSP	Energy Sector Strategic Plan
EUCL	Energy Utility Corporation Ltd
EUR	Euro
GHG	Greenhouse Gas
GoR	Government of Rwanda
IAs	Implementing Agencies
IVA	Independent Verification Agent
KM	Kilometer
LV	Low Voltage
MINECOFIN	Ministry of Finance and Economic Planning
MININFRA	Ministry of Infrastructure
MV	Medium Voltage
NDC	Nationally Determined Contributions
NPV	Net Present Value
NST	National Strategy for Transformation
OAG	Office of Auditor General

PCR	Program Completion Report
PFM	Public Financial Management
PRVR	Program Result Verification Report
PTU	Program Technical Unit
RBF	Result Based Financing
REG	Rwanda Energy Group
RUEAP	Rwanda Universal Energy Access Program
RURA	Rwanda Utilities Regulatory Agency
SDG	Sustainable Development Goal
TSA	Treasury Single Account
USD	United States Dollar

Executive Summary

1. The Rwanda Energy Sector Results-Based Financing (RBF) Project is a five-year, USD300 million project jointly co-financed by the Asian Infrastructure Investment Bank (AIIB) and the African Development Bank (AfDB). AfDB's loan amount of EUR173.84 million (USD200 million equivalent) was approved on July 14, 2025, and AIIB's loan amount of JPY14,802.5 million (USD100 million equivalent) is expected to be approved in October 2025. The standard terms for Sovereign-backed financing apply to AIIB's loan, with a final maturity of 34.5 years, including 5 years grace period, and an average repayment maturity of 19.91 years.

2. The objective of the Project is to increase access to reliable, clean electricity and energy services, including clean cooking in Rwanda. The Project aims to provide new electricity services to 1 million people as part of the AIIB's commitment to Mission 300 initiative in Africa. The Project has three main results areas namely: Improved system reliability and network strengthening, Increased access to grid and off-grid electricity to improve livelihood and safety, and Institutional strengthening and capacity building to contribute to Rwanda's targets of universal access to electricity by 2029.

3. Rwanda has a strong record in results-based financing, with successful projects in different sectors, including energy. Funding for the RBF project will be integrated into the budget to support the Energy Sector Strategic Plan (ESSP), aligning spending with sector goals. The Results Areas and disbursement-linked indicators for the Project match those of the ESSP, ensuring consistency with Rwanda's energy commitments.

4. AfDB's Integrated Safeguards Policy is applicable to this Project. AfDB has categorized the Project as Medium Risk; Category 2 in compliance with AfDB's Integrated Safeguards Systems Operational Safeguards. Environmental and Social issues during the first AfDB-financed RBF program were reportedly associated with gaps in internal management and the budgets for the implementation and supervision of E&S aspects. These gaps are addressed in the new RBF program through requirements and measures incorporated into the legal agreements between the Borrower and the Banks, and between the Borrower and Project Implementing Entities, and through the program action plan.

5. Procurement of goods, works, and services funded under this project will utilize the Borrower's Procurement System (BPS) and align with Rwanda's oversight structures.

Project No. and Name	P001016 Rwanda Energy Sector Results-Based Financing Project		
AIIB Member	Rwanda		
Borrower	Republic of Rwanda		
Guarantor	Republic of Rwanda		
Project Implementation Entity	Energy Development Corporation Limited (EDCL), Rwanda; Energy Utility Corporation Limited, Rwanda (EUCL)		
Proposed Amount of AIIB Financing (USDm)	USD100.00	**Instrument type (Instrument subtype)**	Loan (Direct Sovereign)
		Currency of financing requested	Yen
Sector (Subsector)	Energy (Multi-subsector)	**E&S Category and Comments (if any)**	B, Key potential environmental impacts and risks are related to grid expansion, and may include environmental degradation, generation and disposal of waste, and potential impacts on biodiversity and habitats. Risks related to off-grid access are primarily from electronic waste from solar panels. There are occupational health and safety risks, and impacts on workers and communities during the implementation of the Project. Key potential social risks

			and impacts are related to activities on scaling up of grid electricity access and clean cooking solutions in schools. These may include impacts on people's livelihoods due to restrictions on land use, gender-based violence brought about by labor influx at construction sites and in schools where clean cooking infrastructures will be installed, and risks related to discrimination in accessibility of Project services including solar systems. The ES risk rating of the Project is category 2 per AfDB's classification, which is equivalent to category B if AIIB's ESF were applicable.
Project Objective	The objective of the proposed energy results-based financing program is to increase access to reliable, clean electricity and energy services, including clean cooking in Rwanda.		
Project Description	The results-based financing (RBF) project is a five-year program with three main results areas namely: Improved system reliability and network strengthening, Increased access to grid and off-grid electricity to improve livelihood and safety, and Institutional strengthening and capacity building to contribute to the Government of Rwanda's targets of universal access to electricity by 2030. The RBF Project will increase access of households and businesses to less carbon intensive and lower greenhouse gas (GHG) emitting sources of energy through grid extension and provision of clean cooking solutions. The Project comprises: (i) distribution network rehabilitation		

	and reinforcement; (ii) provision of clean energy access through grid and off-grid connections, clean cooking technologies and streetlighting; and (iii) enhancement of institutional capacity to deliver universal electricity access. The Project will be jointly co-financed with AfDB as the lead co-financer and the scope involves: (a) Rehabilitation of Mukungwa, Gikondo, Jabana and Gasogi substations and construction of 3,855km of medium and low voltage distribution lines. (b) Provision of 200,000 grid connections, including associated distribution backbone infrastructure, and 50,000 off-grid connections through solar home systems. (c) Provision of clean cooking technologies to 100,000 household and 310 public institutions. (d) Provision of productive use equipment and appliances to 850 users. (e) Provision of 200km of streetlights along roads countrywide. (f) Delivery of a Clean Cooking Strategy & Implementation Plan and enhanced E&S monitoring under the RBF reporting, along with relevant capacity building programs.		
Implementation Period	Start Date: December 01, 2026 End Date: March 31, 2031	**Expected Loan Closing Date**	October 31, 2050
Co-financing type	Co-financing led by another financier	**Following other Financier's E&S Policy?**	Yes
Lead financier	African Development Bank	**Following other Financier's Procurement Policy?**	Yes
Financing Plan	AIIB - USD100m (JPY14,802.5m)AfDB - USD200m (EUR173.84m)		
Policy Assurance	The Vice President, Policy and Strategy, confirms an overall assurance that the proposed Bank Financing complies with the applicable Bank operational policies.		

Risk	
Key Risks	**Mitigation Measures**
Accounting and Reporting: Financial reports are inadequate and submitted in delay.	Strict oversight by the EA Financial Systems Manager, ensure financial reports are based on established accounting standards and procedures, and based on credible data/ information, and reports are submitted to the Bank on time. (MININFRA/REG/EDCL)

Budget Execution & Internal Controls: Poor budget execution and financial controls leading resource wastage.	late and execute credible annual budgets and Expenditure Framework and put in place effective internal control environment to detect, mitigate and prevent irregularities, and to ensure efficiency, and effectiveness of the use of resources. (MININFRA/REG/EDCL)
During operation, risks associated with electrical and fire hazards, waste from end of use streetlights, appliances and home solar system components.	Conducting public education and awareness campaigns on electrical and fire hazards and measures to take in case of accidents. Providing arrangements for the environmentally sound disposal of electronic waste including from solar home systems and sensitizing communities on these arrangements. Implementing standard operating procedures to safeguard worker safety.
Quality of procurement document and process: leading to variation, and litigations	An experienced procurement expert assigned to the Program Technical Team; Ensure use of international standards and specifications and adhere to standard bid documents acceptable to the Bank. Capacity building for procurement staff is in the project and will be supplemented by regular Bank delivered fiduciary clinics. (EDCL)
Treasury Management and Funds Flow: Delay in the release of funds at start of the project and unpredictability of funding from MINECOFIN to REG/EDCL for subsequent disbursement requests	Use advance financing and adhere to strict planning of the verification of DLI and prompt submission of disbursement request to the Bank. (MININFRA/REG/EDCL)
Economic Capital (ECap) Consumption	15.38USDm 15.38%

Strategic Alignment	
Alignment with AIIB's thematic priorities	Green infrastructure

Alignment with AIIB's strategies		Strategy on Financing Operations in Non-regional Members; Sustainable Energy for Tomorrow Strategy		
Key Outcomes	**Indicator**	**Unit of measure**	**Baseline (Year)**	**Target (Year)**
Increased access to on-grid, off-grid electricity and clean cooking	Households provided with access to off-grid electricity	Number	0 (2024)	50000 (2029)
Increased access to on-grid, off-grid electricity and clean cooking	Households provided with new or improved access to clean cooking solutions	Number	0 (2024)	100310 (2029)
Increased access to on-grid, off-grid electricity and clean cooking	Additional number of households connected to the grid	Number	0 (2024)	200000 (2029)

Other Key Financing Requirements	
Conditions of Effectiveness	- The Subsidiary Agreement has been executed on behalf of the Borrower and EDCL, and all conditions precedent to its effectiveness have been fulfilled; - The Co-financing Agreement has been executed on behalf of the Co-financier and the Borrower, and all conditions precedent to its effectiveness (other than the effectiveness of this Loan Agreement) have been fulfilled; and - The Project Co-lenders' Agreement has been executed on behalf of the Bank and the Co-financier, and all conditions precedent to its effectiveness (except for the effectiveness of - this Loan Agreement) have been satisfied;
Key Conditions for 1st Disbursement	Payment of the front-end fee
Key Covenants	- The project coordination unit is maintained throughout the Project by the Project Implementing Entities with adequate resources, and staff with experience, qualifications, and terms of reference satisfactory to the Bank. - The Project Steering Committee is maintained during project implementation with terms of reference, functions, resources, and mandate, satisfactory to the Bank; - Annual Work Plans and Budget shall be prepared by the Project Implementing Entities containing all activities proposed to be included in the Project during the following calendar year,

	and a proposed financing plan for expenditures required for such activities.

President	Liqun Jin
Chief Investment Officer	Kim-See Lim
Director General	Rajat Misra
Project Team Leader	Tione Mtalimanja, Senior Investment Officer
Project Team Members	Issam Mokni, Alternate Counsel Nawraj Pradhan, Climate Specialist Ruonan Wang, Co-PTL Ebrima Ceesay, Project Counsel Khaliqa Mohammed, SFD - Environment Specialist Nurul Mutmainnah, SFD - Financial Management Specialist Natan Jere, SFD - Procurement Specialist Charlene d'Almeida, SFD - Social Development Specialist Oliver Schoch, Team Member

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1. Context

1.1 Country and Macroeconomic Overview

1. Rwanda is a country located in Central Africa, bordered to the north by Uganda, to the west by the Democratic Republic of Congo (DRC), to the south by Burundi and to the east by Tanzania. According to the National Institute of Statistics of Rwanda (NISR), Rwanda has a population of 13.2 million people based on the fifth Rwanda Population and Housing Census (2022 RPHC[1]) and the country has a total area of 26,338 km^2.

2. **Economic Overview.** Rwanda's economy experienced a robust average annual growth rate of 8.2% of the Gross Domestic Product (GDP) in 2022-2023, driven by strong private consumption, rapid recovery in tourism, as well as solid growth in industry and services. In 2024[2], real GDP rose to 8.9% from 8.3% in 2023, further highlighting how the country has exhibited strong resilience amidst global uncertainties, driven by robust private consumption, significant investment and strong performances in services, industry, and a recovering agriculture sector. Rwanda's economy has experienced a growth rate of 7.8% in the first quarter of 2025[3], driven by strong growth in the industrial and services sectors. GDP growth is expected to maintain momentum in 2025-27, with a projected annual average of 7% from continued expansion in agriculture, services, and industry, new construction projects including new Bugesera international airport, and strong labor dynamics.

3. **Political Situation.** The country has remained internally peaceful since the 1994 genocide against the Tutsi. However, bilateral relations with neighboring countries Burundi and the DRC remain a challenge. The heightened conflicts in the region have resulted in Rwanda hosting approximately 135,000 displaced people by the end of 2024[4], increasing pressure on provision of basic services, including energy services, to communities.

4. **Development Strategy.** Rwanda aspires to attain upper-middle-income and high-income status by 2035 and 2050 respectively through its Vision 2050[5], whose overarching goals are *Economic Growth and Prosperity* and *High Quality and Standards of Life for Rwandans*. Vision 2050 targets GDP per capita of over USD4,036 and USD12,476 by 2035 and 2050 respectively. The long-term vision is implemented through a series of medium-term national development strategies called National Strategy for Transformation. The first medium-term strategy (NST1) served as a bridge between Vision 2020 and Vision 2050, and it covered the period 2017 to 2024. The current strategy, NST2[6], covers a period of five years from 2024 to 2029, and it targets an annual average real GDP growth rate of 9.3% during the strategy period, with per capita income expected to rise from USD1,040 in 2023 to USD1,369 in 2029.

5. **Member Priorities.** Through the NST2, Rwanda aims to deliver long term success and positively impact on the lives of citizens by prioritizing sustainable development, climate resilience, development of domestic industries, job creation, quality and relevant education, enhanced

[1] NISR, 2022 RPHC
[2] NISR, GDP National Accounts 2024
[3] NISR, GDP_Q1 2025 Report
[4] UNHCR, Rwanda Annual Results Report 2024
[5] MINECOFIN, Republic of Rwanda Vision 2050
[6] MINECOFIN, Second National Strategy for Transformation (NST2)

nutrition and early childhood development, quality-of-service delivery while strengthening citizen engagement and participation. The main objectives of the NST2 are arranged in three pillars namely economic transformation, social transformation and transformational governance pillars. One of the key outcomes under the economic transformation pillar is to ensure universal access to electricity to households and all productive users by 2029.

6. **Development Challenges.** Rwanda has gone through a series of development phases starting from the aftermath of the Genocide against the Tutsi in 1994. The early 2000s provided a blueprint on economic development aspirations and post-2010 saw a period of intensified investment in human capital, developing basic infrastructure and expanding access to various services as a foundation for sustained growth. Rwanda's development journey has shown tremendous progress in economic growth, social cohesion and infrastructure development. Despite the remarkable economic progress Rwanda still faces several challenges including high public debt, insufficient job creation, low productivity, balance of payments deficit and a large informal sector. Persistent poverty and inequality, low human capital development, and a growing rural-urban economic divide are some of the social challenges that exist in the country. Further challenges involve pressure on natural resources, vulnerability to climate change, and the need for greater private sector development. Addressing these challenges is key to Rwanda's long-term economic ambitions within the Vision 2050.

1.2 Energy Sector Overview

7. **Institutional Arrangements.** The Rwanda Energy Group (REG) is a commercially operated state-owned enterprise, with a mandate to develop and operate all public sector energy infrastructure and act as the off taker of all private investments in electricity generation through its two independent subsidiaries, Energy Utility Corporation Ltd (EUCL) and Energy Development Corporation Ltd (EDCL). EDCL is responsible for developing new investment projects, while EUCL oversees the day-to-day operations of the power grid including electricity sales and revenue collection for the energy sector in Rwanda. REG is overseen by the Ministry of Infrastructure (MININFRA) and regulated by the Rwanda Utilities Regulatory Agency (RURA), an independent regulator. The regulator evaluates the revenue requirements of REG and proposes electricity tariffs accounting for affordability constraints. There is significant private sector participation through Independent Power Producers (IPPs), the off-grid electricity access initiative, particularly in Solar Home Systems and provision of clean cooking solutions. Development Partners participate in energy sector development activities through the Energy Sector Working Group (ESWG), co-chaired by MININFRA and a representative from the Development Partners (DPs). Currently the African Development Bank (AfDB) is the co-chair of the ESWG, and the Asian Infrastructure Investment Bank (AIIB) is an active member.

8. **Energy Sector Context.** The development of the energy sector in Rwanda is guided by the periodic Energy Sector Strategic Plan for the period 2024/25 to 2029/30 (ESSP 2025-2030). The ESSP 2025-2030 aligns with the national aspirations outlined in the Vision 2050, the NST2, the Energy Policy 2025[7], as well as Rwanda's commitments to the Nationally Determined Contributions (NDCs) and the Green Growth and Climate Resilient Strategy (GGCRS). Rwanda's power sector has made significant progress in recent years. The number of households connected to the grid increased from 362,174 in March 2013[8] to 1,946,781 by the end of June 2024[9], an average annual connection of 144,000 households. During the same period, electricity

[7] Rwanda Energy Policy 2025
[8] RURA Energy Statistics_June 2013
[9] REG Annual Report_2023-24FY

generation capacity increased from 119.6MW[10] to 406.4MW[11]. According to REG's annual report for fiscal year 2023/24, the national grid had a total length of 1,158km and 32,474km for the transmission and distribution networks respectively by the end of June 2024. Electricity access rate was at 79% (56% grid connected and 23% off-grid)[12] at the end of the fiscal year 2023/2024 and total system losses slightly increased to 17.99% from 16.9% in the previous year. The system losses were higher than the ESSP 2019-2024 target of 15% by 2024.

9. **Energy Sector Priorities and Targets.** The ESSP 2025-2030 has the following key priorities for the electricity sub-sector: scaling up electricity access through both grid and off-grid, implementation of on-going generation projects, promotion of use of clean cooking solutions, ensuring national grid network strengthening and expansion and continuing with the installation of streetlights on the existing major national and urban roads. The ESSP has a target of expanding electricity access to 76% and 24% for grid and off-grid respectively, including 100% access to productive energy users. Power generation capacity is expected to increase to 795.25MW by 2028/29. The ESSP also targets an increase in use of clean cooking solutions from the current 1,489,810 to 2,676,085 households. The targets also include the expansion of transmission and distribution network infrastructure with a construction of new 473.8km of high-voltage (HV) and 6,133.6km of MV Lines, and 21,673km of LV lines to improve reliability and efficiency while reducing the system losses from the current 17.9% to 14.7% by 2029.

10. The Energy Policy 2025 estimates that RWF1,500 billion (USD1.05 billion) and RWF276 billion (USD193.2 million) will be required for 2035 to expand the electricity network for grid connections and implement the least cost transmission and distribution network expansion plans respectively. Similarly, RWF10 billion (USD7.05 million) will be required for off-grid connections in collaboration with the private sector and RWF11 billion (USD7.76 million) will be required for street lighting.

11. **Ongoing Sector Interventions.** The Government of Rwanda (GoR) established the Rwanda Universal Energy Access Program (RUEAP) in 2020, as an extension of the Electricity Access Rollout Program, the electrification program started in 2009. RUEAP is a multi-donor program to achieve the energy access objectives of NST1 and ESSP and builds on the experiences and lessons learned from the Electricity Access Rollout Program. Thus far the RUEAP has raised approximately USD1,100 million in donor financing for ongoing energy access and upstream transmission investments, through three multi-donor projects: the Energy Access and Quality Improvement Project (EAQIP), the Transmission System Reinforcement and Last Mile Connectivity Project and the Accelerating Sustainable and Clean Energy Transformation (ASCENT) Rwanda.

12. The WB is leading the implementation of EAQIP with co-financing from Agence Francaise du Developpement, OPEC Fund for International Development and Saudi Fund for Development for a total of roughly USD290 million up to 31 December 2026. [13] The WB is also leading the implementation of ASCENT with co-financing from AIIB for a total of USD400 million. The implementing agencies for EAQIP and ASCENT are the Energy Development Corporation Ltd (EDCL) and Development Bank of Rwanda (Banque Rwandaise de Developpement, BRD).

13. AfDB is leading the implementation of the Transmission System Reinforcement and Last Mile Connectivity Project with financing of USD265 million up to 31 August 2026.[14] The project aims to provide grid-connected electricity to 77,470 households. Similarly, European Investment

[10] Energy Sector Strategic Plan_2013-2018
[11] REG Annual Report_2023-24FY
[12] REG Annual Report_2023-24FY
[13] World Bank, Rwanda – Energy Access and Quality Improvement Project.
[14] African Development Bank, Rwanda – Transmission System Reinforcement and Last Mile Connectivity Project.

Bank is providing EUR100 million via its Electricity Access Rwanda project under a parallel co-financing with the AfDB's Last Mile Connectivity project.[15] The implementing entity for these two projects is EDCL.

14. AfDB is also implementing a second phase of the Scaling Up Electricity Access Program (SEAP II), whose objective 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. SEAP II is a first results-based financing (RBF) program implemented by AfDB in Rwanda and is nearing completion with 71.8% of funds disbursed. The first RBF has been rated "Satisfactory," having achieved 10 out of 13 results targets and met 5 of 8 disbursement milestones. Notably, it has facilitated an additional 83,891 household grid connections, 354,145 off-grid household connections, and 3,125 productive use connections. At the outcome level, the program has helped increase the national electricity access rate from 44% in 2018 to 78.9% in 2024, and reduced power system losses from 21% to 18% over the same period.

15. **Energy Sector Challenges.** Electricity access rate has grown from 6% in 2009 to roughly 79% as of June 2024, being one of the fastest growth rates in the region over the same period. Despite the remarkable growth in electricity access rates in recent years, underserved communities remain countrywide. Electricity access is unevenly distributed between grid and off-grid access across the country's 30 districts. Only nine districts have attained at least 80% access rate[16] with the overall least access rate of 62% in Gisagara district. Improvement in electricity access has been affected by the nature of settlement patterns with only 65% of the population living in grouped settlements. Other key challenges include limited budget allocations, outdated distribution networks, and supply chain constraints from global conflicts which have hindered infrastructure projects like grid and off-grid electrification, and street lighting, further exacerbating access disparities. These challenges can be addressed through strategic interventions, improved coordination, and increased resource mobilization to ensure sustainable energy access for all.

1.3 Addressing Key Development Challenges: Project Contributions

16. The Rwanda energy sector faces a significant investment gap in the distribution network leading to inability to deliver adequate and quality electricity services. In planning period NST2, the Government in its ESSP estimates that USD1,374 million out of USD2.89 billion is required to address investment gaps in the distribution network. Consequently, the Government has requested AIIB's contribution towards a USD300 million Results-Based Financing (RBF) Project, including USD200 million from AfDB to support activities in three thematic areas; network strengthening, access to electricity services, and institutional capacity building. The resources will go towards network rehabilitation, provision of grid and off-grid access to 200,000 and 50,000 households respectively, supplying 100,000 clean cooking appliances to households and 310 to institutions, and institutional capacity building. The anticipated outcomes from proposed project include increased access to electricity and clean cooking, and enhanced performance of the grid system. The Project will contribute to improving national productivity, security, job creation and the quality of life enjoyed by the people of Rwanda. The RBF Project assumes a continued conducive business environment and macroeconomic stability, and participation of private sector and other financial institutions to mobilize the resources needed. The project contributes towards the ESSP targets of universal access to electricity from both grid and off-grid connections and in turn supports NST2's economic transformation pillar to enhance sustainable development,

[15] European Investment Bank, October 2020, Electricity Access Rwanda Project.
[16] MININFRA, (November 2024). Backward Looking Sector Joint Rport FY2023/24

climate resilience and job creation through access to sustainable and modern energy services and productive use of energy. The project will make a significant contribution to climate change mitigation through the above-mentioned components under Results Area (RA) 1 and Results Area (RA) 2. It is estimated that the project will achieve total GHG emissions reduction of 2,419,051 tCO_2e over the period 2025 to 2050, averaging approximately 93,040 tCO_2e per year and 372,160 tCO_2e over project period.

2. Rationale

2.1 Strategic Fit for AIIB

17. **Corporate Strategy.** The proposed Project is well-aligned with AIIB's thematic priority on **Green Infrastructure** through the reduction in greenhouse gas (GHG) emissions from replacement of unsustainable, inefficient and more carbon intense fuel sources for households, enterprises and public institutions' energy use with less carbon intensive electricity. The Project will also improve the quality and reliability of the electricity supply which will result in lower carbon dioxide emissions during the network operation phase of the project-installed distribution network assets.

18. **Sector Strategy.** The Project is aligned with four of the six Principles of AIIB's *Energy Sector Strategy – Sustainable Energy for Tomorrow*. It supports *Principle 1: Promote energy access and security* through: (i) increased access to modern energy services through greater electrification and deployment of clean cooking; (ii) improved affordability, reliability and quality of electricity supply to serve productive uses and modern society needs; and (iii) reduced negative health impacts due to indoor combustion of solid fuels. The Project also supports *Principle 2: Support transition to a clean energy system* through (i) enabling distribution network infrastructure; (ii) electrification of end-uses; and (iii) fuel shifts from carbon intensive fuels to low carbon alternatives. It supports *Principle 3: Realize energy efficiency potential* by investing in the distribution system to enhance grid efficiency and thereby reducing system losses. Finally, it supports *Principle 4: Manage local and regional pollution* by supporting the shift from the use of polluting household fuels to clean cooking and solar technologies for meeting household energy needs.

19. **Strategy on Financing Operations in Non-Regional Members[17].** The Project is also aligned with the Bank's strategy for eligible investments in non-regional members through the strategy's second principle of global public goods, as it contributes to climate change mitigation. Although Rwanda's electricity sector is primarily powered by renewable hydropower, electrification rates remain low, and many households still depend on inefficient, carbon-intensive energy sources for domestic use. This project will help mitigate greenhouse gas emissions by (i) supporting households and businesses in transitioning from high-carbon fuel sources such as oil lanterns, candles, and firewood to low carbon electricity, (ii) reducing losses from the power distribution system, and (iii) strengthening the grid to enhance its capacity to deliver existing renewable resources to end consumers and integrate more variable renewable energy to meet future growth in demand. In addition to grid and off-grid investments, the provision of streetlighting and productive use technologies will support business transition to clean energy through use of energy efficient lighting technologies[18] to replace inefficient and polluting lamps, and use of electric appliances powered from clean energy instead of polluting fuel sources such as diesel generators. The proposed investments in the RBF projects are within the conditional and unconditional mitigation measures of Rwanda's Updated Nationally Determined Contribution (NDC) to advance global public goods and thereby contributing significant benefits towards Asia, which has 60% of the world's population.

20. **Sustainable Development Goals.** The Project is aligned with the United Nations (UN) Sustainable Development Goal (SDG) No. 3 – ensure healthy lives and promoting well-being for all at all ages, SDG 7 – ensure access to affordable, reliable, sustainable and modern energy for

[17] AIIB, 2018, Strategy on Financing Operations in Non-Regional Members.
[18] Street lighting will benefit roadside traders who would otherwise have had to use kerosene lamps or diesel-powered electric lighting during nighttime hours.

all, SDG 8 – promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all, SDG 9 – build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation, and SDG 13 – take urgent action to combat climate change and its impacts. The RBF Project will support the SDGs through reduced exposure to harmful emissions, increased access to modern energy services, promotion of productive use of energy and installation of power infrastructure that aligns with the Paris Agreement.

2.2 **Paris Agreement Alignment (PAA) and Climate Finance**

21. In line with AIIB methodology for assessing the alignment with the mitigation and adaptation goals of the Paris Climate Agreement, the RBF project is assessed as aligned. PAA of the project is further discussed in Section 6 and Annex 8. In line with the joint MDB methodology Common Principles for Climate Mitigation Finance Tracking and the Joint Methodology for Tracking Climate Change Adaptation Finance, it is estimated that USD75.68 million contributed to support mitigation (under RA1 and RA2), and USD1.88 million contributes to support adaptation (under RA1). For the reporting purposes and to avoid double counting, USD74.74 million (74.74 percent) of AIIB finance for the project is reported as mitigation finance, and USD0.94 million (0.94 percent) as adaptation finance, with USD75.68 million (75.68 percent) as total climate finance. Details on the climate finance estimates are provided in Annex 8.

2.3 **Value Addition by AIIB**

22. Beyond the provision of financing, AIIB's participation alongside AfDB during project preparation helped to strengthen the quality of project preparation and effective project implementation framework through lessons learned from other AIIB RBF projects. The RBF project has benefitted from project design experience in other AIIB RBF projects specifically regarding choice of DLIs and scalability of DLIs to ensure alignment of achieved results with project timelines and disbursement allocations. AIIB's contribution to project design also enhanced the project's compliance to environmental and social framework requirements, with clear boundaries for high-risk activities to be excluded from the RBF project activities.

2.4 **Value Addition to AIIB**

23. The Project will be AIIB's first co-financed direct lending project with AfDB and a first RBF project in Africa for AIIB. The Project will increase AIIB's understanding of RBF operations in Africa and enhance AIIB's capacity to deploy RBF instruments in low-income countries, for which greater client demand is anticipated. The Project will also strengthen AIIB's partnership with AfDB and increase AIIB's knowledge and understanding of AfDB's: (i) Integrated Safeguards Systems (ISS); (ii) Independent Review Mechanism (IRM); (iii) policy on results-based financing; and (iv) other operational policies. The Project will also increase AIIB's impact and visibility in Rwanda and broaden AIIB's member collaboration by providing the opportunity to engage on a new instrument (RBF).

24. The Project is part of AIIB's commitment to Mission 300 Initiative, where AIIB President pledged USD1-1.5 billion to support the initiative during the African Heads of State Energy Summit held in Dar es Salaam, Tanzania in January 2025. Mission 300 initiative was launched by the World Bank Group (WBG) and AfDB, in collaboration with other partners, to connect 300 million people to electricity in Sub-Saharan Africa by 2030. Mission 300 focuses on expanding the electricity grid and increasing connections in underserved areas and deploying mini-grids and standalone solar solutions to bring power to remote, off-grid communities. The Project will therefore increase AIIB's impact and visibility in Africa and facilitate replication of project preparation efforts in AIIB members who are part of Mission 300.

25. **Lessons Learned.** Based on the successful implementation of other energy sector projects under a multi-donor approach, Rwanda Energy Sector RBF Project will be implemented under the multi-donor energy access program, RUEAP. RUEAP provides a framework for coordination between donors and country stakeholders for integrated technical, financial and implementation planning for the sector. In addition, the project design integrates lessons learned from the ongoing AfDB's RBF program. Relevant lessons include: (i) the project activities have been carefully designed, costed and packaged to deliver the agreed results within the project's implementation timeframe; (ii) the disbursement-linked indicator (DLI) resource weights have been assigned with a clear focus on incentivizing the ESSP implementation towards the sectors key outcomes – electricity access, system reliability and system operational performance, and (iii) the structure and composition of the RBF Project implementation arrangements emphasize the use of experienced technical experts from the Government and REG, led by an experienced Project Coordinator from EDCL, to ensure efficiency and quality of delivered results. Key lessons related to the selection of DLI targets, result measurement, challenges of data quality have all been adequately taken into consideration. Some of the lessons learned in this RBF project preparation were taken from AIIB projects including *India: Maharashtra Climate Resilient Distributed Renewable Energy Access Program* on critical areas for country systems' assessments for compliance with AIIB's policy requirements on an energy project; *Jordan: Inclusive Transparent and Climate Responsive Investments Program for Results* on the review and alignment with AIIB's policy requirements of country systems' assessments done by a co-financier; *and India: Resilient Kerala Program for Results* on the approach to results chain analysis and choice of DLIs on a program with multiple implementing entities.

3. Project Description

3.1 Government Program and RBP Scope

26. **Government Program.** The proposed Results-Based Financing (RBF) project will be part of the overall government objectives targeted within the NST2 and ESSP. The GoR has estimated that USD 2.89 billion is required to implement the initiatives over the ESSP period (up to 2029/30). Specifically, the ESSP is expected to deliver 1,127,223 and 223,191 grid and off-grid household connections respectively, 2,530 connections to Productive Use Entities (PUEs) and clean cooking technologies to 3,658,000 households. The ESSP is also expected to construct 6,136km and 21,673km of medium voltage (MV) and low voltage (LV) lines respectively to strengthen the distribution network. Some of the objectives of the NST2 and ESSP are being achieved through implementation of RUEAP and the proposed RBF project will contribute to the NST2 and ESSP through RUEAP program.

27. **RBP Scope.** The RBF project is a five-year project with three main results areas namely: Improved system reliability and network strengthening, Increased access to grid and off-grid electricity to improve livelihood and safety, and Institutional strengthening and capacity building to contribute to the GoR's targets of universal access to electricity by 2029.The RBF Project will increase access of households and businesses to less carbon intensive and lower GHG emitting sources of energy through grid extension and provision of clean cooking solutions. The Project comprises: (i) distribution network rehabilitation and reinforcement; (ii) provision of clean energy access through grid and off-grid connections, clean cooking technologies and streetlighting; and (iii) enhancement of institutional capacity to deliver universal electricity access. The Project will be jointly co-financed with AfDB as the lead co-financer and the scope involves:

(a) Rehabilitation of Mukungwa, Gikondo, Jabana and Gasogi substations and construction of 3,855km of medium and low voltage distribution lines.

(b) Provision of 200,000 grid connections, including associated distribution backbone infrastructure, and 50,000 off-grid connections through solar home systems.

(c) Provision of clean cooking technologies to 100,000 households and 310 public institutions.

(d) Provision of productive use equipment and appliances to 850 users.

(e) Provision of 200km of streetlights along roads countrywide.

(f) Delivery of a Clean Cooking Strategy & Implementation Plan and enhanced E&S monitoring under the RBF reporting, along with relevant capacity building programs.

28. The RBF project will be the second of its kind in Rwanda's energy sector, following the SEAP II RBF program funded by the AfDB. The Project will be implemented in parallel with ongoing and planned ESSP investment operations funded by the Government and development partners. It will complement projects like SEAP II, Transmission System Reinforcement and Last Mile Connectivity project (both AfDB-financed), Electricity Access Rwanda (EIB), Rwanda Energy Access and Quality Improvement Project (World Bank, AFD, OPEC, Saudi Fund), clean cooking and street lighting campaigns, and the Accelerating Sustainable and Clean Energy Transformation (ASCENT) Rwanda funded by AIIB and World Bank. Implementation progress for the RBF project will be included in the regular semi-annual ESSP reports to the Energy Sector Working Group.

29. **RBF Rationale.** Rwanda has a strong record in results-based financing, with successful projects in sectors like agriculture, health skills development, and off-grid energy. Key institutions

such as MININFRA, REG and its subsidiaries EDCL and EUCL bring experience in performance-based operations to the RBF project. Funding from ongoing AfDB's RBF program and this new initiative will be integrated into the budget to support ESSP, aligning spending with sector goals. The Results Areas and DLI targets match those of the ESSP, ensuring consistency with Rwanda's energy commitments. Embedding the RBF within a broader government framework encourages both ownership and oversight, with progress reported publicly at the National Leadership Retreat and in Parliament.

30. **Expected Beneficiaries.** The principal beneficiaries of the project encompass households, enterprises, and public institutions that will receive access to both grid-connected and off-grid electricity, clean cooking solutions, and productive-use technologies. Additionally, current domestic, industrial, commercial, and productive-use customers will experience enhanced service quality due to improved power system reliability. Local contractors are expected to benefit from opportunities in the supply and installation of electrical services, while small-scale businesses may gain from greater security and extended operating hours because of upgraded street lighting. The small-scall businesses will also benefit from reduced energy costs from the replacement of fossil-fuel lighting with light from the streetlights. Furthermore, the local communities within project areas will also see increased employment prospects during the project's implementation phase. Furthermore, the initiative aims to expand access to modern energy services with an emphasis on inclusivity, specifically targeting women, with a goal that 25% of beneficiaries will be female.

31. The proposed RBF project is estimated at USD300 million (EUR260.76 million/ JPY44,407.5 million). AIIB will provide USD100 million (~EUR86.92 million/ JPY14,802.5 million) and AfDB has provided EUR173.84 million (~USD200 million) through a joint co-financing arrangement as shown in Table 1 below. The Results Area 1 component accounts for 12.5 percent (USD37.5 million/EUR32.59 million), 83.8 percent (USD215.5 million/EUR218.6 million) for the Results Area 2 and the Results Area 3 component accounts for 3.7 percent (USD11.0 million/EUR9.56 million) of the Project.

Table 1: RBP Financing

Source	Amount (USD million)	Amount (EUR million)	Amount (JPY million)	% of Total
AIIB	100	86.92	14,802.50	33%
AfDB	200	173.84	29,605.00	67%
Total Program Financing	**300**	**260.76**	**44,407.50**	**100%**

Use	Amount (USD million)	Amount (EUR million)	Amount (JPY million)	% of Total
Results Area 1: System Reliability and Network Strengthening				
Substation rehabilitation	15.0	13.04	2,220.38	5.0%
Overhead lines reinforcement	22.5	19.56	3,330.56	7.5%
Subtotal	**37.5**	**32.59**	**5,550.94**	**12.5%**
Result Area 2: Increased access to on-grid, off-grid electricity and clean cooking				
Provision of Grid Access Connections	112.15	97.48	22,203.75	37.4%
Provision of Off-grid Access Connections	35.75	31.07	2,264.78	11.9%
Provision of Productive Use Connections	25.00	21.73	3,996.68	8.3%
Electrification of Green and Innovation Cities	20.28	17.62	3,404.58	6.8%
Provision of Streetlighting	13.60	11.82	2,694.06	4.5%
Distribution of Clean Cooking Technologies	37.73	32.79	2,220.38	12.6%
Distribution of Solar Water Heaters	7.00	6.08	444.08	2.3%
Subtotal	**251.50**	**218.60**	**37,228.29**	**83.8%**

Use	Amount (USD million)	Amount (EUR million)	Amount (JPY million)	% of Total
Results Area 3: Institutional Strengthening and Capacity Building				
Cooking Strategy and Implementation Plan	3.0	2.61	444.08	1.0%
Development and revision of targeted strategies and plans	8.0	6.96	1,184.20	2.7%
Subtotal	**11.0**	**9.57**	**1,628.28**	**3.7%**
Total Program Financing	**300.0**	**260.76**	**44,407.50**	**100%**

32. Project implementation is scheduled for the 2025/26 to 2029/30 fiscal years and will focus on three main Results Areas, each designed to support the achievement of ESSP objectives. Consistent with the RBF's limitation to activities presenting environmental and social risks no greater than category B (AfDB category 2), the Results Areas emphasize strengthening, upgrading, and rehabilitating the distribution network; expanding access to electricity services, clean cooking, and street lighting; and advancing institutional strengthening and capacity building. The RBF Project's activities will be executed in selected regions across the country.

33. **Excluded activities under the RBF Project**: Consistent with AIIB's Procurement Policy and the Environmental and Social Policy (ESP), the following activities will be excluded from RBF project: (i) high risk activities classified as Category A (AfDB's Category 1) under the ESP which would require the preparation of a full Resettlement Action Plan (RAP), (ii) high-value individual contracts and (iii) activities with complex design or requiring specialized implementation arrangements, which have affected the timely completion of the ongoing RBF project.

34. **RBF Project Approval**: The Board of Directors of the AfDB approved EUR173.84 million for its RBF 2 project on July 14, 2025, with AIIB's financing of JPY14,802.5 million (equivalent of USD100 million) expected to be approved in October 2025.

3.2 RBP Development Objective (PDO)

35. The objective of the proposed energy sector results-based financing (RBF) project is to increase access to reliable, clean electricity and energy services, including clean cooking in Rwanda.

3.3 RBP Key Results and Disbursement Linked Indicators

36. **Advance.** An advance financing of up to 25% of the loan amount will be made available to initiate the implementation of RBF project activities. GoR will submit a justification for the advance to AIIB no later than AIIB loan negotiations for review and consideration. Any further requests for an advance under the project will be evaluated individually.

37. **Advance Recovery.** An advance paid against a DLI shall be recovered within three financial years and not later the fourth year of project implementation. The advanced amount will be recovered in three equal amounts from year 2 to year 4, with the amount to be recovered deducted first before disbursement on achieved results. No advanced amount shall remain outstanding during the final year (year 5) of project implementation.

38. **Already Achieved DLIs.** AfDB and AIIB may agree with the GoR to disburse, following effectiveness of the RBF and upon verification, amounts not to exceed in the aggregate twenty-five percent (25%) of the total RBF amount against DLIs that have been achieved between the RBF's Concept Review and the date of signing of the legal agreements. The combined amount of the RBF allocated for Advances and Already Achieved DLRs may not exceed thirty percent (30%) of the total amount of RBF financing.

39. **Key Results Areas.** The RBF project has three (3) Results Areas covering nineteen (19) results and these align with the government's targets in the ESSP.

40. **Results Area 1: System Reliability and Network Strengthening (USD25 million AfDB; USD12.5 million AIIB or EUR21.73 million AfDB; EUR10.86 million AIIB).** This results area is aimed at improving the existing electricity distribution network particularly in areas that have seen increased population growth including the City of Kigali, and secondary cities of Musanze and Rwamagana, and other locations across the country. The scope will largely include the upgrade of obsolete and overloaded network equipment, extension of medium voltage (MV) and low voltage (LV) circuits, upgrading of switchyard equipment, conversion of overhead bare conductors into overhead insulated cables and underground cables in densely populated urban areas, and the implementation of comprehensive maintenance and rehabilitation of existing power plants. It will also involve distribution network automation through the deployment of smart intelligent devices.

41. Results Area 1 has one DLI that demonstrates distribution network performance namely ***DLI 1.1: Grid outage frequency compared to the previous 3-year average***. Given the data quality challenges that AfDB experienced in the first RBF about the use of System Average Interruption Duration Index (SAIDI) and System Average Interruption Frequency Index (SAIFI), which are standard system reliability metrices, it was agreed that average frequency of interruption would be used as this data is readily accessible from the EUCL system. Recognizing that system performance does not follow a straight line but rather it averages along a trend line, the DLI result will be the difference between the current and previous value based on the average indicators measured over the previous three-year period. The Baseline parameters in 2024/2025 therefore are the averages of the three previous fiscal years – 2021/22, 2022/23 and 2023/24. The average will be calculated based on the average of the past three fiscal years at any given time.

42. **Results Area 2: Increased access to on-grid, off-grid electricity and clean cooking (USD167.7 million AfDB; USD83.8 million AIIB or EUR145.73 million AfDB; EUR72.87 million AIIB).** This results area is aimed at increased access to grid and off-grid electricity to improve livelihood and safety. This result area will support increasing access to electricity countrywide for households and productive electricity usage, particularly targeting regions with significantly low access rates mainly located in the rural parts of Rwanda. Off-grid solar solutions for households will be provided in areas where grid access is not cost-effective. Activities will also increase the number of households using efficient clean cooking technologies and support the government objective of ensuring a secure environment for a 24-hour economy in urban centers and along major roads experiencing rapid population growth, through the installation of street lighting.

43. Results Area 2 has four (4) DLIs that measure the number of households provided with grid and off-grid access, number of households provided with clean cooking solutions, and number of new productive users. ***DLI 2.1: Additional number of households connected to the grid*** and ***DLI 2.4: New productive use customers provided with electricity services*** are for grid electricity access while ***DLI 2.2: Additional number of households installed with standalone off-grid systems*** and ***DLI 2.3: Additional number of households and institutions provided with clean cooking technologies*** are for off-grid access.

44. **Results Area 3: Institutional Strengthening and Capacity Building (USD7.3 million AfDB; USD3.7 million AIIB or EUR6.37 million AfDB; EUR3.19 million AIIB).** This results area is aimed at enhancing implementation capacity required to deliver on the national mandate of universal access, while ensuring a timely and efficient project implementation to achieve its development objectives. In addition, this Results Area will address identified energy sector gaps

that are essential for the sector's sustainability and will also facilitate the work of the Independent Verification Agency (IVA). These energy sector gaps include: Development of strategy for management of streetlight and E-Mobility Charging Master Plan; Review of Energy Policy and National Electrification Plan, and Update of the energy efficiency strategy and Least Cost Power Development Plan.

45. The long-term outcome of this Results Area is the improved operational performance of the energy sector, alongside the efficient delivery, monitoring of the new ESSP, and the effective verification of the results under the proposed RBF project.

46. Results Area 3 has two DLIs namely ***DLI 3.1: Development of clean cooking strategy and implementation plan*** and ***DLI 3.2: Development of streetlight management strategy and e-mobility charging master plan; review of Energy Policy and National Electrification Plan; and revision of the Energy Efficiency Strategy and Least Cost Power Development Master Plan.***

47. **Disbursement-linked Indicators (DLIs).** The summary of DLIs for the RBF project is given below.

a) DLI 1.1: Grid outage frequency compared to the previous 3-year average

b) DLI 2.1: Additional number of households connected to the grid

c) DLI 2.2: Additional number of households installed with standalone off-grid systems

d) DLI 2.3: Additional number of households and institutions provided with clean cooking technologies

e) DLI 2.4: New productive use customers provided with electricity services

f) DLI 3.1: Development of clean cooking strategy and implementation plan

g) DLI 3.2: Development of streetlight management strategy and e-mobility charging master plan; review of Energy Policy and National Electrification Plan; and revision of the Energy Efficiency Strategy and Least Cost Power Development Master Plan.

48. The details of the expected results will be measured and monitored as indicated in the Results Monitoring Framework in Annex 1.1. Annex 1.2 shows the program results chain which summarizes the expected results and relevant activities undertaken to achieve the project development objective.

49. The RBF's detailed DLI matrix, the verification protocol and the disbursement arrangements are presented in Annex 2.

50.

Table 2

51. Table 2 provides a summary of scope for each results area and geographical coverage.

Table 2: Scope Summary of Each Results Area

EXPECTED RESULTS	GEOGRAPHICAL SCOPE
Results Area 1: System Reliability and Network Strengthening	

EXPECTED RESULTS	GEOGRAPHICAL SCOPE
• Reduced grid outage frequency by 230 over the project period • Reduced grid outage duration by 46 hours over project period • Reduced system losses from 18% to 16.9% over the project period • Construction of 3,855 km of MV and LV length of connections • Installation of 138 units of distribution transformers	Kigali and secondary cities, Musanze, Rwamagana, and countrywide,
Result Area 2: Increased access to on-grid, off-grid electricity and clean cooking	
• Increased access to 200,000 households to grid electricity • Connect 50,000 households to standalone SHS countrywide. • Provision of 100,000 clean cooking technologies to households and 310 institutions • 850 new productive use customers provided with electricity services. • 200 km of roads provided with street lighting countrywide.	City of Kigali, Southern, Eastern, Northern, Western Provinces, and countrywide
Results Area 3: Institutional Strengthening and Capacity Building	
• Develop a Clean Cooking strategy and implementation plan • Training of 50 staff across various areas of expertise • Enhance E&S monitoring through results-based reporting • Development and revision of targeted strategies and plans	EDCL/ EUCL/ MININFRA

3.4 RBP Key Capacity Building and Institutional Strengthening Activities

52. A key component of the project is the enhancement of institutional capacity and capability, aimed at increasing the effectiveness of REG, EDCL, and EUCL in executing and sustaining Rwanda's power sector initiatives. Comprehensive technical, fiduciary, environmental, and social evaluations have identified areas for improvement.

53. **Technical.** The technical capacity, monitoring, and supervision arrangements in the energy sector are considered adequate. However, the RBF project requires additional expertise in areas such as distribution system design, procurement, project management, monitoring and evaluation, and operational performance, including conditional monitoring. The project includes specific training for energy planning, rural electrification, construction and supervision of distribution networks, operations and maintenance, loss reduction, standards, network protection, and power system efficiency. Technical assistance will be provided, and capacity will be strengthened through the provision of specialized engineering tools and equipment for planning, construction, operations, and maintenance.

54. **Financial Management and Procurement.** Technical assistance will be provided to enhance the REG team's ability to accelerate procurement processes. Training on audit and compliance will be conducted as part of the implementation activities. A capacity building initiative will cover the design of technical specifications, negotiations, contract management, and monitoring of procurement plans. Capacity building support in negotiation skills, project and contract management, and preparation of technical documents is expected to enable implementing agencies to manage procurement activities.

55. **Environmental and Social Impact Assessment.** The RBF action plan includes training on environmental protection, gender mainstreaming, and health and safety for implementing agency safeguard teams. Additionally, the EDCL will recruit an environmental specialist and a sociologist to improve its technical capacity for impact assessment preparation.

3.5 RBP Contribution to Climate Mitigation

56. **Results Area 1: System Reliability and Network Strengthening.** This results area

focuses on improving system efficiency by reducing losses, which will reduce the required electricity generation from higher cost thermal power plants and thereby reducing the grid emission factor of the Rwandan power system.

57. **Results Area 2: Increased access to on-grid, off-grid electricity and clean cooking.** This results area focuses on increased access to grid and off-grid electricity to reduce use of non-renewable energy sources including use of kerosene and candles for lighting and use of diesel for productive activities. The results area also provides access to clean cooking solutions thereby replacing the use of wood fuel collected unsustainably for cooking and the contribution of residential solid fuels to black carbon emissions. These interventions at household, institution and enterprise levels supports the reduction in GHG emissions.

58. **Results Area 3: Institutional Strengthening and Capacity Building.** This results area seeks to provide enhanced implementation capacity for energy access programs. The results area provides secondary contribution towards reduction in GHG emissions through efficient delivery of energy programs that supports access to modern energy services.

4. RBP Implementation

A. Institutional and Implementation Arrangements

59. **Co-financiers.** AfDB will be the lead co-financier for the Project and will lead project implementation oversight. A Memorandum of Understanding (MOU) is in place between AIIB and AfDB, and the two institutions will enter a Project-level co-lenders' agreement (CLA) prior to project approval by AIIB Board of Directors.

60. **Institutional Arrangements.** The Ministry of Finance and Economic Planning (MINECOFIN) will oversee and facilitate coordination between the Banks and relevant implementing agencies. MININFRA will additionally provide comprehensive oversight and strategic direction for the program. Program activities, including planning, design, procurement, and construction or installation, will be executed within the established REG organizational structure. Results Areas 1 and 2 will be implemented by EDCL and EUCL, while Results Area 3 will be implemented by EDCL with support from MININFRA.

61. **Subsidiary Agreements.** MINECOFIN will enter into subsidiary agreements with EDCL and EUCL, outlining the terms regarding the proceeds of financing, as well as their respective responsibilities in executing activities under the program. Both EDCL and EUCL possess extensive experience in managing similar technical initiatives, such as RUEAP, and its staff members are well-qualified to oversee distribution activities within this RBF project. The physical implementation of the proposed project will be undertaken by REG through its subsidiary entities, EDCL and EUCL.

62. **Program Technical Unit.** For daily supervision and coordination, MININFRA will establish a Program Technical Unit (PTU) led by a MININFRA technical expert and comprising senior officers from key units within EDCL, EUCL, and REG. Administratively, the PTU will report to the REG CEO. Strategic oversight and guidance will be provided by a Program Steering Committee (PSC), chaired by the Permanent Secretary of MININFRA. The PSC will also include the Head of National Programs and Projects Oversight of MINECOFIN, REG CEO, EDCL Managing Director, and EUCL Managing Director among its members.

63. **Independent Verification Agency (IVA).** The Office of the Auditor General (OAG) shall undertake the services of the IVA based on satisfactory performance under the ongoing RBF operation and its experience in carrying out similar tasks for World Bank-financed results-based programs. It is also the IVA for the ongoing AfDB RBF. OAG has the capacity and experience to provide credible and independent opinions on the results achieved. The IVA also leverages private sector expertise on a case-by-case basis to deliver its responsibilities. The OAG has separate departments responsible for the external audit of foreign loan-funded projects and DLI verification/IVA, to ensure independence and avoid potential conflicts of interest. The external audit of foreign loan projects is handled by the Department of Quality Assurance while IVA is managed by the Department of Performance Audit. The selection of an IVA will provide independent verification of project results. The Terms of Reference (ToR) for the IVA need to be approved by AfDB and AIIB.

64. The implementation arrangements for the project are shown in Figure 1Figure 1 below.

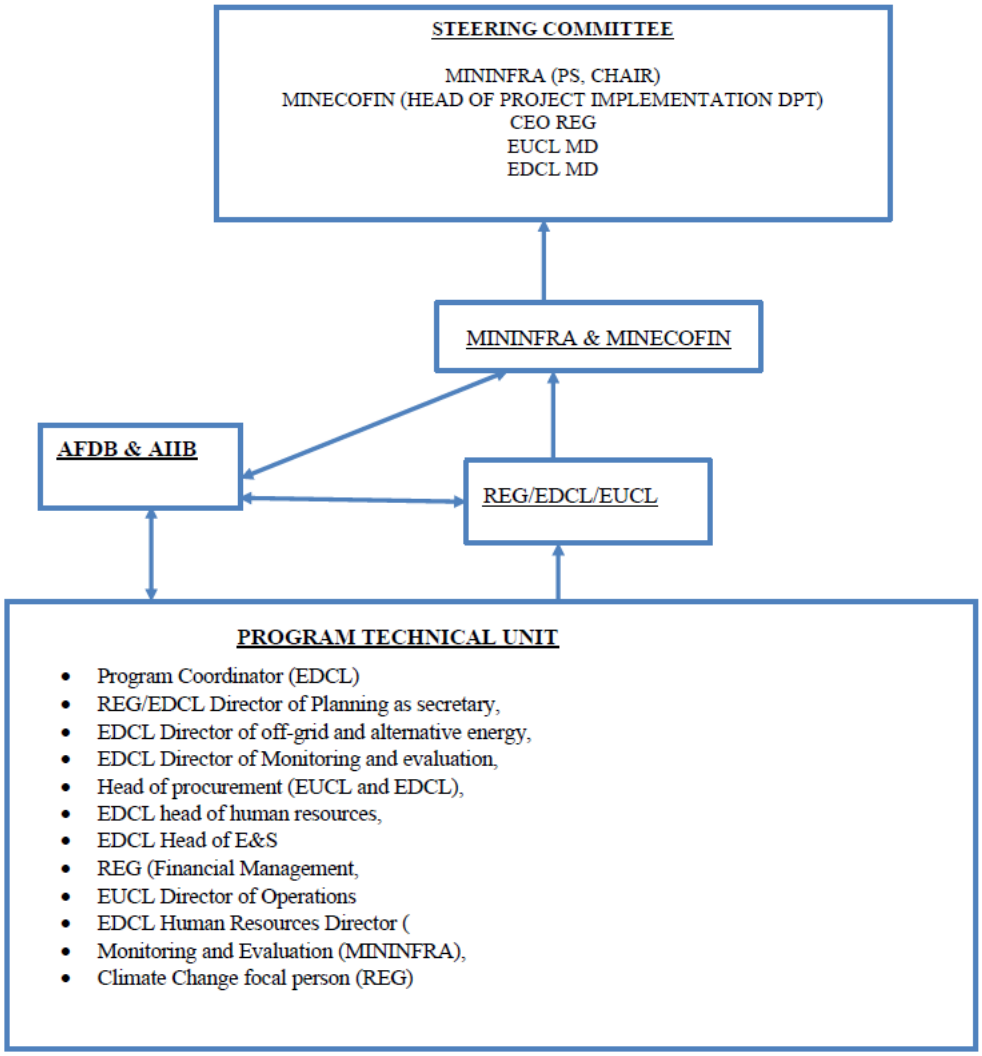

Figure 1: Project Implementation Arrangements

65. **Procurement.** Procurement of goods, works, and services funded by AIIB under this project will utilize the Borrower's Procurement System (BPS) and align with the country's oversight structures. This Project's procurement activities will comply with Rwanda Public Procurement Law No. 031/2022, enacted on November 21, 2022. An assessment of the Rwanda Public Procurement System found it suitable for use in AIIB-funded operations. The system operates within a legislative framework emphasizing procurement principles such as efficiency, accountability, value for money, and transparency in managing public resources.

66. **Financial Management.** The Rwanda's Public Financial Management (PFM) system based on the Country Fiduciary Risk Assessment (CFRA) dated April 2024 is adequate to implement Bank-financed operations and programs. The overall fiduciary risk covering procurement, financial management and governance systems is deemed moderate. Detailed analysis has been included in Section 6 of this document.

67. **Project Audit.** The Project proceeds will be audited, as part of the overall entity audit of

each of the IAs, by the Office of the Auditor General for State Finances (OAG). The MINECOFIN will transmit to AIIB the audit reports of MININFRA, REG, EUCL and EDCL for each of the years of the implementation of the project within six (6) months following the end of the fiscal year.

68. **Environmental and Social Risk Management.** EDCL and EUCL will implement safeguard measures for the RBF Project, drawing on their expertise: EDCL with its Environmental and Social Safeguard Unit, and EUCL with its Safety Unit. REG, through its subsidiaries EDCL and EUCL, and its predecessor institution have over 20 years' experience in similar projects.

69. **Implementation Support.** Despite the existing implementation experience within REG and its subsidiaries, substantial implementation support will be required for the Project based on the lessons learnt from the ongoing energy RBF program. In addition, the new RBF project has a high degree of geographic dispersion of activities and activity scale-up will be carried out simultaneously with efforts to strengthen distribution planning, procurement and contract management. The new RBF project also requires modification/strengthening of the project performance verification procedures. The implementation support will therefore focus on technical, procurement, financial management, and environmental and social as detailed in Annex 3.

B. Results Monitoring and Evaluation

70. Monitoring and evaluation of progress towards the proposed RBF targets will be conducted by MININFRA, alongside the semi-annual reporting on ESSP implementation. MININFRA possesses demonstrated expertise and capacity to fulfil the monitoring and evaluation requirements of the RBF Project through established results-based management frameworks. High-level oversight will be provided by MINECOFIN to ensure the efficient utilization of allocated funds, while OAG will assess value-for-money of implemented activities via regular financial audits of the EAs. The capabilities required for monitoring and evaluation will be further strengthened through targeted capacity-building initiatives for staff from MININFRA, MINECOFIN, OAG, and the EAs under Results Area 3. In addition, MININFRA will prepare and submit quarterly reports to AIIB, detailing progress achieved during the reporting quarter, challenges encountered, and measures implemented to address or mitigate project implementation delays. These quarterly reports will also encompass E&S implementation measures, climate change tracking, and any other requirements stipulated in the financing agreements. Furthermore, the government will engage a consultant to undertake a comprehensive Project Completion Report (PCR) prior to the Last Disbursement Date (LDD) of the project.

C. Disbursement Arrangements and Verification Protocol

71. **Disbursement Arrangements.** The loan proceeds from AIIB and AfDB will be disbursed through a foreign account to the Treasury Single Account (TSA) after submission of the IVA's Program Result Verification Report (PRVR) confirming the achievement of DLIs to both AIIB and AfDB. The IVA is required to submit the PRVR simultaneously to MINECOFIN and MININFRA within four weeks following each agreed verification period. MINECOFIN will then forward the IVA report to AIIB and AfDB within five weeks after the agreed verification period. Based on the PRVR, AIIB and AfDB will determine the amount eligible for disbursement and will notify MINECOFIN of the invoiced amount. Subsequently, MINECOFIN will submit a disbursement request to both institutions. The Project Expenditure Framework will be monitored to ensure continued adequacy of the government program financing.

72. The disbursement arrangements for the Project are summarized in Figure 2Figure 2 below.

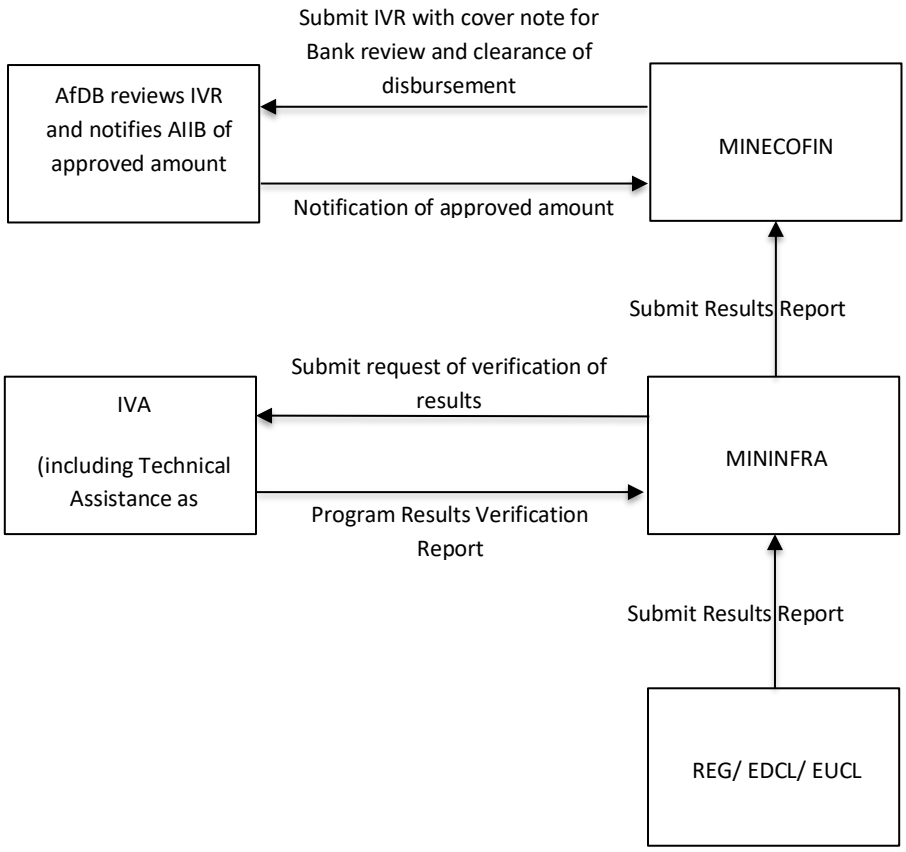

Figure 2: Disbursement Arrangement

73. Some DLIs of the project have predefined minimum and maximum values on disbursement. The DLIs are DLI 1.1, DLI 2.1, DLI 2.2, DLI 2.3 and DLI 2.4 and their minimum and maximum values are defined below.

74. **Minimum DLI** (value, number, or percentage) refers to the threshold level of DLI achievement required to initiate disbursement by financiers for each reporting period. Disbursement claims are estimated using a specific formula based on verified results. Any results below the minimum threshold are excluded but may be carried forward to subsequent claims. The amount claimed will be adjusted to account for recovery of advances, ensuring an accurate calculation of the actual cash flow disbursed to the government.

75. **The maximum DLI** value represents the highest target established in agreement with the government for reporting purposes. This maximum value is capped according to the estimates detailed in the DLI matrix in Annex 2.1 and must comply with credit risk parameters stipulated by AfDB and AIIB loan requirements. Consequently, any results under a DLI that exceed these limits may not be eligible for disbursement, ensuring that resource allocation for each DLI[19] remains within the proposed budgeted outcomes. Maximum DLI value will also be applicable to grid connections in urban areas as guided by targets in the RBF Results Chain to ensure equitable energy access to rural communities.

[19] The subsequent reallocation of the resources across the DLIs during implementation is subject to Banks' due diligence review of the entire program and approval by senior management.

76. **Refund.** The total amount disbursed under the RBF may not exceed the total amount of expenditures incurred under the project. Any such excess will be refunded to the Bank prior to the RBF's loan closing date.

77. **Verification Protocol.** The indicative timelines for DLI achievement are set in Fiscal Years (FYs), covering the period from July 1 to June 30, with proposed annual targets. The GoR may request disbursement from the Bank when significant results have been attained. Based on the GoR's request, the initial verification for disbursement is scheduled to begin in September 2025 for Year 1 (2025/2026). Following this, all subsequent verifications for disbursements will occur on a semi-annual basis according to the FY schedule.

78. The IVA will assess results utilizing management reports, quarterly and annual reports, financial audits, procedural validations, and physical inspections to evaluate the completeness, accuracy, and quality of outcomes reported by REG (EDCL and EUCL). Consistent with established audit practices, physical verification will be conducted on a sample comprising no less than 20% of agreed activities and at specified intervals. MININFRA and MINECOFIN will develop the Terms of Reference (ToR) for the IVA, which must meet the financiers' standards and align with the agreed DLIs, activities, verification protocol, and timeline. A workshop involving all relevant stakeholders will be held in mid-November 2025 for the verification process.

79. The IVA will prepare a Program Results Verification Report (PRVR) using the verification protocol in Annex 2.2 and submit it to AfDB and AIIB according to the verification timeline.

5. Assessment Summary

80. **Reliance on Third Party Assessments.** In line with the Bank's Operational Policy on Financing, the project has relied on AfDB's country systems' assessment, and the assessment approach used by AfDB generally aligns with the Bank's assessment framework. The assessment summaries of the country systems are given below.

A. Technical Assessment (including RBP economic evaluation)

81. **Strategic Relevance.** The ESSP 2025-2030 outlines a comprehensive energy sector strategy aimed at achieving the NST2 objectives of enhancing the population's quality of life and attaining upper-middle income status (UMIC) by 2035. This strategy is anchored on establishing a reliable and secure electricity network and ensuring universal access to affordable, dependable clean electricity services. Of the total ESSP budget of USD2.89 billion, 73% has been allocated to scaling up electrification and reinforcing distribution network reliability, while 21% is designated for promoting clean and efficient cooking technologies. This allocation highlights the strong alignment and relevance of the proposed RBF Project, which primarily focuses on these two critical aspects of the Government's agenda. Efforts to accelerate universal electricity access and advance clean cooking solutions will benefit the nation, foster inclusivity, and guide development toward sustainable growth and poverty reduction. The formulation of the ESSP program included thorough engagement with private sector stakeholders who play a pivotal role in advancing clean cooking initiatives. Further details regarding strategic alignment with the SDGs and the Africa Union Agenda 2063 are provided in Section 3.

82. **Technical Soundness and Risk Rating.** The proposed RBF Project benefits from lessons learnt in the design and implementation of the first RBF financed by the AfDB in Rwanda and similar operations in AfDB's regional member countries (RMCs). Consequently, the project activities have been carefully designed, costed and packaged to deliver the agreed results within the project's implementation timeframe. The DLI resource weights are also assigned with clear focus on incentivizing the ESSP implementers towards the sectors key outcomes – electricity access, system reliability and system operational performance. The structure and composition of the RBF Project implementation arrangement emphasizes the use of experienced technical experts from the Government and REG and headed by an experienced Project Coordinator from EDCL will ensure efficiency and quality of delivered results. The RBF Project is assessed as category B under AIIB's Environment and Social safeguards system and therefore focuses on low-risk distribution network level of activities. Consequently, implementation risks associated with technology are very low. However, the operation could still face risks associated with delay in internal approvals of final designs of the various activities, misinterpretation of the DLI verification protocol leading to delayed disbursement, and inadequacy of the transmission system to support added customers effectively. None of these risks was found to be significant and therefore returning a ***low technical risk rating***.

83. The implementation framework for the RBF Project prioritizes the involvement of seasoned technical professionals from the Government and REG, under the leadership of a skilled Project Coordinator from EDCL, ensuring effective management and delivery of high-quality results. Categorized as category B under AIIB's Environment and Social Framework, the project focuses on low-risk distribution network interventions. As a result, technological risks associated with implementation remain minimal.

84. **Governance.** Over the past decade, Rwanda has demonstrated consistent security and improved economic prospects for its citizens. According to the 2022 Mo Ibrahim Index, Rwanda achieved scores of 66.2 in security and rule of law, 44.8 in participation, rights, and inclusion, 63.4

in foundations for economic opportunity, and 62.2 in human development. These results placed Rwanda 9th, 30th, 9th, and 10th, respectively, among 54 African countries. Additionally, Rwanda leads the African Development Bank Group's Country Policy and Institutional Assessment (CPIA), with recent scores exceeding 4.6 in 2023.

85. **Institutional Arrangements.** The Sector Ministry (MININFRA) and the Executing Agencies (EDCL/EUCL) have gained experience from the ongoing RBF and the drawbacks experienced have been addressed particularly with respect to verification protocol, definition and design of DLI targets, and the timing of the disbursement requests to align with the national budget framework. The institution has demonstrated a high understanding of the instrument and has built the skills and the capacity to deliver this RBF Project alongside the ESSP. Equally important, the sector has demonstrated the availability of adequately trained staff to ensure the sustainability of the infrastructure installed with the resources provided by the Bank and other Development Partners.

86. **Expenditure Framework.** The total expenditure for the Project is USD300 million (EUR260.76 million) out of the overall government program of USD470 million under the current RUEAP. The RBF Project will contribute approximately 64 percent of the outstanding RUEAP budget, and it will be disbursed between FY2025/26 and FY2029/30 (Annex 2.3). Details of the overall government program are provided in Table 3Table 3 below.

Table 3: Program Expenditure Framework

Source	Amount (USD'M)	Amount (EUR"M)	Amount (JPY'M)	% of Total
Overall Government Program				
AfDB - RBF Project	200.00	173.84	29,605.00	43%
AIIB - RBF Project	100.00	86.92	14,802.50	21%

GoR	170.00	147.76	25,164.25	36%
Total Program Financing	**470.00**	**408.52**	**69,571.75**	**100%**
Use	**Amount (USD'M)**	**Amount (EUR'M)**	**Amount (JPY'M)**	**% of Total**
Results Area 1: System Reliability and Network Strengthening				
Substation rehabilitation	23.50	20.43	3,478.59	5.0%
Overhead lines reinforcement	35.25	30.64	5,217.88	7.5%
Subtotal	**58.75**	**51.06**	**8,696.47**	**12.5%**
Results Area 2: Increased access to on-grid, off-grid electricity and clean cooking				
Provision of Grid Access Connections	175.59	152.62	25,991.71	37.4%
Provision of Off-grid Access Connections	56.02	48.69	8,292.36	11.9%
Provision of Productive Use Connections	39.14	34.02	5,793.70	8.3%
Electrification of Green and Innovation Cities	31.76	27.61	4,701.27	6.8%
Provision of Streetlighting	21.29	18.50	3,151.45	4.5%
Distribution of Clean Cooking Technologies	59.11	51.38	8,749.76	12.6%
Distribution of Solar Water Heaters	10.94	9.51	1,619.39	2.3%
Subtotal	**393.85**	**342.33**	**58,299.65**	**83.8%**
Results Area 3: Institutional Strengthening and Capacity Building				
Cooking Strategy and Implementation Plan	4.70	4.09	695.72	1.0%
Development and revision of targeted strategies and plans	12.70	11.04	1,879.92	2.7%
Subtotal	**17.40**	**15.12**	**2,575.64**	**3.7%**
Total Program Financing	**470.00**	**408.52**	**69,571.75**	**100.0%**

Source: MINECOFIN

87. **Results Chain Analysis.** The Results Chain Analysis outlines the strategic linkage between the RBP DLIs and the intended outcomes across key areas of infrastructure investment, project implementation, community benefits, and expenditure effectiveness. Each DLI is designed to incentivize critical actions that contribute to the project's success, such as the grid outage duration, the additional number of households provided with electricity access, and the approval of the cooking strategy. This structured approach ensures that financial support is directly tied to measurable progress and the achievement of specific, impactful results, driving the projects toward their overarching goals. Annex 1.3 provides the program's results chain, summarizing key activities and expected outcomes designed to achieve the development objectives.

88. **Choice of DLIs.** The DLIs for the RBF Project encompass a combination of outcome, output, and process measures. The selection process was informed by three primary considerations: initially, outcome indicators were evaluated for their direct alignment with project objectives; subsequently, the feasibility of measuring, monitoring, and verifying these indicators was assessed; finally, intermediate and output indicators were chosen based on their relevance in demonstrating progress toward the anticipated outcomes. In total, seven DLIs have been selected for the Project.

89. **Results Framework.** The proposed RBF results framework identifies DLIs that stimulates incentives to achieve the key outputs and outcomes as shown in Annex 1.

90. **Monitoring and Evaluation Capacity.** The Government through MININFRA will be responsible for the monitoring and evaluation of both the RBF Project and the ESSP and has a dedicated unit for this purpose. The Ministry has also implemented Performance for Result type of operations from other DPs effectively particularly in the off-grid electrification systems. The ministry has adequate skills and capacity, and robust institutional structure to provide global oversight for the RBF Project.

91. **Economic Rationale.** The economic viability of the Project was assessed through a cost-benefit analysis, which estimated the net benefits by comparing the costs and benefits with and without the Project. The economic costs considered included supply and installation costs,

construction costs, and routine operations and maintenance costs. The economic benefits for the Project included: (i) avoided cost of diesel-based electricity generation; (ii) avoided GHG emissions from decreased diesel consumption and from improved grid efficiency; (iii) reduction in unserved demand from grid interruptions due to grid reinforcement for grid-connected customers and, (i) avoided cost of alternative methods of lighting; and (ii) avoided greenhouse gas emissions for off-grid customers. The economic benefits for clean-cooking solutions included: (i) fuel savings from use of more efficient cookstoves; and (ii) avoided GHG emissions.

92. The economic evaluation showed that the project is economically viable with a positive economic net present value (ENPV) and an economic internal rate of return (EIRR) above ten percent for each of the relevant Project interventions namely grid-based electricity access, off-grid electricity access and clean cooking solutions. The economic analysis benchmarks the project's EIRR against an Economic Opportunity Cost of Capital (EOCK) of 9 percent, the standard hurdle rate for public infrastructure programs. Overall, the project has an ENPV of USD247.6 million and an EIRR of 26.0 percent as shown in Table 4 below. Detailed economic evaluation of the Project, including key assumptions, is shown in Annex 7.

Table 4. Results of Cost-Benefit Analysis for the Project

Intervention	Without GHG Benefits		With GHG Benefits	
	ENPV (USDm)	EIRR	ENPV (USDm)	EIRR
Grid-based electricity access (incl. network strengthening)	178.9	21.7%	234.9	25.0%
Off-grid SHS electricity	2.9	24.6%	4.6	34.5%
Clean cooking solutions	1.1	19.7%	7.97	73.0%
Overall Project	**183.0**	**21.7 %**	**247.6**	**26.0 %**

93. **Sensitivity Analysis for Economic Rationale.** Sensitivity analyses show that the project has a positive ENPV and an EIRR more than the discount rate under different scenarios. The model covered a scenario with either 20 percent higher investment costs or 20 percent lower benefits and with both scenariosTable 5. The base case has an ENPV of USD247.6m and EIRR of 26.0% while the worst-case scenario has an ENPV of USD42.1m and an EIRR of 11.7% as shown in Table 5 below.

Table 5: Sensitivity Analysis for Economic Evaluation

Scenario	ENPV (USDm)	EIRR
Base Case	**247.6**	**26.0%**
Higher Investment Costs by 20%	169.6	18.9%
Lower Benefits by 20%	120.1	17.5%
Higher Investment Costs by 20% + Lower Benefits by 20%	42.1	11.7%

94. **Financial Rationale.** The financial evaluation of the RBF project was conducted using a discounted cash flow approach to estimate the Financial Internal Rate of Return (FIRR) and Financial Net Present Value (FNPV). The financial viability of the Project was assessed through a cost-benefit analysis, which estimated the net benefits by comparing the costs and benefits from the Project. The financial costs included capital costs and operations and maintenance costs. The financial benefits for the Project included: (i) revenue from energy sales for new connections and additional demand from improved system reliability for grid-connected customers; (ii) revenue from grid connections fees, once-off prepaid meter charges and monthly meter rentals fees.

95. The financial evaluation showed that the project is financially viable with a positive financial

net present value (FNPV) and a financial internal rate of return (FIRR). The project was estimated to have an FNPV of USD56.3 million and an FIRR of 17.7 percent. Detailed financial evaluation of the Project, including key assumptions, is shown in Annex 7.

96. **Sensitivity Analysis for Financial Evaluation**. Sensitivity analyses show that the project has a positive FNPV and an FIRR more than the discount rate under one scenario and a negative FNPV under another scenario, representing the delicate nature of the electricity sector, whose financial sustainability depends on government subsidies due to the non-cost reflective nature of electricity tariffs. The model covered a scenario with either 20 percent higher investment costs or 20 percent lower benefits and the project was still viable under higher investment costs but not viable with lower benefits Table 5. The base case has an FNPV of USD56.3m and FIRR of 17.7% while the worst-case scenario has an FNPV of negative USD7.7m and an FIRR of 12.3% as shown in Table 6 below.

Table 6: Sensitivity Analysis for Financial Evaluation

Scenario	FNPV (USDm)	FIRR
Base Case	**56.3**	**17.7%**
Higher Investment Costs by 20%	3.6	13.3%
Lower Benefits by 20%	-7.7	12.3%

B. Fiduciary Systems Assessment

97. **Financial Management.** Rwanda's Public Financial Management (PFM) system, as reviewed in the Country Fiduciary Risk Assessment (CFRA) from April 2024, is appropriate for executing operations and programs financed by the Bank. The comprehensive fiduciary risk, which includes aspects of procurement, financial management, and governance systems, is assessed to be moderate.

98. According to the AIIB Operational Policy on Financing, the RBF Project will utilize the country's Public Financial Management (PFM) systems, adhering to the existing government financial management frameworks as mandated by the Organic Law on public finance management N° 002/2022.OL dated 12/12/2022, N° 79/2013 dated 11/09/2013, and Law N° 007/2021 dated 05/02/2021, which regulates companies in Rwanda. The EAs are integrated into the IFMIS system, applying the same principles and tools as the central PFM structure at MINECOFIN. Consequently, all project expenditure outlined in the budget will be managed within the PFM System.

99. The GoR possesses adequate capabilities to develop, implement, and monitor credible annual budgets within a Medium-Term Expenditure Framework (MTEF), and these processes function effectively. In the last three years, the GoR's expenditure budgets have been practical, resulting in the creation of a reliable budget. The Treasury utilizes a Treasury Single Account (TSA) system, enabling the GoR to determine the overall government cash position in real time.

100. The accounting and financial reporting by the EAs are satisfactory, with financial statements submitted annually to the Office of the Auditor General (OAG) in a timely manner. In terms of internal controls, Chief Budget Managers (CBMs) are tasked with ensuring adherence to relevant Public Financial Management (PFM) requirements. Public Entities (PEs) are mandated by the 2022 organic law on PFM to establish a robust internal control environment. The internal control framework for the implementing agencies is sufficient.

101. The loan funds will be released upon the achievement of results or agreed DLIs, as verified

by the Independent Verification Agency (IVA) and approved by the AfDB and AIIB. MINECOFIN will provide the Bank with the IVA's Program Results Verification Report (PRVR) detailing the achievement of DLIs. The Bank will disburse project funds into a foreign currency account established by MINECOFIN at the National Bank of Rwanda (BNR). The equivalent amount in local currency will then be transferred to the GoR's Consolidated Fund (Treasury Single Account (TSA)). From the TSA and/or other revenue sources available to the Rwandan government budget, the funds will be allocated to Executing Agencies (EAs) and the IVA according to the country's systems, budgetary priorities, and the approved budgetary law for each relevant project financial year.

102. MINECOFIN will allocate an adequate budget to the implementing agencies each year, with verification on the budget allocation to be carried out by the Independent Verification Agency (IVA). The IVA will review the financial performance by assessing a) the total flow of funds to the sector/project over a specific period; b) the efficiency and effectiveness of the funds flow to the sector/project; and c) the relevance and reliability of the data used in verification reports for disbursement indicators. The Office of the Auditor General (OAG) will act as the IVA for the project, with sufficient resources provided through regular budget cycles. AfDB confirmed that the OAG has separate departments for financial audits and independent verifications and has the necessary experience in independent verification work with other development partners. The OAG also continues to build the verification capacity through recruiting people with specialized skills as needs arise.

103. The Project funds will be audited as part of the comprehensive entity audit for each Implementing Agency (IA) by the Office of the Auditor General for State Finances (OAG). The financial audit opinions on the Executing Agencies' financial statements for the past three fiscal years, up to the year ending June 2023, were all unqualified (clean opinions). The audited project financial statement (APFS) of all IAs for the fiscal year ending June 30, 2024, were submitted on December 31, 2024, with a clean opinion. Meanwhile the management letters were submitted around the end of February 2025. MINECOFIN will send the audit reports for MININFRA, REG, EUCL, and EDCL to the Bank for each year of the project's implementation within six months after the end of fiscal year.

104. **Procurement.** Procurement of goods, works, and services financed by the Bank under this project will follow the Borrower's Procurement System (BPS), leveraging the country's existing oversight institutions. Specifically, procurement for this Project will adhere to the Rwanda Public Procurement Law No. 031/2022, enacted on November 21, 2022. The Bank assessment of the Rwanda Public Procurement System concluded that it is globally sound and adequate for use in Bank-funded operations. This system is underpinned by a legislative framework that upholds core procurement principles: efficiency, accountability, value for money, and transparency in the utilization of public resources.

105. Assessments of procurement risks at country, sector, and project levels, along with assessments of procurement capacity at the EAs, indicate a moderate risk level. To ensure the smooth and timely execution of procurement activities, capacity-building support is recommended. These measures have been included in the PAP.

106. To ensure adherence to regulations, all procurement activities will be audited as part of the overall entity audits by the Office of the Auditor General (OAG). The MINICOFIN will transmit the compliance audit reports of MININFRA, REG, EUCL, and EDCL to AfDB and AIIB within six months of the fiscal year's end.

107. **Governance and Anti-corruption.** AfDB's Anticorruption Guidelines apply to the Project. To the extent that Prohibited Practices are not covered by the AfDB's Anticorruption Guidelines,

AIIB's Policy on Prohibited Practices applies. AIIB is committed to preventing fraud and corruption in the projects it finances, thus, the Bank reserves the right to investigate, directly or indirectly through its agents, any alleged corrupt, fraudulent, collusive, coercive, or obstructive practices, and misuse of resources and theft or coercive practices relating to the Project and to take necessary measures to prevent and address any issues in a timely manner, as appropriate. Detailed requirements will be specified in the Loan Agreement.

C. Environmental and Social Systems Assessment

108. **Environmental and Social Policy and Categorization.** This Project will be co-financed with AfDB. An Environmental and Social System Assessment (ESSA) has been carried out in accordance with AfDB's Integrated Safeguards Policy for results-based financing. To support a harmonized approach to addressing the ES risks and impacts of the Program, and as permitted under AIIB's Environmental and Social Policy (ESP), the AfDB's Integrated Safeguards Policy for results-based financing will-apply to the Program in lieu of AIIB's ESP. AIIB has reviewed the AfDB's policy and procedures and is satisfied that: i) it is consistent with AIIB's Articles of Agreement and materially consistent with the provisions of AIIB's ESP, including the ES Exclusion List; and (ii) the monitoring procedures that are in place are appropriate for the Program.

109. AfDB has categorized the Project as Medium Risk; Category 2 in compliance with AfDB's Integrated Safeguards System. This category is equivalent to AIIB's Category B according to AIIB's ESP. This ES Categorization reflects the limited, moderate and reversible nature of the Project's potential environmental and social impacts which can be avoided, mitigated, compensated or offset using appropriate management measures.

110. **Excluded Activities.** As per ESSA, high risk activities are excluded from the list of proposed activities to be financed through this RBF program and include : (i) any activity that will require the preparation of full Resettlement Action Plan (RAP) and any other high risk/impact activity classified as Category One (1)[20] under the AfDB's Integrated Safeguards System (ISS). Excluded activities include activities causing significant conversion or degradation of critical natural habitat.

111. **Environmental and Social Instruments.** An Environmental and Social System Assessment (ESSA) was developed by AfDB, with the support of the implementing entity (REG), and it was disclosed on REG's website[21] on 21 January 2025 and on AfDB's website on 27 January 2025. The ESSA provides a high-level overview of the legal and institutional framework and operational capacity of the systems that REG and its subsidiaries will rely on as part of the RBF. As part of the ESSA, an Environmental and Social Safeguards System Strengthening Action Plan (ESSSSAP) has been developed to strengthen the Client's system for managing E&S risks. In addition, an Environmental and Social Management Plan (ESMP) Annex to the Financial Agreement (FA) between borrower and AfDB was disclosed by REG on 07 May 2025 and by AfDB on 15 May 2025. The ESMP Annex to the FA outlines the material measures and actions that are required to be implemented for the RBF Project, that were agreed between AfDB and the Borrower, and for which the Borrower is responsible. The relevant sub-project level environmental and social assessments and site-specific ESMPs will be developed prior to the start of activities.

112. **ES Policy and Legal Framework.** The legal framework governing ES management of the Project is grounded in the Law on Environment (2018) which regulates the protection and

[20] Category 1: High-risk operations likely to cause significant and/or irreversible adverse environmental and/or social impacts on a large scale, or to significantly affect environmental or social components that the Bank or the borrowing country considers sensitive.
[21] Rwanda Energy RBF ESSA

management of the environment, and the National Policy on Environment, the Organic Law N° 04/2005 of 08/04/20053. According to Article 67, Environmental Impact Assessments must be carried out prior to the development of infrastructure projects. Rwanda Environmental Management Authority (REMA) was set up to implement this policy. Other laws and policies relevant to the Project include the National Land Policy, 2004, e-waste management regulations, Law governing biodiversity in Rwanda (N° 70/2013 of 02/09/2013) and Biodiversity Policy (2011), Ministerial Order Nº 02/MIFOTRA/22 of 30/08/2022 on Occupational Safety, and Law n° 027/2023 of 18/05/2023 amending the Law n° 66/2018 of 30/08/2018 regulating labor in Rwanda.

113. **Environmental Aspects.** The Project is expected to generate positive environmental impacts by increasing access to clean energy through off-grid connections to home solar systems and grid connections to access the country's renewable energy mix. Furthermore, the Project will contribute to improved air quality and reduced pressure on the forest biomass through use of improved cook stoves. There is the potential for adverse environmental impacts during construction/rehabilitation, including disturbance to biodiversity and habitats due to vegetation clearance, noise generation, accelerated soil erosion during excavations, and soil and water contamination from liquid waste (used oils; fuels and lubricants) and solid waste (construction/demolition waste and replaced transformers). There are also safety risks for workers and the public due to exposure to electrical and other hazards, dust and noise nuisance to residents in nearby communities, traffic disruption and risk of accidents due to the movement of vehicles to and from worksites. During operations/maintenance, the main environmental risks are pollution from transformer oil/coolant leakages and electronic waste generated from streetlights, home solar systems (including solar panels and spent batteries), cooking stoves and other productive use equipment and appliances on reaching their end-of-life. There are also safety risks to maintenance workers and users of clean cooking technologies and productive use appliances associated with exposure to electrical and fire hazards. Risks associated with construction and operations are considered to be moderate and will be managed through the implementation of Environmental and Social Management Plans (ESMPs) for the project activities and REG's operational systems. Management measures will be informed by relevant subproject level assessments.

114. **Social Aspects.** Overall, the Project is expected to have positive social impacts as the interventions will improve the reliability of power supply through activities under Results Area 1 such as upgrade, extension of LV and MV lines, rehabilitation of substation and increase access to clean cooking solutions for households through activities under Results Area 2 such as purchase of electrical materials, installation of stand-alone solar home system, thereby enhancing their quality of life. During construction, anticipated social risks and impacts are related to potential temporary economic displacement affecting the livelihoods of individuals within the existing distribution line corridors, potential exclusion of vulnerable groups from program's benefits, labor and working conditions issues, labor influx, and risks of gender-based violence. These risks and impacts are considered moderate and manageable with adequate gap filling measures outlined in instruments such as RAP, as applicable and site specific ESMPs in place during implementation.

115. **Institutional Capacity.** The ESSA conducted by AfDB indicates that the Implementing Entity has experience in implementing similar projects or programs. However, E&S capacity needs to be reinforced to ensure effective implementation and monitoring of the E&S requirements of this Project. In this regard, the ESSA recommends capacity building and the appointment of E&S and safety personnel to the PIU.

116. **Previous Project E&S Performance.** E&S compliance issues identified for the first AfDB-financed RBF program were reportedly associated with gaps in internal management and the

budgets for the implementation and supervision of E&S aspects. These gaps are addressed in the new RBF program through requirements and measures incorporated into the FA between AfDB and the Borrower, the ESMP to the FA and the PAP developed by AfDB. Such measures include the appointment of E&S and Safety personnel to the PIU, incorporation of site-specific E&S measures in the requests for proposals such that these measures are appropriately budgeted for, and the need for independent verification of compliance of the Project with E&S requirements.

117. **ESSA Recommended Actions.** The ESSA highlighted the following areas for improvement: road traffic management, waste management, vegetation clearance, and occupational health and safety. Actions to strengthen ES systems include: i) Road traffic impacts will be managed through traffic and community safety plans, regular monitoring by the E&S team, securing permits, and strengthening public awareness via stakeholder engagement; ii) Waste management will follow similar improvements, with formal waste management plans for each activity, reuse and recycling of materials, proper e-waste disposal, and field monitoring by E&S staff; iii) Vegetation clearance will involve informing communities about tree cutting and ground cable installation, explaining construction impacts, duration, and mitigation measures; iv) Water pollution prevention will focus on human waste management at worksites, provision of drinking water and sanitary facilities, and budget allocation for their maintenance; v) Worker occupational and community health and safety will be upgraded to meet international standards. Measures include budgeting for safety tools and equipment, regular site monitoring by E&S teams, emergency planning for infrastructure failures, and community education on electricity safety. All workers will receive HSE induction training, use personal protective equipment, and work under supervision of trained site Health & Safety Officers with first aid facilities. These improvements aim to strengthen compliance with environmental, social, and health standards, reduce risks to communities and workers, and ensure effective monitoring and stakeholder engagement throughout project activities.

118. **In addition, the updated PAP includes gap-filling measures** such as: i) developing ES screening checklist to screen ES risks of subprojects and exclude any high risk activities before commencement of activities, ii) The RAP will include compensation values for Project-Affected Persons (PAPs) in line with AfDB requirements, either at full replacement cost or, where applicable, through negotiated settlement. Any negotiated settlement will be conducted through a transparent, fair, and well-documented process, iii) the RAP to include compensation and potential interim livelihoods support for informal land users, iv) assessment of GBV risks in site specific ESIAs and inclusion of mitigation measures in site specific ESMPs, v) preparation of OHS evaluation plan to review relevant operational systems of EDCL/EUCL, and vi) training for EDCL/EUCL on RBF reporting and monitoring requirements. The Bank's due diligence has confirmed that the updated PAP is materially consistent with AIIB's ESP.

119. **Gender.** The Project will contribute to gender equality and women empowerment through the following measures; (i) employment of women which is targeted at 30%; (ii) income generating activities, (iii) 30% of REG interns will be female, aiming to boost the number of female engineers in the institution (iv) connecting electricity for Female Headed households; v) capacity building in gender mainstreaming for REG, EDCL and EUCL officers (vi) 30% of Female-Headed Households (WHH) to benefit from off-grid and clean cooking solutions.

120. Enhancing electricity services for Rwandan households, social institutions, and businesses is expected to advance gender equality, expand employment and entrepreneurial opportunities for women, and improve developmental outcomes. For instance, increased lighting will enable children to study in the evening and enhance safety on roads and in public areas, while access to basic appliances such as radios can help reduce social isolation. The program has established gender-specific targets, with provisions anticipated to benefit women, girls, and children. Access

to electricity in health posts and clinics contributes to improved hygiene standards, safer childbirth, and better pediatric care. In educational settings, electrification facilitates the use of computers and other essential devices. Collectively, these measures are projected to enhance the socio-economic wellbeing of girls and women-headed households. The gender considerations in the project design for the RBF project aligns with AIIB's Gender Action Plan in seeking to address key issues of access and affordability, health and safety, productivity and workforce participation.

121. **Stakeholder Engagement Grievance Redress Mechanism (GRM).** The ESSA identified governmental agencies, local institutions and project-affected people as stakeholders. As indicated in the ESSA, consultations were undertaken with MINFRA and EUCL. Further consultations will take place during the preparation of site-specific relevant ES instruments. As outlined in the ESSA, the Borrower will establish a two-tiered project-level GRM to receive and address concerns and complaints relating to Project activities. Information on the GRM will be disclosed to stakeholders in a timely and suitable manner and the GRM will remain accessible and functional throughout the project life cycle.

122. **Independent Accountability Mechanism.** The Project will be co-financed with the AfDB. AIIB has agreed that AfDB's Integrated Safeguards Policy will apply to this Project. Pursuant to the agreement with AfDB, the AfDB's Independent Recourse Mechanism (IRM) will handle submissions relating to ES issues under the Project. Consequently, in accordance with the Bank's Policy on Project-affected People's Mechanism (PPM), submissions to the PPM under this Project will not be eligible for consideration by the PPM. Information on AfDB's IRM is available at https://irm.afdb.org/en?trk=public_post_main-feed-card-text.

123. **Monitoring and Supervision Arrangements.** The Client will prepare and submit quarterly monitoring reports on the Project's E&S performance and annual E&S audit reports throughout the project implementation period to AfDB and AIIB. Independent verification of compliance with E&S safeguard measures will be done by the IVA. AIIB will monitor the Project's ES management performance together with AfDB by reviewing the ES reports and participating in supervision missions.

124. **Climate Risks and Opportunities.** The Project is exposed to climate related risks as well as presents opportunities to contribute to mitigate climate change. A primary physical risk to the project is the vulnerability of the energy infrastructure to climate-related hazards like extreme heat, wildfire and strong winds / storms. A range of targeted climate resilience measures have been integrated into project design. These include: high-ambient ("tropical") equipment with enhanced ventilation and temperature, partial-discharge monitoring for heat; Right-of-Way vegetation management, insulated aerial-bundled cable on priority spans, and selective MV undergrounding in dense corridors for wildfire; and higher wind-load standards, feeder interlinks, selective undergrounding at bottlenecks, and distribution automation over for wind/storms and rapid restoration and ensuring that the Project Technical Team includes a design unit head from EDCL to oversee this. These measures are specified for the R1 urban nodes and R2 districts and will be embedded in Owner's Requirements, standard bidding documents (SBDs), bill of quantities (BoQs), and verification protocols, thereby reducing outage risk and protecting assets while ensuring reliable, low-carbon access expansions in RA2 (grid/off-grid connections, clean cooking, LED street lighting).

125. The project offers significant climate-related opportunities. It supports the transition to a clean energy system by increasing access to low carbon electricity and strengthening the grid to accommodate more renewable energy. Furthermore, the provision of clean cooking solutions and the shift away from biomass will contribute to a reduction in GHG emissions.

126. **Climate Change Mitigation.** The project will make a significant contribution to climate

change mitigation through the above-mentioned components under RA1 and RA2. Under RA1, substation rehabilitation and overhead lines reinforcement will enable the grid to meet a portion of consumers' power demand that would otherwise have remained unserved by the grid under the without-project scenario. Of this demand to be met by the strengthened grid, half would otherwise have been met by diesel generators under the without-project scenario. Under RA2, new grid connections will serve households' power demand, thereby displacing diesel power that would otherwise have been supplied under the without-project scenario. The installation and operation of off-grid SHSs will displace fossil fuel consumption, such as kerosene lamps and diesel-powered lighting. In addition, the provision of clean cooking technologies to households and institutions will support fuel and technologies transitions that will reduce fuel consumption and improve combustion efficiency. Collectively, these displacement activities and upgrading measures are expected to result in total GHG emissions reductions of 2,419,051 tCO_2e over the period 2025 to 2050, equivalent to an annual average of approximately 93,040 tCO_2e.

127. **Paris Alignment Assessment.** In line with AIIB methodology for assessing the alignment with the mitigation and adaptation goals of the Paris Climate Agreement, the project is assessed as aligned. On climate mitigation, the operation supports activities listed as universally aligned under the joint MDB methodology under eligible operation types of “electricity transmission and distribution, energy access”, “clean cooking technologies”, “LED street lightning”, “professional services “and “public administration”. Further, the Project is consistent with Rwanda’s climate policy framework and sector strategy Energy Sector Strategic Plan and supports NDC implementation and the Green Growth and Climate Resilience Strategy by enabling grid/off-grid renewable electricity access, reducing technical losses, and accelerating a transition away from biomass for cooking. As for adaptation and climate resilience, the project has undergone detailed physical climate risk screening and integrates targeted adaptation measures to manage potentially material physical climate risks associated with extreme heat, wildfire, and strong winds/ storms. In addition, proposed actions are in support of climate resilience policies and priorities as outlined in Rwanda’s National Climate Strategy and sector priorities, therefore the project is considered aligned with the Paris Agreement’s adaptation goals.

D. Risk Assessment

128. The overall risk rating of the Project is considered moderate as summarized in 7Table 7 below. Detailed risks and associated mitigation measures are given in Annex 4.

Table 7. Summary of Risks and Ratings

Risk	Rating
Technical	Low
Fiduciary	Moderate
Climate, Environmental and Social	Moderate
Disbursement Linked Indicator	Moderate
Overall Risk	**Moderate**

E. RBF Action Plan

129. The assessments under the Project have identified many potential improvements that could be carried out to enhance the development effectiveness of REG and its subsidiaries’ distribution expenditure, including technical, procurement and financial management as well as environmental and social. REG has agreed with AfDB and AIIB on measures to improve project management. Detailed RBF Action Plan is given in Annex 5.

Annex 1: Results Monitoring Framework and Result Chain

Annex 1.1: Result Monitoring Framework

Results Areas Supported by RBP	PO/Outcome Indicators	Intermediate Results Indicators	DLI #	Unit of Measure	Baseline (2024)	End Target (2029/30)
Results Area 1: System Reliability and Network Strengthening	PO Indicator: Number of people provided with electricity service			Number	0	1,000,000
	Outcome Indicator 1: Reduced grid outage frequency		1.1	Number	7,679	7,449
	Outcome Indicator 2: Reduced grid outage duration			Hours	1,523	1,477
	Outcome Indicator 3: Reduced total system losses (technical and non-technical)			%	18	16.9
		IR Indicator 1.1: Length of MV and LV distribution lines added		km	0	3,855
		IR Indicator 1.2: Number of distribution transformers added		Number	0	138
		IR Indicator 1.3: New MV switching cabins installed		Number	0	7
Results Area 2: Increased access to on-grid, off-grid electricity and clean cooking		IR Indicator 2.1: Number of households provided with grid electricity access	2.1	Number	0	200,000
		IR Indicator 2.2: Number of households provided with off-grid electricity access	2.2	Number	0	50,000
		IR Indicator 2.3: Number of households and institutions provided with clean cooking technologies	2.3	Number	0	100,310
		IR Indicator 2.4: Number of productive users provided with electricity services	2.4	Number	0	850

Results Areas Supported by RBP	PO/Outcome Indicators	Intermediate Results Indicators	DLI #	Unit of Measure	Baseline (2024)	End Target (2029/30)
		IR Indicator 2.5: Length of roads provided with street lighting		km	0	200
Results Area 3: Institutional Strengthening and Capacity Building		IR Indicator 3.1: Clean cooking strategy and implementation plan approved	3.1	Yes/No	No	Yes
		IR Indicator 3.2: Completion of targeted strategies and plans	3.2	Yes/No	No	Yes
		IR Indicator 3.3: Independent Verification Agent (IVA) contracted	Prior	Yes/No	No	Yes
		IR Indicator 3.4: Program Action Plan (PAP) approved	Prior	Yes/No	No	Yes
		IR Indicator 3.5: ESSP 2024/25 – 2029/30 approved		Yes/No	No	Yes
		IR Indicator 3.6: Sector capacity building plan approved		Yes/No	No	Yes
		IR Indicator 3.7: Number of sector staff trained		Number	0	50
		IR Indicator 3.8: Studies for distribution and access projects completed		Yes/No	No	Yes

Annex 1.2: Indicator Description

Indicator Name (#)	Description	Frequency	Data Source	Responsibility for Data Collection	Responsibility for Data Verification	DLIs Scalability of Disbursement (Yes/No)
POI	PO Indicator: Number of people provided with electricity service	Annual	ESSP Report to ESWG	MININFRA		
OI-1	Outcome Indicator 1: Reduced grid outage frequency	Annual	System Reports	EUCL/ REG	IVA	No
OI-2	Outcome Indicator 2: Reduced grid outage duration	Annual	System Reports	EUCL/ REG		
OI-3	Outcome Indicator 3: Reduced total system losses (technical and non-technical)	Annual	System Reports	EUCL/ REG		
IRI-1.1	IR Indicator 1.1: Length of MV and LV distribution lines added	Annual	Company Reports	EUCL/ REG		
IRI-1.2	IR Indicator 1.2: Number of distribution transformers added	Annual	Company Reports	EUCL/ REG		

Indicator Name (#)	Description	Frequency	Data Source	Responsibility for Data Collection	DLIs	
					Responsibility for Data Verification	Scalability of Disbursement (Yes/No)
IRI-1.3	IR Indicator 1.3: New MV switching cabins installed	Annual	Company Reports	EUCL/ REG		
IRI-2.1	IR Indicator 2.1: Number of households provided with grid electricity access	Annual	EDCL Reports	EDCL	IVA	Yes
IRI-2.2	IR Indicator 2.2: Number of households provided with off-grid electricity access	Annual	EDCL Reports	EDCL	IVA	Yes
IRI-2.3	IR Indicator 2.3: Number of households and institutions provided with clean cooking technologies	Annual	EDCL Reports	EDCL	IVA	Yes
IRI-2.4	IR Indicator 2.4: Number of productive users provided with electricity services	Annual	EDCL/ EUCL Reports	EDCL	IVA	Yes
IRI-2.5	IR Indicator 2.5: Length of road provided with street lighting	Annual	System Reports	EUCL/ REG		
IRI-3.1	IR Indicator 3.1: Clean cooking strategy and implementation plan approved	Once	Approved Strategy	MININFRA	IVA	No
IRI-3.2	IR Indicator 3.2: Completion of targeted strategies and plans	Once	Approved Strategy/ Plan/ Program/ Report	MININFRA	IVA	No
IRI-3.3	IR Indicator 3.3: Independent Verification Agent (IVA) contracted	Once	Letter to the Banks	MININFRA/ REG		
IRI-3.4	IR Indicator 3.4: Program Action Plan (PAP) approved	Once	Letter to the Banks	MININFRA/ REG		
IRI-3.5	IR Indicator 3.5: ESSP 2024/25 – 2029/30 approved	Once	Approved ESSP	MININFRA		
IRI-3.6	IR Indicator 3.6: Sector capacity building plan approved	Once	Approved Program Action Plan	MININFRA		
IRI-3.7	IR Indicator 3.7: Number of sector staff trained	Annual	HR Reports	MININFRA/ REG		
IRI-3.8	IR Indicator 3.8: Studies for distribution and access projects completed	Once	Final Report	EDCL		

Annex 1.3: RBF Result Chain

S/N	Activity	Description	Expected Results	Location	Cost (USD)	Cost (EUR)	PIE	Year of Delivery
Results Area 1: System Reliability and Network Strengthening					**37,500,000**	**32,594,524**		
A.1.1	Rehabilitation of Mukungwa switchyard	Replacement of old 15MVA 6.6/110kV transformer and 30kV Switchgears	Improve power plant availability	Musanze	1,200,000	1,043,025	EUCL	2025-2029
A.1.2	Rehabilitation of auxiliary power supply for Gikondo & Jabana Substations	Replacement of low voltage AC/DC distribution installation (auxiliary power supply) for Gikondo & Jabana substations	Improvement of power system operations	Kigali	1,000,000	869,187	EUCL	2025-2029
A.1.3	Rehabilitation of Low voltage network in Kigali	Replacement of 90km of bare conductors by insulated Aerial bundled cables	Reduction of power outages and corresponding losses	Kigali	1,500,000	1,303,781	EDCL	2025-2029
A.1.4	Civil works at Gasogi Substation	construction of fence for protection of the substation and installation of CCTV cameras	Improved security and safety	Kigali	300,000	260,756	EDCL	2025-2029
A.1.5	Karenge water treatment plant	1. Supply of electrical materials (poles, towers, cables/conductors, transformers, insulators, etc.) 2. Installation to be done by in-house teams and/or contractors	Reliable power supply to water supply system	Rwamagana	6,000,000	5,215,124	EDCL	2025-2029
A.1.6	Move from Overhead to Underground the MV line	Construction of MV underground line and associated connections.	Contribute to improved operation efficiency, reliability and safety	Kigali and secondary cities	5,000,000	4,345,937	EDCL	2024-2026
A.1.7	Upgrade/refurbish/extension of MV and LV lines and installation of new transformers and their connections	1. Supply of electrical materials (poles, towers, cables/conductors, transformers, insulators, etc.) 2. Installation to be done by in-house teams and/or contractors	Contribute to the improved operation efficiency, reliability, safety and quality of service delivery	Countrywide	10,000,000	8,691,873	EDCL	2024-2027
A.1.8	Linking MV feeders from different sources to create N-1, N-2 redundancies, a solution enabled by extension of MV lines	1. Supply of electrical materials (poles, towers, cables/conductors, transformers, insulators, etc.) 2. Installation to be done by in-house teams and/or contractors	Contribute to the improved operation efficiency, reliability	Countrywide	2,000,000	1,738,375	EDCL	2025-2027

S/N	Activity	Description	Expected Results	Location	Cost (USD)	Cost (EUR)	PIE	Year of Delivery
A.1.9	Extension of fiber optic network using ADSS and/or OPGW and associated accessories to expand the distribution grid automation	1. Supply of electrical materials (poles, towers, cables/conductors, transformers, insulators, etc.) 2. Installation to be done by in-house teams and/or contractors	Contribute to smart grid and improve reliability, availability, and efficiency of distribution system through real time information and quick action	n/a	5,500,000	4,780,530	EDCL	2024-2027
A.1.10	Purchase of materials/spare parts for power plants and/or substations	Supply of electro-mechanical materials/ spare parts for maintenance of power plants and/or substations	Maintain efficiency and availability of power plants and improve transmission operations	Countrywide	5,000,000	4,345,937	EDCL	2024-2026
Results Area 2: Increased access to on-grid, off-grid electricity and clean cooking					**251,500,000**	**218,600,608**		
A.2.1	Purchase of electrical materials (transformers, pre-paid meters, poles, cables and other accessories needed for connecting HHs/ grid densification in Kigali City	Connection of 40,000 new households to electricity through construction of MV and LV line and installation of transformers		City of Kigali	22,430,000	19,495,871	EDCL	2025-2029
A.2.2	Purchase of electrical materials (transformers, pre-paid meters, poles, cables and other accessories needed for connecting HHs/ grid densification Northern Province	Connection of 40,000 new households to electricity through construction of MV and LV line and installation of transformers	200,000 new households connected to electricity countrywide and 2,000 youth-led SMEs / 6,000 new jobs created	Northern Province	22,430,000	19,495,871	EDCL	2025-2029
A.2.3	Purchase of electrical materials (transformers, pre-paid meters, poles, cables and other accessories needed for connecting HHs/ grid densification Eastern Province	Connection of 40,000 new households to electricity through construction of MV and LV line and installation of transformers		Eastern Province	22,430,000	19,495,871	EDCL	2025-2029
A.2.4	Purchase of electrical materials (transformers, pre-paid meters, poles, cables and other accessories needed for connecting HHs/ grid densification Southern Province	Connection of 40,000 new households to electricity through construction of MV and LV line and installation of transformers		Southern Province	22,430,000	19,495,871	EDCL	2025-2029

S/N	Activity	Description	Expected Results	Location	Cost (USD)	Cost (EUR)	PIE	Year of Delivery
A.2.5	Purchase of electrical materials (transformers, pre-paid meters, poles, cables and other accessories needed for connecting HHs/ grid densification in Western Province	Connection of 40,000 new households to electricity through construction of MV and LV line and installation of transformers		Western Province	22,430,000	19,495,871	EDCL	2025-2029
A.2.6	Supply and installation of MV power lines materials for productive users	1. Supply of electrical materials (poles, towers, cables/conductors, transformers, insulators, etc.), connecting 850 PUA's 2. Installation to be done by in-house teams and/or contractors	Increased efficiency and reliability in the area supplied through creation of redundancy supply	Countrywide	25,000,000	21,729,683	EDCL	2024-2026
A.2.7	Provision of streetlighting to newly constructed roads countrywide (200 km)	Provide streetlighting along: * Nyagatare-Base-Rukomo Road * Huye- Kibeho road * Other roads. Along these roads there are many business activities that streetlighting will allow them to operate beyond normal hours (From 6pm and beyond)	Provision of security to improve livelihoods and enhance business activities along the roads	Countrywide	13,600,000	11,820,947	EDCL	2024-2027
A.2.8	Construction of Low voltage lines and switching cabins to Gabiro Agribusiness Hub irrigation sites	Construction of MV and LV and transformers to Gabiro agro-business hub	Improved power supply and stability at the agri-business hub	Nyagatare	7,000,000	6,084,311	EDCL	2024-2027
A.2.9	Installation of stand-alone solar home system	The project will connect 50,000 households to Off Grid area countrywide	50,000 new households connected to off-grid solutions	Countrywide	35,750,000	31,073,446	EDCL	2025-2026
A.2.10	Electricity supply to Green city Kigali and Innovation city	1. Supply of electrical materials (poles, towers, cables/conductors, transformers, insulators, etc.) 2. Installation to be done by in-house teams and/or contractors	Reliable power supply to the green city	Kigali	13,275,000	11,538,461	EDCL	2024-2026

S/N	Activity	Description	Expected Results	Location	Cost (USD)	Cost (EUR)	PIE	Year of Delivery
A.2.11	Distribution of clean cooking technologies to Institutions and households	Provision of 100,000 and 310 clean cooking technologies to households and institutions respectively countrywide (technologies to be distributed are from Tier 3 and above)	Scale up usage of clean cooking technologies (100,000 Household and 310 institutions)	Countrywide	37,725,000	13,037,810	EDCL	2025-2029
A.2.12	Distribution of Solar Water Heaters (SWH) for Households	Provision of solar water heaters to households (Different capacities will distributed)	Supply and installation of SWH to 2,000 SMEs and HHs	Countrywide	7,000,000	6,084,311	EDCL	2025-2029
Results Area 3: Institutional Strengthening and Capacity Building					**11,000,000**	**9,561,060**		
A.3.1	Cooking strategy and implementation plan approved	Consultant to be hired to develop the clean cooking strategy and implementation plan	Approval of the plan and trainings	n/a	3,000,000	2,607,562	MININFRA	2024-2027
A.3.2	Development of streetlight management strategy and e-mobility charging master plan; review of Energy Policy and National Electrification Plan; and revision of the Energy Efficiency Strategy and Least Cost Power Development Master Plan	Development and revision of targeted strategies and plans	Approval of strategies and plans	n/a	8,000,000	6,953,499	MININFRA	2024-2029
TOTAL COST					**300,000,000**	**260,756,192**		

Annex 2: Disbursement Linked Indicators, Verification Protocols and Disbursement Arrangements

Annex 2.1: Disbursement Linked Indicators

Table 8: Disbursement-Linked Indicator Matrix - EUR

DLI #	Indicator	Financing Allocated	% of Total Financing Amount	Baseline	Advance/ Already Achieved DLIs (EUR'M)	Target Dates				
		EUR'M	%	2024	Year 0 2025	Year 1 2025/26	Year 2 2026/27	Year 3 2027/28	Year 4 2028/29	Year 5 2029/30
	Results Area 1	**32.59**	**12.5%**		**8.15**	**5.38**	**8.20**	**2.66**	**2.81**	**5.38**
DLI 1.1	Grid outage frequency compared to the previous 3 years average			7,679		7,641	7,564	7,526	7,487	7,449
	Target annual results (number)					(38)	(77)	(38)	(39)	(38)
	Disbursement claim required for annual results	32.59	12.5%		8.15	5.38	10.92	5.38	5.53	5.38
	Recovery of advance						(2.72)	(2.72)	(2.72)	
	Results Area 2	**218.6**	**83.8%**		**54.65**	**37.19**	**42.71**	**42.71**	**18.78**	**22.55**
DLI 2.1	Additional number of households connected to the grid			1,946,781		1,966,781	2,026,781	2,086,781	2,126,781	2,146,781
	Target annual results (number)					20,000	60,000	60,000	40,000	20,000
	Disbursement claim required for annual results	109.30	41.9%		27.33	10.93	32.79	32.79	21.86	10.93
	Recovery of advance						(9.11)	(9.11)	(9.11)	
DLI 2.2	Additional number of households installed with standalone off-grid systems			9,360		21,860	34,360	46,860	54,360	59,360
	Target annual results (number)					12,500	12,500	12,500	7,500	5,000
	Disbursement claim required for annual results	37.16	14.3%		9.29	9.29	9.29	9.29	5.57	3.72
	Recovery of advance						(3.10)	(3.10)	(3.10)	
DLI 2.3	Additional number of household and institutions with improved cooking technologies			22,253		47,253	72,353	97,453	112,563	122,563
	Target annual results (number)					25,000	25,100	25,100	15,110	10,000
	Disbursement claim required for annual results	32.79	12.6%		8.20	8.17	8.20	8.20	4.94	3.27
	Recovery of advance						(2.73)	(2.73)	(2.73)	
DLI 2.4	New productive use customers provided with electricity services			9,360		9,550	9,780	10,010	10,110	10,210
	Target annual results (number)					190	230	230	100	100
	Disbursement claim required for annual results	39.35	15.1%		9.84	8.80	10.65	10.65	4.63	4.63
	Recovery of advance						(3.28)	(3.28)	(3.28)	
	Results Area 3	**9.57**	**3.7%**		**7.61**	**0.52**	**0.98**	**0.45**	**0.00**	**0.00**
DLI 3.1	Development of Clean cooking strategy and Implementation plan									
	Target annual results (number)									
	Disbursement claim required for annual results	2.61	1.0%		0.65	0.52	1.31	0.78		
	Recovery of advance						(0.33)	(0.33)		
DLI 3.2	Development of streetlight management strategy and e-mobility charging master plan; review of Energy Policy and National Electrification Plan; and revision of the Energy Efficiency Strategy and Least Cost Power Development Master Plan.									
	Target annual results (number)									
	Disbursement claim required for annual results	6.96	2.7%		6.96					
	Recovery of advance									
	TOTAL	**260.76**	**100%**		**70.41**	**43.09**	**51.90**	**45.83**	**21.60**	**27.93**

Table 9: Disbursement-Linked Indicator Matrix - JPY

DLI #	Indicator	Financing Allocated	% of Total Financing Amount	Baseline	Advance/ Already Achieved DLIs (JPY'M)	Target Dates				
					Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
		JPY'M	%	2024	2025	2025/26	2026/27	2027/28	2028/29	2029/30
	Results Area 1	**5,550.94**	**12.5%**		**1,387.73**	**916.27**	**1,395.14**	**453.70**	**481.82**	**916.27**
DLI 1.1	Grid outage frequency compared to the previous 3 years average			7,679		7,641	7,564	7,526	7,487	7,449
	Target annual results (number)					(38)	(77)	(38)	(39)	(38)
	Disbursement claim required for annual results	5,550.94	12.5%		1,387.73	916.27	1,857.71	916.27	944.40	916.27
	Recovery of advance						(462.58)	(462.58)	(462.58)	
	Results Area 2	**37,228.29**	**83.8%**		**9,307.07**	**6,333.22**	**7,274.67**	**7,274.67**	**3,199.28**	**3,839.38**
DLI 2.1	Additional number of households connected to the grid			1,946,781		1,966,781	2,026,781	2,086,781	2,126,781	2,146,781
	Target annual results (number)					20,000	60,000	60,000	40,000	20,000
	Disbursement claim required for annual results	18,614.14	41.9%		4,653.54	1,861.41	5,584.24	5,584.24	3,722.83	1,861.41
	Recovery of advance						(1,551.18)	(1,551.18)	(1,551.18)	
DLI 2.2	Additional number of households installed with standalone off-grid systems			9,360		21,860	34,360	46,860	54,360	59,360
	Target annual results (number)					12,500	12,500	12,500	7,500	5,000
	Disbursement claim required for annual results	6,328.07	14.3%		1,582.02	1,582.02	1,582.02	1,582.02	949.21	632.81
	Recovery of advance						(527.34)	(527.34)	(527.34)	
DLI 2.3	Additional number of household and institutions with improved cooking technologies			22,253		47,253	72,353	97,453	112,563	122,563
	Target annual results (number)					25,000	25,100	25,100	15,110	10,000
	Disbursement claim required for annual results	5,583.50	12.6%		1,395.88	1,391.56	1,397.13	1,397.13	841.06	556.62
	Recovery of advance						(465.29)	(465.29)	(465.29)	
DLI 2.4	New productive use customers provided with electricity services			9,360		9,550	9,780	10,010	10,110	10,210
	Target annual results (number)					190	230	230	100	100
	Disbursement claim required for annual results	6,702.57	15.1%		1,675.64	1,498.22	1,813.64	1,813.64	788.54	788.54
	Recovery of advance						(558.55)	(558.55)	(558.55)	
	Results Area 3	**1,628.28**	**3.7%**		**1,295.22**	**88.56**	**167.58**	**77.32**	**0.00**	**0.00**
DLI 3.1	Development of Clean cooking strategy and Implementation plan									
	Target annual results (number)									
	Disbursement claim required for annual results	444.08	1.0%		111.02	88.56	233.09	132.83		
	Recovery of advance						(55.51)	(55.51)		
DLI 3.2	Development of streetlight management strategy and e-mobility charging master plan; review of Energy Policy and National Electrification Plan; and revision of the Energy Efficiency Strategy and Least Cost Power Development Master Plan.									
	Target annual results (number)									
	Disbursement claim required for annual results	1,184.20	2.7%		1,184.20					
	Recovery of advance									
	TOTAL	**44,407.50**	**100%**		**11,990.03**	**7,338.05**	**8,837.39**	**7,805.69**	**3,681.10**	**4,755.66**

Annex 2.2: DLI Verification Protocol

DLI #	Disbursement Linked Indicator (DLI)	Definition/Description of Achievement	Scalability of the DLI	Protocol to evaluate achievement of the DLI and data/result verification		
				Data Sources	Verification Entity	Procedure
DLI 1.1	Grid outage frequency compared to the previous 3 years average	The result will be the difference between the average age of reporting and the previous year's average one starting with a baseline average value of 2023/24. The average will be calculated as an average of the past 3 years at a given time.	Yes	REG/EDCL/EUCL quarterly and annual report. REG quality inspection report, EUCL summary of activities implemented, E&S quarter implementation reports and E&S annual audit report	IVA	MININFRA/MINECOFIN to send the following to IVA (i) REG quarterly and yearly reports, including Quarter E&S implementation reports and E&S annual audit reports; (ii) REG quality inspection reports including implementation of E&S safeguards measures; (iii) list of activities implemented including location, and (iv) Indicator level of achievement. IVA to verify progress and E&S compliance.
DLI 2.1	Additional number of households connected to the grid	From the baseline of Customers as reported in the FY 2024/25, connect additional new customers in CoK, Southern, Eastern, Northern and Western provinces, taking into consideration E&S safeguards measures and standards as defined in the ESSA.	Yes	REG/EDCL/EUCL quarterly and annual report. REG quality inspection report, EUCL summary of activities implemented, E&S quarter implementation and E&S annual audit reports	IVA	MININFRA/MINECOFIN to send the following to IVA: (i) REG quarterly and yearly reports; (ii) REG quality inspection reports; (iii) E&S quarter implementation reports and E&S annual audit reports, (iv) list of customers connected, including location; and (v) DLI level of achievement. IVA to verify DLI achievement as well verify a sample of at least 20% on site. (vi) status of compliance with E&S mitigation measures
DLI 2.2	Additional number of households installed with standalone off-grid systems	From the baseline of Customers as reported in FY 2024/25, connect additional new customers countrywide, taking into consideration E&S safeguards measures and standards as defined in the ESSA.	Yes	REG/EDCL/EUCL quarterly and annual report. REG quality inspection report, EUCL summary of activities implemented, E&S quarter implementation and E&S annual audit reports	IVA	MININFRA/MINECOFIN to send the following to IVA: (i) REG quarterly and yearly reports; (ii) REG quality inspection reports; (iii) E&S quarter implementation reports and E&S annual audit reports, (iv) list of customers connected, including location; and (v) DLI level of achievement. IVA to verify DLI achievement as well verify a sample of at least 20% on site and (vi) the compliance with E&S mitigation measures.
DLI 2.3	Additional number of household and institutions with clean cooking technology appliances	From the baseline of Customers as reported in FY 2024/25, connect additional new customers countrywide, taking into consideration E&S safeguards measures and standards as defined in the ESSA.	Yes	REG/EDCL/EUCL quarterly and annual report. REG quality inspection report, EUCL summary of activities implemented, E&S quarter implementation and E&S annual audit reports	IVA	MININFRA/MINECOFIN to send the following to IVA: (i) REG quarterly and yearly reports; (ii) REG quality inspection reports; (iii) E&S quarter implementation report and E&S annual audit reports; (iv) list of customers connected, including location; and (v) DLI level of achievement. IVA to verify DLI achievement as well as verify a sample of at least 20% on site,

DLI #	Disbursement Linked Indicator (DLI)	Definition/Description of Achievement	Scalability of the DLI	Protocol to evaluate achievement of the DLI and data/result verification		
				Data Sources	Verification Entity	Procedure
						and the compliance with E&S mitigation measures.
DLI 2.4	New productive use customers provided with electricity services	From the baseline of Customers as reported in FY 2024/25, connect additional new customers countrywide, taking into consideration E&S safeguards measures and standards as defined in the ESSA.	Yes	REG/EDCL/EUCL quarterly and annual report. REG quality inspection report, EUCL summary of activities implemented, E&S quarter implementation and E&S annual audit reports	IVA	MININFRA/MINECOFIN to send the following to IVA: (i) REG quarterly and yearly reports; (ii) REG quality inspection reports; (iii) list of customers connected, including location; and (iv) DLI level of achievement. IVA to verify DLI achievement as well verify a sample of at least 20% on site.
DLI 3.1	Development of Clean cooking strategy and Implementation plan	The results will be achieved in 3 steps that will include: (i) TOR + REoI Publication (ii) delivery of the draft strategy document by the consultant in the form that is acceptable to the government (iii) the delivery by the consultant of the final strategy in the form that is acceptable to the government.	No	REG/EDCL/EUCL/MININFRA quarterly and annual reports.	IVA	MININFRA/MINECOFIN to send the following to IVA (i) published EoI and proof of publication like link of web page (ii) draft reviewed strategy and email notifying consultant to proceed with the final copy (iii) finalized draft that has been reviewed and approved by the technical committee in readiness for Exco approval. IVA to verify progress.
DLI 3.2	Development of streetlight management strategy and e-mobility charging master plan; review of Energy Policy and National Electrification Plan; and revision of the Energy Efficiency Strategy and Least Cost Power Development Master Plan.	The results will be achieved in 2 steps that will include: (i) delivery of the draft document in the form that is acceptable to the government (ii) the delivery of the final document in the form that is acceptable to the government.	No	REG/EDCL/EUCL/MININFRA quarterly and annual reports.	IVA	MININFRA/MINECOFIN to send the following to IVA (i) draft reviewed strategy and/or plans and email notifying consultant to proceed with the final copy. (ii) finalized draft that has been reviewed and approved by the technical committee in readiness for Exco approval. IVA to verify progress.

Annex 2.3: Disbursement Arrangements

Table 10: AfDB and AIIB Loan Disbursements

DLI #	Indicator	Financing Allocated	% of Total Financing Amount	Advance/ Already Achieved DLIs (EUR'M)	Target Dates				
		EUR'M	%	Year 0 2025	Year 1 2025/26	Year 2 2026/27	Year 3 2027/28	Year 4 2028/29	Year 5 2029/30
Results Area 1: System Reliability and Network Strengthening		**32.59**	**12.5%**	**8.15**	**5.38**	**8.20**	**2.66**	**2.81**	**5.38**
DLI 1.1	Grid outage frequency compared to the previous 3 years average	32.59	12.5%	8.15	5.38	8.20	2.66	2.81	5.38
Results Area 2: Increased access to on-grid, off-grid electricity and clean cooking		**218.6**	**83.8%**	**54.65**	**37.19**	**42.71**	**42.71**	**18.78**	**22.55**
DLI 2.1	Additional number of households connected to the grid	109.30	41.9%	27.33	10.93	23.68	23.68	12.75	10.93
DLI 2.2	Additional number of households installed with standalone off-grid systems	37.16	14.3%	9.29	9.29	6.19	6.19	2.47	3.72
DLI 2.3	Additional number of household and institutions with improved cooking technologies	32.79	12.6%	8.20	8.17	5.47	5.47	2.21	3.27
DLI 2.4	New productive use customers provided with electricity services	39.35	15.1%	9.84	8.80	7.37	7.37	1.35	4.63
Results Area 3: Institutional Strengthening and Capacity Building		**9.57**	**3.7%**	**7.61**	**0.52**	**0.98**	**0.45**	**0.00**	**0.00**
DLI 3.1	Development of Clean cooking strategy and Implementation plan	2.61	1.0%	0.65	0.52	0.98	0.45		
DLI 3.2	Development of streetlight management strategy and e-mobility charging master plan; review of Energy Policy and National Electrification Plan; and revision of the Energy Efficiency Strategy and Least Cost Power Development Master Plan.	6.96	2.7%	6.96					
	TOTALS	**260.76**	**100%**	**70.41**	**43.09**	**51.90**	**45.83**	**21.60**	**27.93**
	Expected Disbursement Rate			**27.0%**	**16.5%**	**19.9%**	**17.6%**	**8.3%**	**10.7%**

Table 11: AfDB Loan Disbursements

DLI #	Indicator	Financing Allocated	% of Total Financing Amount	Advance/ Already Achieved DLIs (EUR'M)	Target Dates				
		EUR'M	%	Year 0 2025	Year 1 2025/26	Year 2 2026/27	Year 3 2027/28	Year 4 2028/29	Year 5 2029/30
Results Area 1: System Reliability and Network Strengthening		**21.73**	**12.5%**	**5.43**	**3.59**	**5.47**	**1.78**	**1.88**	**3.59**
DLI 1.1	Grid outage frequency compared to the previous 3 years average	21.73	12.5%	5.43	3.59	5.47	1.78	1.88	3.59
Results Area 2: Increased access to on-grid, off-grid electricity and clean cooking		**145.73**	**83.8%**	**36.43**	**24.79**	**28.48**	**28.48**	**12.52**	**15.03**
DLI 2.1	Additional number of households connected to the grid	109.30	41.9%	18.22	7.29	15.79	15.79	8.50	7.29
DLI 2.2	Additional number of households installed with standalone off-grid systems	37.16	14.3%	6.19	6.19	4.13	4.13	1.65	2.48
DLI 2.3	Additional number of household and institutions with improved cooking technologies	32.79	12.6%	5.47	5.45	3.65	3.65	1.47	2.18
DLI 2.4	New productive use customers provided with electricity services	39.35	15.1%	6.56	5.87	4..91	4.91	0.90	3.09
Results Area 3: Institutional Strengthening and Capacity Building		**6.38**	**3.7%**	**5.08**	**0.35**	**0.66**	**0.30**	**0.00**	**0.00**
DLI 3.1	Development of Clean cooking strategy and Implementation plan	1.74	1.0%	0.44	0.35	0.66	0.30		
DLI 3.2	Development of streetlight management strategy and e-mobility charging master plan; review of Energy Policy and National Electrification Plan; and revision of the Energy Efficiency Strategy and Least Cost Power Development Master Plan.	4.64	2.7%	4.64					
	TOTALS	**173.84**	**100%**	**46.94**	**28.73**	**34.60**	**30.55**	**14.40**	**18.62**
	Expected Disbursement Rate			**27.0%**	**16.5%**	**19.9%**	**17.6%**	**8.3%**	**10.7%**

Table 12: AIIB Loan Disbursements in EUR

DLI #	Indicator	Financing Allocated	% of Total Financing Amount	Advance/ Already Achieved DLIs (EUR'M)	Target Dates				
		EUR'M	%	Year 0 2025	Year 1 2025/26	Year 2 2026/27	Year 3 2027/28	Year 4 2028/29	Year 5 2029/30
Results Area 1: System Reliability and Network Strengthening		**10.86**	**12.5%**	**2.72**	**1.79**	**2.73**	**0.89**	**0.94**	**1.79**
DLI 1.1	Grid outage frequency compared to the previous 3 years average	10.86	12.5%	2.72	1.79	2.73	0.89	0.94	1.79
Results Area 2: Increased access to on-grid, off-grid electricity and clean cooking		**72.87**	**83.8%**	**18.22**	**12.40**	**14.24**	**14.24**	**6.26**	**7.52**
DLI 2.1	Additional number of households connected to the grid	36.43	41.9%	9.11	3.64	7.89	7.89	4.25	3.64
DLI 2.2	Additional number of households installed with standalone off-grid systems	12.39	14.3%	3.10	3.10	2.06	2.06	0.82	1.24
DLI 2.3	Additional number of household and institutions with improved cooking technologies	10.93	12.6%	2.73	2.72	1.82	1.82	0.74	1.09
DLI 2.4	New productive use customers provided with electricity services	13.12	15.1%	3.28	2.93	2.46	2.46	0.45	1.54
Results Area 3: Institutional Strengthening and Capacity Building		**3.19**	**3.7%**	**2.54**	**0.17**	**0.33**	**0.15**	**0.00**	**0.00**
DLI 3.1	Development of Clean cooking strategy and Implementation plan	0.87	1.0%	0.22	0.17	0.33	0.15		
DLI 3.2	Development of streetlight management strategy and e-mobility charging master plan; review of Energy Policy and National Electrification Plan; and revision of the Energy Efficiency Strategy and Least Cost Power Development Master Plan.	2.32	2.7%	2.32					
	TOTALS	**86.92**	**100%**	**23.47**	**14.36**	**17.30**	**15.28**	**7.20**	**9.31**
	Expected Disbursement Rate			**27.0%**	**16.5%**	**19.9%**	**17.6%**	**8.3%**	**10.7%**

Table 13: AIIB Loan Disbursements in JPY

DLI #	Indicator	Financing Allocated	% of Total Financing Amount	Advance/ Already Achieved DLIs (JPY'M)	Target Dates				
				Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
		JPY'M	%	2025	2025/26	2026/27	2027/28	2028/29	2029/30
Results Area 1: System Reliability and Network Strengthening		**1,850.31**	**12.5%**	**462.58**	**305.42**	**465.05**	**151.23**	**160.61**	**305.42**
DLI 1.1	Grid outage frequency compared to the previous 3 years average	1,850.31	12.5%	462.58	305.42	465.05	151.23	160.61	305.42
Results Area 2: Increased access to on-grid, off-grid electricity and clean cooking		**12,409.43**	**83.8%**	**3,102.36**	**2,111.07**	**2,424.89**	**2,424.89**	**1,066.43**	**1,279.79**
DLI 2.1	Additional number of households connected to the grid	6,204.71	41.9%	1,551.18	620.47	1,344.35	1,344.35	723.88	620.47
DLI 2.2	Additional number of households installed with standalone off-grid systems	2,109.36	14.3%	527.34	527.34	351.56	351.56	140.62	210.94
DLI 2.3	Additional number of household and institutions with improved cooking technologies	1,861.17	12.6%	465.29	463.85	463.85	463.85	125.26	185.54
DLI 2.4	New productive use customers provided with electricity services	2,234.19	15.1%	558.55	499.41	499.41	499.41	76.66	262.85
Results Area 3: Institutional Strengthening and Capacity Building		**542.76**	**3.7%**	**431.74**	**29.52**	**55.86**	**25.77**	**0.00**	**0.00**
DLI 3.1	Development of Clean cooking strategy and Implementation plan	148.03	1.0%	37.01	29.52	55.86	25.77		
DLI 3.2	Development of streetlight management strategy and e-mobility charging master plan; review of Energy Policy and National Electrification Plan; and revision of the Energy Efficiency Strategy and Least Cost Power Development Master Plan.	394.73	2.7%	394.73					
	TOTALS	**14,802.50**	**100%**	**3,996.68**	**2,446.02**	**2,945.80**	**2,601.90**	**1,227.03**	**1,585.22**
	Expected Disbursement Rate			**27.0%**	**16.5%**	**19.9%**	**17.6%**	**8.3%**	**10.7%**

Annex 3: Implementation Support

Main Focus of Implementation Support

Time	Focus	Skills Needed	Resource Estimate	Partner Role
0 – 6th month	Recruitment of IVA Hiring Technical Assistance Entry into force of the loan, Disbursement of loan advance (1st disbursement)	Energy	TM and Co-TM follow-up on recruitment of IVA, hiring of Technical Assistance & fulfilment of entry into force and disbursement conditions	Consultation, comments on implementation
0 – 6th month	Project launch workshop	Energy, Fiduciary, E&S, Legal, Disbursement	5-days project launch mission consisting of TM, Co-TM, FM, procurement, disbursement, and E&S - 3 staff will travel	Consultation, comments on implementation
7 - 48th month	Monitoring & Review Supervision missions, assessing project implementation, project risks & alignment with objectives, and quality of verification process, compliance with Bank requirements (fiduciary, E&S, reporting), etc.	Energy (2) Fiduciary (2) E&S	At least seven (7) supervision missions to be conducted, each of 9 days, including 2 days field visits.	Consultation, comments on implementation
20–24th month	Conduct a Mid-Term review, assess project continued relevance and alignment with objectives, assess the need for restructuring and further Technical Assistance	Energy (2) Fiduciary (2) E&S Legal Policy and Strategy Governance	a 9-day mid-term review, including half day workshop with development partners and half day workshop with Energy Private sector group	Consultation, Comments on implementation
48–54th month	Project Completion Report (PCR)	Energy (2) Consultant Fiduciary (2) E&S Policy and Strategy Governance	A consultant will prepare the PCR report which will be reviewed by the Project Team.	Provide comments

Annex 4: Integrated Risk Assessment

Risk Description	Assessment (H/M/L)	Due Date	Mitigation Measures
1. Technical risks			
1.1. Technical risks - 1 Likely mismatch in timely implementation of associated transmission network projects to support increased grid access under the project. Hence, inadequacy of the transmission system to support added customers	Low	FY25/26	Ensure all the earmarked and ongoing transmission network projects under the ESSP are accelerated. (MININFRA/ REG)
1.2. Technical risks - 2 Delay in internal approvals of final designs of the various activities.	Low	FY25/26	Senior staff in charge of projects design are nominated to the Project Technical Team and ensure deepened on-site supervision activities and review of quarterly reports to identify early signs of challenges. Complex activities such as distribution grid automation have been struck out of the project. (MININFRA/ REG/ Bank team)
1.3. Technical risks - 3 Misinterpretation of the DLI verification protocol leading to delayed disbursement.	Low	FY24/25	Clear and elaborate definition of the DLIs and the DLI verification protocol (MININFRA/ REG/ Bank team)
2. Fiduciary Risks – Financial Management			
2.1. Fiduciary Risks - 1 **Budget Execution & Internal Controls:** Poor budget execution and financial controls leading resource wastage.	Medium	FY25/26	Formulate and execute credible annual budgets and Expenditure Framework and put in place effective internal control environment to detect, mitigate and prevent irregularities, and to ensure efficiency, and effectiveness of the use of resources. (MININFRA/REG/EDCL)
2.2. Fiduciary Risks - 2 **Accounting and Reporting:** Financial reports are inadequate and submitted in delay.	Medium		Strict oversight by the EA Financial Systems Manager, ensure financial reports are based on established accounting standards and procedures, and based on credible data/ information, and reports are submitted to the Bank on time. (MININFRA/REG/EDCL)
2. Fiduciary Risks - Procurement			
2.3. Fiduciary Risks - 3 Quality of procurement document and process: leading to variation, and litigations	Medium	FY25/26	An experienced procurement expert assigned to the Program Technical Team; Ensure use of international standards and specifications and adhere to standard bid documents acceptable to the Bank. Capacity building for procurement staff is in the project and will be supplemented by regular Bank delivered fiduciary clinics. (EDCL)
3. Disbursement Linked Indicator Risks			

Risk Description	Assessment (H/M/L)	Due Date	Mitigation Measures
3.1. Disbursement Risk - 1 **Treasury Management and Funds Flow:** Delay in the release of funds at start of the project and unpredictability of funding from MINECOFIN to REG/EDCL for subsequent disbursement requests	Medium	FY25/26	Use advance financing and adhere to strict planning of the verification of DLI and prompt submission of disbursement request to the Bank. (MININFRA/REG/EDCL)
4. Environment and Social Risks			
4.1. E&S Risks - 1 During construction, generation of noise, dust and waste, health and safety risks, issues relating to labor and working conditions, GBV risks and minor land acquisition	Low	FY25/26	Environmental and social impacts and risks will be outlined in the ESMP of each activity in the project and is supported by capacity building embedded in the Program Action Plan. As part of the results verification process the IVA will also confirm the achievement of the results also complied with the E&S requirements outlined in the Financing Agreement. Bank will also conduct regular E&S briefs/clinics with the EDCL staff implementing Bank financed projects. (MININFRA/REG/EDCL)
4.2. E&S Risk - 2 During operation, risks associated with electrical and fire hazards, waste from end of use streetlights, appliances and home solar system components.	Medium	FY25/26	Conducting public education and awareness campaigns on electrical and fire hazards and measures to take in case of accidents. Providing arrangements for the environmentally sound disposal of electronic waste including from solar home systems and sensitizing communities on these arrangements. Implementing standard operating procedures to safeguard worker safety.
5. Climate Change Risks			
5.1. Climate Risk - 1 Landslides and flooding destroying distribution network and switching cabins	Low	FY25/26	Head of EDCL design unit included in the Program Technical Team to ensure design and construction works for the distribution network is climate change resilient. (EDCL)
5.2. Climate Risk - 2 Misinterpretation of the DLI verification protocol leading to delayed disbursement	Low	FY25/26	DLIs verification protocol is well defined
OVERALL RISK RATING: MODERATE			

Annex 5: RBF Action Plan

S/N	Action Description	DLI (Y/N)	Due Date	Responsible Party	Completion Measurement
Technical					
AP1-8	Approval of the Energy Sector Strategic Plan and implementation plan (gender responsive)	Y	March 2026	MININFRA	Approved by Minister of Infrastructure
AP1-9	Approval of sector capacity building program (gender responsive) agreed with the Bank	Y	March 2026	MININFRA	Approved by Minister of Infrastructure
AP1-10	Designation of staff and focal point for technical unit (PTU) MININFRA to send official letters with names (of whom 30% females)	N	Immediately	MININFRA	Send official letters with names no later than one (1) month after the Date of the Loan Agreement
AP1-11	Finalized the ToR of the IVA (Independent Verification Agency)	N	May 2025	MININFRA/ EDCL/ EUCL	TOR cleared by the Bank
AP1-12	Commencement of the Preparation of the Project Completion Report (PCR) by a consultant prior to last disbursement	N	June 2028	MININFRA/ EDCL/ EUCL	Confirmation during project supervision
Procurement					
AP2-1	Develop and implement a comprehensive training program for procurement staff across relevant government ministries and agencies. This program should cover topics such as procurement planning, tender document preparation, bid evaluation, contract management, gender issues in procurement and ethics in procurement. Include both foundational and advanced modules.	N	Within 6 months of the project effectiveness	MININFRA	Report on the number of Procurement Staff Trained and Certified at Different Levels
AP2-2	Recruit procurement officers at EDCL (of whom 30% females)	N	Within 12 months of the project effectiveness	EDCL/ REG / MININFRA	Appointment letters
AP2-3	The ToRs of the IVA should include adequate provisions to closely examine any potential loopholes in the procurement process which might be source of complaints	N	Each annual audit/assessment and continuous	EDCL/ REG / MININFRA	Approved ToRs
AP2-4	Procurement Audit	N	Each annual audit/assessment and continuous	EDCL/ REG / MININFRA	OAG Procurement Audit Reports
AP2-5	Value for money audit	N	Each annual audit/assessment and continuous	EDCL/ REG / MININFRA	OAG Procurement Audit Reports
Fiduciary Management					
AP3-1	Address specialized skills for finance specialists through skills training to enable monitoring of DLIs into the work program of the Internal Auditor pool at REG, MININFRA, MINECOFIN,	N	on going	REG/ MINECOFIN	
AP3-2	Support PFM staff in obtaining professionally qualification – professional certification training (REG/EDCL/EUCL) as well as supporting already qualified staff in Continuous Professional Development (CPD) with focus on energy sector (of whom 30% females)	N	on going	REG/ MINECOFIN	CPA / ACCA / CIA / CISA / CIPS / CAT licenses obtained and CPD Certificate Obtained
AP3-3	Allocate sufficient budget for project activities and timely disburse for achieved results.	N	During implementation	EDCL/ EUCL/ REG / MINECOFIN	Result Verification Report and associated Disbursement Reports
Environmental and Social					
AP4-1	Human resources needed for the management of E&S risks are: one Environmental and social safeguard specialist to be appointed by EDCL and one Safety manager to be appointed by EUCL	N	on going	EDCL / EUCL	Letter of confirmation of appointment/assignment by EDCL MD
AP4-2	IVA opinion from REMA on compliance of underlining RBF 2 to E&S requirements	N	During implementation	IVA	Result Verification Report
AP4-3	Prepare ES screening checklist to assess, before commencement of activities,ES risks of subprojects and exclude high risk activities.	N	Before effectiveness	EDCL/ EUCL	ES screening checklist

S/N	Action Description	DLI (Y/N)	Due Date	Responsible Party	Completion Measurement
AP4-4	Prepare a protocol outlining the process for submission of ES instruments for review by AfDB and AIIB	N	Before effectiveness	EDCL/EUCL	ES review protocol
AP4-5	Resettlement Action Plan to include compensation value for PAPs in line with AfDB requirements either at full replacement cost or through fair, transparent, well documented settlement with the landowner.	N	Before commencement of works	EDCL/ EUCL	Resettlement Action Plans
AP4-6	Resettlement Action Plan to include compensation and potential interim livelihood support for informal land users	N	Before commencement of works	EDCL/EUCL	Resettlement Action Plans
AP4-7	Assess in site-specific Environmental and Social Impact Assessment risks of Gender-Based Violence (GBV) and propose in site-specific ESMPs adequate mitigations measures such as training of staff and contractors on GBV, implementation of Code of Conduct for workers, implementation of responsive Grievance Redress Mechanism	N	Before commencement of works	EDCL/EUCL	Site-specific Environmental and Social Impact Assessments/ Environmental and Social Management Plans (ESMPs)
AP4-8	Training for EDCL/EUCL staff on ES reporting and monitoring requirements for RFB project to be included in Capacity Building Plan.	N	on going	EDCL/ EUCL	Capacity Building Plan/ES Monitoring Report
AP4-9	Preparation and implementation of OHS Evaluation Plan to assess and improve, as needed, the EUCL/EDCL operational systems for health and safety	N	During implementation	EDCL/EUCL	OHS Evaluation Plan/ Bank supervision report of the project
Gender and Youths					
AP5-1	30% of REG interns recruited will be female	N	on going	EDCL/ EUCL	Confirmation of intern recruitment as reviewed using supervision
AP5-2	Extension and equipping of REG's nursing rooms	N	on going	EDCL/ EUCL	Bank supervision report of the project
AP5-3	Sector Staff trained, of which • 20% of trainees will be women. • 30% of trainees within the age range of 18 to 35 years	N	on going	EDCL/ EUCL	Bank supervision report of the project
AP5-4	30% of full-time and part time jobs created by the project will be held by women	N	on going	EDCL/ EUCL	Bank supervision report of the project
AP5-5	20% of productive–use connections from the project will serve women	N	on-going	EDCL/ EUCL	Bank supervision report of the project
AP5-6	10% of FHH are targeted to benefit from off-grid and clean cooking solutions	N	on-going	EDCL/ EUCL	Bank supervision report of the project
Resilience Action					
AP6-1	Improvement of the regulatory environment, including the regulation of captive power.	N	on going	MININNFRA / RURA	Bank supervision report of the project
AP6-2	Research into new energy technologies and strategies for climate resilience including GHG accounting and on generating carbon credits from clean cooking interventions	N	on going	MININFRA	Bank supervision report of the project
AP6-3	Investment in training programs for engineers, technicians, and policymakers (of whom 30% females) on the latest energy technologies and resilience strategies.	N	on going	EDCL / EUCL / MININFRA	Bank supervision report of the project

Annex 6: Country Credit Fact Sheet

130. **Background.** Rwanda is a small, landlocked, low-income country in Eastern Africa, with a population of around 14 million and income per capita of around USD1,000 (around USD4,000 in purchasing power parity). Since the devastating civil war in 1994 Rwanda has made a decisive turnaround. Underpinning the good performance has been an uninterrupted period of political stability, government's strong focus on a home-grown development agenda, investment in infrastructure and human capital, as well as support from development partners. Rwanda has put in place a relatively strong institutional framework and reformed its private sector business environment. Macroeconomic stability has been maintained, and the country has embraced regional integration through the East African Community (EAC). To overcome infrastructure constraints, the government has been promoting a service-oriented development strategy, with a focus on international business hospitality and mid/high-end tourism.

131. As a result, economic growth has been robust for the past two decades, at 7.5 percent per year on average. Access to basic services has improved, infant mortality fell by half, and poverty declined from 77 percent in 2001 to an estimated 47 percent in 2024. Hailed as a success story, Rwanda has become an exemplar of development among the donor community.

132. Still, viewed in absolute terms, Rwanda's development challenges are formidable. Half of the population lives in extreme poverty. Pervasive infrastructure shortages result in high transportation costs and render many businesses uncompetitive. Human capital is still low. Export base is small (around 17 percent of GDP) and narrow (agriculture, limited mining products). Agriculture accounts for a third of the economy (much of it is subsistence farming) and 45 percent of employment. There is a large informal sector.

133. Macroeconomic situation has been generally stable. Inflation has been volatile due to the volatile external environment and food prices, but generally contained over the medium term. The structurally high current account deficit reflects Rwanda's high investment needs that is generally financed with official donor support and foreign direct investment. The exchange rate has been managed along a moderately depreciating path. FX reserves, at around 5 months of imports, are adequate. The banking sector is small, but well-capitalized and profitable; non-performing loans are relatively low.

134. Rwanda has had a long history of engagement with the IMF. Currently, it is under three concurrent programs, worth USD640 million in total, including an RSF, which is meant to address long-term climate change challenges. Performance on these programs has been generally strong.

Selected Indicators	2021	2022	2023	2024	2025*	2026*	2027*
GDP growth 1/	10.9	8.2	8.3	8.9	7.1	7.5	7.4
Inflation (e.o.p.) 1/ 5/	-2.0	31.7	6.2	6.4	6.3	4.1	5.0
Fiscal balance 2/	-8.6	-7.6	-6.4	-6.3	-5.0	-4.0	-3.0
Public debt 3/	73.4	67.1	73.5	78.7	84.7	86.3	86.3
Current account balance	-11.2	-9.8	-11.7	-12.7	-13.8	-15.9	-13.4
External debt	75.7	72.5	77.6	85.9	92.6	96.5	98.6
FX reserves (e.o.p., USD billion)	1.89	1.69	1.83	2.41	2.58	2.60	2.65
Exchange rate (e.o.p., RWF/USD) 4/	1,010	1,071	1,264	1,383	1,451	..	..

Source: IMF Country report 25/127; in percent of GDP, unless indicated otherwise; '*' = projections; 'e.o.p.' = end-of-period
Notes: 1/ percent change y/y; 2/ fiscal year basis (FY is Jul to Jun); 3/ incl. guarantees; 4/ data from central bank, 2025 as of Sep 3; 5/ data for 2021-24 from the National Institute of Statistics.

135. **Recent developments.** Rwanda's economy grew by 8.9 percent in 2024. The agricultural sector recovered from earlier weather shocks, the industrial sector recorded strong growth, thanks to construction, while the services sector has been driven by trade, tourism, and transport. Unemployment rate decreased to 14.9 percent in 2024, from 17.2 percent in 2023.

136. Inflation has declined from the post-pandemic peak of over 30 percent in late 2022 to zero in mid-2024, but has since increased again, to over 7 percent, as of July 2025. FX reserves have increased and remain generally stable, supported by inflows from development partners, while the exchange rate has kept on the historical trend of moderate depreciation.

137. The fiscal position is facing pressure due to significant spending on large infrastructure projects (the new airport and the expansion of national air carrier), and the recent pension reform.

138. In 2025, geopolitical tensions have erupted with Rwanda's large neighbor, creating a serious risk of a withdrawal of external financial support and a decrease in tourism. A peace agreement was signed in July 2025 between the parties, but the implementation remains uncertain.

139. **Outlook and risks.** In 2025 the economy is expected to decelerate slightly, to a still strong 7.1 percent, due to the projected fiscal consolidation. That said, the growth outlook remains robust.

140. The authorities plan to implement fiscal consolidation, and the deficit so far remains in line with IMF projections. However, access to concessional funding is becoming more constrained and fiscal deficit could deteriorate amid heightened geopolitical tensions. The anticipated reduction in external support is expected to weigh on Rwanda's fiscal position. Finally, if the off-budget priority infrastructure investment projects planned for the near term were to be accounted for, the FY26 fiscal deficit would rise to 7.4 percent of GDP.

141. According to the IMF, the risk of debt distress is moderate, but key indicators have deteriorated. During 2012-19, debt has increased by over 30 percentage points, to 57 percent of GDP, to finance large public investments, then by further 15 percentage points during the pandemic, and there is more spending on large investments in the pipeline. Debt is now expected to return to the IMF-recommended 65 percent-of-GDP target by 2033, instead of 2030 as hoped before. Factors mitigating the situation are high growth and the concessional nature of debt, which makes it affordable. A credible medium-term fiscal consolidation will be critical for fiscal sustainability.

142. Rwanda's sovereign credit risk rating is B+ (Fitch, S&P) and B2 (Moody's). During 2024-25 Moody's and Fitch changed the outlook to from 'stable' to 'negative', mostly due to the challenging regional geopolitical environment, and S&P is contemplating the same. Still, the economy has proved resilient to the many shocks in the past. High growth and government's commitment to fiscal consolidation and revenue mobilization are credit positive.

Annex 7: Economic and Financial Analysis

A. Economic Analysis.

143. **Approach and Methodology.** A cost-benefit analysis was undertaken to assess the economic viability of the Project, based on a comparison between "with-" and "without-" project scenarios. The "without-project" scenario assumes that unconnected customers would otherwise meet their electricity needs through diesel-based generators (for consumers targeted for grid-connection under the Project) or through alternative lighting energy sources (for consumers targeted for off-grid access under the Project). The EIRR and ENPV of the project were estimated using discounted cash flow analysis of economic costs and benefits. All costs used in the model are exclusive of taxes. A sensitivity analysis was performed to evaluate the impact of increased investment costs and decreased benefits.

144. **Economic Costs and Benefits.** The economic costs of the Project include the up-front costs – namely the combined investment financed from WB and AIIB funds – for provision of electricity or clean cooking solutions, and the ongoing operation and maintenance costs. The economic benefits for the Project include grid-connected customers: (i) avoided cost of diesel-based electricity generation; (ii) avoided GHG emissions from decreased diesel consumption and from improved grid efficiency; (iii) reduction in unserved demand from grid interruptions due to grid reinforcement. For off-grid customers, economic benefits include: (i) avoided cost of alternative methods of lighting; and (ii) avoided greenhouse gas emissions. With respect to clean-cooking solutions, economic benefits include: (i) fuel savings from use of more efficient cookstoves; and (ii) avoided GHG emissions.

145. **Grid Electricity Access Assumptions.** The main assumptions used in the analysis for grid-based electricity are as follows:

- Consumption growth: 10% annually up to 2030 and 5% thereafter[22]
- Discount rate: 9 percent
- System losses decrease in time in line with the Least Cost Power Development Plan
- Grid emission factor: the GHG emission factor of the grid evolves in line with the projected electricity generation mix of the Least Cost Power Development Plan
- Constant 2025 prices: all costs and benefits are represented in constant 2025 prices
- Economic life of the grid-access related investments: 23 years
- Average grid connection cost: 750 USD/household (including VAT)
- Avoided cost of diesel-based self-generation:[23] 67 USc/kWh
- Emission factor of diesel-based generation: 1.1 kgCO2e/kWh
- Benefits assumed to accrue starting in the year(s) in which the investment(s) are made

146. **Off-grid Electricity Access Assumptions.** The following assumptions were used in the analysis for off-grid electricity access.

[22] REG, June 2023, Rwanda: Least Cost Power Development Plan (LCPDP) 2023-2050.
[23] Calculated based on 3kW diesel generator.

- Average cost of SHS: 306 USD/system (including VAT)
- Annual O&M cost for SHS: 2% per year
- Economic lifetime of SHS: 5 years

147. **Clean Cooking Assumptions.** The following assumptions were used in the analysis for clean cooking solutions.

- Avoided cost of alternative lighting expense: 72 USD/year
- Cost of cooking stoves: traditional wood stove (tier 0): 2 USD/system; wood improved stove (tier 3): 35 USD/system; charcoal stove (tier 2): 7 USD/system; charcoal improved stove (tier 3); 45 USD/system: LPG stove (tier 5): 70 USD/system
- Thermal efficiencies of cooking stoves: traditional wood stove (tier 0): 0.15%; wood improved stove (tier 3): 0.3%; charcoal stove (tier 2): 0.25%; charcoal improved stove (tier 3): 0.3%; LPG stove (tier 5): 0.55%
- Technology shares: 70% of cookstove users switch to tier 3 technologies, of which 25% to charcoal and 75% wood; 30% of cookstove users switch to tier 4/5 (LPG). Of the users of wood improved stoves (tier 3), the share of households collecting wood is 90%, while 10% purchase wood
- Economic lifetime of clean cooking solutions: 5 years

148. **Cost-Benefit Analysis.** The results show that the Project is economically viable. The EIRR for the individual Project activities are, without and with GHG benefits (refer to Table 14 below): 21.7 percent (25.0 percent when accounting for GHG benefits) for grid-based electricity access (including connections and network strengthening); 24.6 percent (34.5 percent) for off-grid SHS; and 19.7 percent (73 percent) for clean cooking. The EIRR of the overall Project is 21.7 percent without GHG benefits and 26.0 percent when GHG benefits are taken into account. The ENPV of the Project is estimated at USD183 million, without taking into account GHG benefits and USD234.9 million with GHG benefits taken into account.

Table 14: Results of Cost-Benefit Analysis for the Project

Intervention	Without GHG Benefits ENPV (USDm)	Without GHG Benefits EIRR	With GHG Benefits ENPV (USDm)	With GHG Benefits EIRR
Grid-based electricity access (incl. network strengthening)	178.9	21.7%	234.9	25.0%
Off-grid SHS electricity	2.9	24.6%	4.7	34.5%
Clean cooking solutions	1.1	19.7%	8.0	73.0%
Overall Project	**183.0**	**21.7%**	**247.6**	**26.0%**

149. **Sensitivity Analysis.** A sensitivity analysis of the EIRR and the ENPV was conducted to assess the impact of adverse changes in key variables. Specifically, it considers the result in the face of potential underestimation of investment costs or over-estimation of benefits. For the sensitivity, tests were done in relation to 20% reduction in benefits or 20% increase in costs or with both scenarios.

150. The sensitivity analyses show that the project has a positive ENPV and an EIRR more than

the discount rate under different scenarios. The model covered a scenario with either 20 percent higher investment costs or 20 percent lower benefits and with both scenarios as shown in Table 15 below. The base case has an ENPV of USD158.6m and EIRR of 19.8% while the worst-case scenario has an ENPV of USD125.7 and an EIRR of 16.3%.

Table 15: Sensitivity Analysis for Economic Evaluation

Scenario	ENPV (USDm)	EIRR
Base Case	**269.8**	**27.4%**
Higher Investment Costs by 20%	191.8	20.1%
Lower Benefits by 20%	137.9	18.6%
Higher Investment Costs by 20% + Lower Benefits by 20%	59.9	12.7%

B. Financial Analysis

151. **Approach and Methodology.** The financial evaluation of the RBF project was conducted using a discounted cash flow approach to estimate the Financial Internal Rate of Return (FIRR) and Financial Net Present Value (FNPV). The financial viability of the Project was assessed through a cost-benefit analysis, which estimated the net benefits by comparing the costs and benefits from the Project. The financial costs included capital costs and operations and maintenance costs. The financial benefits for the Project included: (i) revenue from energy sales for new connections and additional demand from improved system reliability for grid-connected customers; and (ii) revenue from grid connections fees, once-off prepaid meter charges and monthly meter rentals fees.

152. **Grid Electricity Access Assumptions.** The main assumptions used in the financial analysis for grid-based electricity, in addition to the ones indicated under economic analysis, are as follows:

- Discount rate: 13 percent
- Connection fees of RWF56,000
- Once-off charges of RWF140,000 for a pre-paid meter
- Meter monthly rental charge of RWF500
- Reduction in unserved demand as a result of grid reinforcement: 40%

153. With reliability improvement of the system, the power system is expected to have reduced commercial and distributions losses. This will result in additional energy being saved and distributed to end users. Also with improved reliability, the system is expected to take up slightly more energy from the production facilities. The energy saved results in incremental revenues at no extra cost of production while the incremental revenue generated will translate into increased sales and additional production costs.

154. **Financial Evaluation.**

155. The financial evaluation showed that the project is financially viable with a positive financial net present value (FNPV) and a financial internal rate of return (FIRR). The project was estimated to have an FNPV of USD56.3 million and an FIRR of 17.7 percent.

156. **Sensitivity Analysis for Financial Evaluation**. Sensitivity analyses show that the project

has a positive FNPV and an FIRR more than the discount rate under one scenario and a negative FNPV under another scenario, representing the delicate nature of the electricity sector, whose financial sustainability depends on government subsidies due to the non-cost reflective nature of electricity tariffs. The model covered a scenario with either 20 percent higher investment costs or 20 percent lower benefits and the project was still viable under higher investment costs but not viable with lower benefitsTable 5. The worst-case scenario has an FNPV of negative USD7.7m and an FIRR of 12.3% as shown in Table 6 below.

Table 16: Sensitivity Analysis for Financial Evaluation

Scenario	FNPV (USDm)	FIRR
Base Case	**56.3**	**17.7%**
Higher Investment Costs by 20%	3.6	13.3%
Lower Benefits by 20%	-7.7	12.3%

157. **Detailed Analyses**. The detailed financial and economic analyses are shown in tables belowTable 5.

Table 11: Economic Analysis for the RBF Project

Year	Investment Costs	O&M Costs	Project Costs Total Cost	Grid Electrification		SHS		Cooking Solutions		Total Benefits	Net Benefit
				Avoided Cost of Diesel Generation	Avoided GHG	Avoided Cost of Lighting Alternatives	Avoided GHG	Savings in Fuel Costs	Avoided GHG		
2025	-$34,160,240	-$4,427,998	-$38,588,238	$6,749,842	$334,305	$900,000	$120,109	$0	$0	$8,104,256	-$30,483,982
2026	-$50,140,027	-$8,613,310	-$58,753,337	$16,641,267	$1,098,656	$1,881,733	$247,388	$392,172	$505,539	$20,766,755	-$37,986,582
2027	-$43,765,027	-$13,506,974	-$57,272,002	$28,443,479	$2,066,460	$2,950,765	$376,460	$785,933	$1,044,788	$35,667,885	-$21,604,117
2028	-$29,883,848	-$17,805,122	-$47,688,970	$38,722,423	$3,019,567	$3,701,700	$464,660	$1,179,694	$1,591,999	$48,680,043	$991,073
2029	-$20,256,606	-$21,242,581	-$41,499,187	$46,683,693	$3,802,042	$4,299,759	$523,459	$1,416,725	$1,968,943	$58,694,622	$17,195,435
2030	$0	-$23,260,081	-$23,260,081	$51,352,063	$4,391,570	$3,371,249	$403,350	$1,573,596	$2,218,657	$63,310,485	$40,050,404
2031	$0	-$24,253,565	-$24,253,565	$53,919,666	$4,861,310	$2,349,552	$276,071	$1,181,425	$1,713,315	$64,301,338	$40,047,773
2032	$0	-$25,296,665	-$25,296,665	$56,615,649	$5,312,327	$1,228,119	$139,828	$787,664	$1,158,143	$65,241,730	$39,945,065
2033	$0	-$26,417,649	-$26,417,649	$59,446,431	$5,868,740	$513,554	$57,365	$393,903	$595,044	$66,875,037	$40,457,388
2034	$0	-$27,605,997	-$27,605,997	$62,418,753	$6,470,144			$156,872	$243,296	$69,289,064	$41,683,067
2035	$0	-$28,877,237	-$28,877,237	$65,539,691	$7,128,315					$72,668,005	$43,790,768
2036	$0	-$30,287,190	-$30,287,190	$68,816,675	$7,584,429					$76,401,104	$46,113,914
2037	$0	-$31,766,899	-$31,766,899	$72,257,509	$8,064,565					$80,322,074	$48,555,174
2038	$0	-$33,319,815	-$33,319,815	$75,870,384	$8,569,802					$84,440,187	$51,120,371
2039	$0	-$34,949,561	-$34,949,561	$79,663,904	$9,101,260					$88,765,163	$53,815,602
2040	$0	-$36,659,938	-$36,659,938	$83,647,099	$9,660,096					$93,307,195	$56,647,256
2041	$0	-$38,469,970	-$38,469,970	$87,829,454	$10,169,526					$97,998,980	$59,529,010
2042	$0	-$40,370,292	-$40,370,292	$92,220,926	$10,697,487					$102,918,413	$62,548,121
2043	$0	-$42,365,411	-$42,365,411	$96,831,973	$11,244,148					$108,076,121	$65,710,709
2044	$0	-$44,460,055	-$44,460,055	$101,673,571	$11,809,628					$113,483,200	$69,023,145
2045	$0	-$46,659,188	-$46,659,188	$106,757,250	$12,506,315					$119,263,565	$72,604,377
2046	$0	-$48,966,719	-$48,966,719	$112,095,112	$12,864,038					$124,959,150	$75,992,431
2047	$0	-$51,389,295	-$51,389,295	$117,699,868	$13,213,928					$130,913,796	$79,524,501
2048	$0	-$53,932,652	-$53,932,652	$123,584,861	$13,651,202					$137,236,064	$83,303,412
2049	$0	-$56,602,810	-$56,602,810	$129,764,105	$13,951,613					$143,715,717	$87,112,907
2050	$0	-$59,406,092	-$59,406,092	$136,252,310	$14,347,604					$150,599,914	$91,193,822
Total	**-$178,205,749**	**-$870,913,069**	**-$1,049,118,818**	**$1,971,497,959**	**$211,789,077**	**$21,196,430**	**$2,608,691**	**$7,867,982**	**$11,039,723**	**$2,225,999,862**	**$1,176,881,044**
ENPV	**-$141,672,035**	**-$248,333,110**	**-$390,005,145**	**$553,792,880**	**$55,983,723**	**$14,253,220**	**$1,766,611**	**$4,920,960**	**$6,857,893**	**$637,575,286**	**$247,570,142**
EIRR											**26.0%**

Table 17: Financial Analysis for the RBF Project

Year	Project Costs			Grid Electrification						
	Investment Costs	O&M Costs	Total Cost	Energy sales from improved system reliability	Energy sales from new connections	Revenue from connection charges	Revenue from meter once-off charges	Revenue from meter rentals	Total Income	Net Income
2025	-$30,744,216	-$3,985,198	-$34,729,414	$0	$874,488	$790,012	$1,975,030	$84,644	$3,724,174	-$31,005,241
2026	-$45,126,025	-$7,751,979	-$52,878,003	$5,770,908	$3,847,745	$2,370,036	$5,925,090	$338,577	$18,252,356	-$34,625,648
2027	-$39,388,525	-$12,156,277	-$51,544,802	$8,863,452	$7,406,909	$2,370,036	$5,925,090	$592,509	$25,157,996	-$26,386,805
2028	-$26,895,464	-$16,024,610	-$42,920,073	$11,357,736	$10,475,486	$1,580,024	$3,950,060	$761,797	$28,125,103	-$14,794,970
2029	-$18,230,945	-$19,118,323	-$37,349,268	$13,272,168	$12,803,372	$790,012	$1,975,030	$846,441	$29,687,023	-$7,662,245
2030	$0	-$20,934,073	-$20,934,073	$17,386,356	$14,083,709	$0	$0	$846,441	$32,316,507	$11,382,434
2031	$0	-$21,828,209	-$21,828,209	$21,574,176	$15,492,080	$0	$0	$846,441	$37,912,698	$16,084,489
2032	$0	-$22,766,999	-$22,766,999	$25,844,832	$15,492,080	$0	$0	$846,441	$42,183,354	$19,416,355
2033	$0	-$23,775,884	-$23,775,884	$30,198,324	$16,266,684	$0	$0	$846,441	$47,311,450	$23,535,566
2034	$0	-$24,845,397	-$24,845,397	$34,643,856	$17,080,018	$0	$0	$846,441	$52,570,316	$27,724,919
2035	$0	-$25,989,513	-$25,989,513	$39,181,428	$17,934,019	$0	$0	$846,441	$57,961,889	$31,972,375
2036	$0	-$27,258,471	-$27,258,471	$43,801,836	$18,830,720	$0	$0	$846,441	$63,478,998	$36,220,526
2037	$0	-$28,590,209	-$28,590,209	$48,523,488	$19,772,256	$0	$0	$846,441	$69,142,186	$40,551,976
2038	$0	-$29,987,834	-$29,987,834	$53,327,976	$20,760,869	$0	$0	$846,441	$74,935,287	$44,947,453
2039	$0	-$31,454,605	-$31,454,605	$58,233,708	$21,798,912	$0	$0	$846,441	$80,879,062	$49,424,457
2040	$0	-$32,993,944	-$32,993,944	$63,240,684	$22,888,858	$0	$0	$846,441	$86,975,984	$53,982,039
2041	$0	-$34,622,973	-$34,622,973	$68,348,904	$24,033,301	$0	$0	$846,441	$93,228,647	$58,605,674
2042	$0	-$36,333,263	-$36,333,263	$73,558,368	$25,234,966	$0	$0	$846,441	$99,639,776	$63,306,512
2043	$0	-$38,128,870	-$38,128,870	$78,869,076	$26,496,714	$0	$0	$846,441	$106,212,232	$68,083,362
2044	$0	-$40,014,049	-$40,014,049	$84,290,232	$27,821,550	$0	$0	$846,441	$112,958,224	$72,944,174
2045	$0	-$41,993,269	-$41,993,269	$89,812,632	$29,212,627	$0	$0	$846,441	$119,871,701	$77,878,432
2046	$0	-$44,070,047	-$44,070,047	$95,454,684	$30,673,259	$0	$0	$846,441	$126,974,385	$82,904,337
2047	$0	-$46,250,366	-$46,250,366	$101,197,980	$32,206,922	$0	$0	$846,441	$134,251,344	$88,000,978
2048	$0	-$48,539,387	-$48,539,387	$107,060,928	$33,817,268	$0	$0	$846,441	$141,724,638	$93,185,251
2049	$0	-$50,942,529	-$50,942,529	$113,043,528	$35,508,131	$0	$0	$846,441	$149,398,101	$98,455,572
2050	$0	-$53,465,483	-$53,465,483	$119,145,780	$35,508,131	$0	$0	$846,441	$155,500,353	$102,034,870
Total	**-$160,385,174**	**-$783,821,762**	**-$944,206,936**	**$1,406,003,045**	**$536,321,076**	**$7,900,120**	**$19,750,300**	**$20,399,238**	**$1,990,373,779**	**$1,046,166,843**
FNPV	**-$127,504,831**	**-$205,768,159**	**-$333,272,990**	**$330,575,798**	**$149,928,088**	**$6,182,479**	**$15,456,196**	**$7,021,891**	**$509,164,452**	**$56,285,776**
FIRR										**17.7%**

Annex 8: Paris Agreement Alignment and Climate Finance

158. This annex provides details on the assessment of the alignment of the Project with the mitigation (BB1) and adaptation (BB2) goals of the Paris Climate Agreement (PA), as well as the estimates of climate finance for the RBF project can report, as well as project level GHG assessment

A. Assessment of Paris Agreement Alignment

A1. Climate Mitigation Goals (BB1)

159. The Project can be classified as Universally Aligned with the mitigation goals of the Paris Agreement, in accordance with the Joint MDB Methodological Principles (2023) and AIIB's own Paris Agreement Alignment Methodology. The investment activities that directly contribute to the decarbonization of Rwanda's electricity sector and reduction of GHG emissions. The activities under **Results Area 1** (substation rehabilitation, overhead lines reinforcement) and **Results Area 2** (expanding grid and off-grid access and clean cooking solutions), fall under categories recognized as universally aligned in the Joint MDB list of universally aligned with the mitigation goals in the **energy sector**: (a) Electricity transmission and distribution, including energy access, energy storage, and demand-side management; (b) Clean cooking technologies, and also under **buildings and public installations sector**: (c) LED street lighting, and also under **buildings and public installations sector**: (c) LED street lighting. The activities under **Results Area 3** (institutional strengthening, planning, and program support) are mitigation-neutral/immaterial and therefore considered PA-aligned on the mitigation side.

160. These interventions are fully consistent with Rwanda's Updated NDC (2021), which commits to reducing GHG emissions by 38 percent by 2030 relative to BAU, with the energy sector identified as a principal mitigation priority. In addition, the World Bank (2022) Country Climate and Development Report (CCDR) highlights that achieving these targets requires transformative investments in energy access and grid modernization, including expanded deployment of renewable energy and clean cooking solutions to reduce reliance on traditional biomass.24 Similarly, Rwanda's national climate strategy emphasizes accelerating electrification and clean cooking access as core pathways for mitigation.[25]

BB1 Conclusion: All project components, focused on electricity distribution, substations, grid strengthening, and clean cooking, fall within the categories of *universally aligned activities* for climate mitigation under the Joint MDB methodology, and Results Area 3, is considered aligned due to its neutral climate mitigation impact. The interventions are also fully consistent with Rwanda's Updated NDC (2021) target of 38% emissions reduction by 2030, and the energy sector's role as a key mitigation driver. Therefore, the Program is considered aligned with the Paris Agreement's climate mitigation goals (BB1).

[24] World Bank. (2022). *Rwanda Country Climate and Development Report*. Washington, D.C.: World Bank.
[25] Republic of Rwanda. (2021). *Updated Nationally Determined Contribution (NDC)*. Kigali: Ministry of Environment.

A2. Climate Adaptation Goals (BB2)

161. In line with AIIB methodology, the program is assessed following the three steps for its alignment with the adaptation and climate resilience goals of the Paris Agreement:

Step 1. Climate vulnerability and risks

162. Rwanda's energy sector is highly exposed to climate hazards, intense rainfall, flooding and landslides (especially in the north and west), alongside rising temperatures and episodic drought in the east. These hazards affect hydropower generation (low flows, siltation) and distribution assets (washouts, slope failure, heat-related derating). National analyses and development-partner diagnostics consistently flag increasing rainfall variability, landslide and flood damages, and warming trends with hot and dry periods in eastern and south-western regions.[26]

163. For the proposed project, changes in key weather parameters under a warmer climate are expected to have significant impacts on the performance and service delivery (see Table 13). Using an in-house tool, a physical climate risk screening across Rwanda and the distribution line extensions and substation sites (at Mukungwa, Gikondo, Jabana and Gaso) was carried out to assess potentially material physical climate risks that the project may be exposed to. The screening indicated an overall medium climate risk rating and identified the following key climate hazards which may pose material physical climate risks under scope a) substations and distribution line extensions and, proportionately, for the distributed/end-use scope (b)–(e) (low risk). Measures are specified for the R1 urban nodes (Kigali, Musanze, Rwamagana) and R2 districts (Musanze, Nyagatare, Rusizi, Huye). These impacts have already been observed in Rwanda and are summarized in 13 below. Risks to other activities under RA2 (Increase access to on-grid and off grid electricity and clean cooking) and RA3 (Institutional strengthening and capacity building) were considered as low (see Table 13 below).

Table 18: Potential Impacts of Climate-related Hazards on Substations and Distribution line extensions

Climate-related hazard	Potential Impacts
High temperature and heatwaves	Elevated ambient temperatures increase transformer winding/hot-spot temperatures and accelerate insulation ageing; conductor thermal expansion raises line sag and may reduce clearance; switchgear and power-electronics face derating and higher failure rates; operators may need to part-load feeders/substations to remain within thermal limits.
Wildfire	Heat and flames can char wooden components (where used), deform aluminum conductors (annealing), crack insulators; smoke/ionized air increases flashover risk; asset damage and safety stand-offs impede restoration; post-fire erosion heightens follow-on risks to poles and footings.
Strong winds and cyclones	Wind loading and gusts can cause pole/cross-arm failures, hardware loosening, and conductor galloping; treefall and debris produce faults and line breaks; at substations, paneling and light structures (gantries, fences) can be damaged, leading to outages and access constraints for repair.

164. Other activities under RA2 (Increase access to on-grid and off grid electricity and clean

[26] Climate Risk Profile: Rwanda (2021): The World Bank Group.

cooking) and RA3 (Institutional strengthening and capacity building) were identified as low risk. A low-risk rationale table is provided below.

Table 19: Risk Materiality Summary by Scope of the Project

Results Area	Activity / Asset	Climate Risk	Risk Rationale
RA1 - System reliability & network strengthening	Substations; MV/LV line extensions	Medium	Fixed network assets and overhead spans are exposed to extreme heat/heatwaves, wildfire (vegetation fires), strong winds/storms, and lightning/surge. Consequences are system-wide (outages, safety, asset aging).
RA2 - Increase access to on-grid/off-grid electricity & clean cooking	Grid last-mile connections (Kigali + all provinces)	Low (localized)	Distributed service drops and small LV segments; failures are localized and do not propagate. Resilience managed via standard design classes and RA1 backbone hardening.
	Off-grid access (SHS)	Low	Modular, stand-alone micro-assets; localized exposure; non-propagating failures.
	Productive-use connections / equipment (incl. SMEs, public services, e-mobility)	Low	Point-load assets at customer sites; risk governed by micro-siting; rapid restoration possible.
	Provision of 200km of streetlights along roads countrywide	Low	Linear, segmental consequence; pole failures don't destabilize the grid. Hazards are local (pluvial flooding, winds), best handled via design classes rather than mass point-screening.
	Clean-cooking technologies (households & institutions)	Low	End-use devices with minimal hydromet exposure; failures are household-level.
	Solar water heaters (building-mounted)	Low	End-use systems with localized exposure; standard manufacturer/site design governs resilience
RA3 - Institutional strengthening & capacity building	Capacity-building program; IVA/OAG facilitation; Program Action Plan activities	Low	Institutional/TA activities; no climate-exposed physical assets. Adaptation relevance via governance, SOPs, and E&S system strengthening rather than direct exposure.

Step 2. Climate adaptation and resilience measures

165. In consultation with the projects technical design team and review of client documents including an ESSA report, the project has included targeted climate adaptation measures that

address potentially material physical climate risks associated with hazards identified in Step 1 for (a) substations and distribution line extensions. Such measures, including linking high-ambient equipment ratings, insulated/underground sections, feeder interlinks, automation, and management to address heat, wildfire, and wind/storm hazards, are embedded in RA1 works. They are specified for the R1 urban nodes (Kigali, Musanze, Rwamagana) and R2 districts (Musanze, Nyagatare, Rusizi, Huye), consistent with climate risk screening results (e.g., Heat: High in Kigali and Rwamagana; Wind: High in Musanze City and Rusizi District; Landslide: High in Rusizi District). All requirements need to be embedded in the Owner's Requirements, Standard Bidding Documents, BoQs, and verification protocols

Step 3. Alignment with broader national and sectoral adaptation policies and priorities

166. Actions to be supported under the proposed project are consistent with Rwanda's Updated NDC and the Green Growth and Climate Resilience Strategy (GGCRS) as well as energy-sector guidance in the ESSA Technical Documents.

BB2 Conclusion: TA detailed physical climate risk screening for the Project identified potentially material risks to assets under RA1 from key hazards such as high temperature and heatwaves, wildfire, strong wind and storm. Project design and implementation has embedded targeted resilience measures for substations and distribution assets to address the risks identified. Such measures include smart-substation specifications and EHS-aligned practices, conversion of bare conductors to insulated/underground cables in dense urban areas, distribution automation and remote switching, and governance via the EDCL Head of Design to climate-proof designs and works. Actions to be supported under the proposed project are in support of relevant national adaptation and climate resilience policies and strategies. As such, the project is considered aligned with the Paris Agreement's adaptation goals (BB2).

B. Climate Finance

B1. Climate Mitigation Finance

167. The project qualifies for climate mitigation finance under the Joint MDB Common Principles for Climate Mitigation Finance Tracking (2023) as follows:

(a) Result Area 1 (RA1) investments in distribution substations and line reinforcement are eligible under *Category 2.9: Greenfield transmission or distribution of electricity.*
(b) Results Area 2 (RA2) investments in on-grid and off-grid access, clean cooking technologies, under *Category 2.9*[27]; productive equipment are under *Category 9.5 (stand-alone high efficiency equipment)*; LED street lighting are counted under *Category 9.3: LED street lighting.*

168. AIIB climate mitigation finance is therefore estimated at USD75.68 million (75.68 percent of AIIB's USD100m), reflecting: (i) RA1 distribution/substation investments eligible under category 2.9, and (ii) RA2 access and end-use efficiency package (grid connections under categories

[27] As specified by the MDB Common Principles, financing of general transmission or distribution investments within an existing grid shall be apportioned according to the share of additional electricity delivered that can be characterized as non-nuclear, very-low-carbon electricity during a 10-year period comprising five years before and five years after the start of the operation of the new infrastructure.

2.9.

169. AIIB finance for these two RAs, USD75.68 million, therefore support mitigation (Table 14). However, as discussed below on adaptation finance, USD1.88 million of AIIB finance under RA1 also contributes to support adaptation (i.e., leading to mitigation and adaptation dual benefits). To avoid "double counting", AIIB finance targeting mitigation and adaptation dual benefits is reported as 50 percent mitigation finance and 50 percent adaptation finance. Therefore, the total mitigation finance is estimated as USD74.74 million.

Table 20: Estimate of AIIB Finance Contributing to Mitigation Finance

Project Component	Description	Estimated Mitigation Costs (USD m)	Mitigation Finance Justification
Results Area 1: System reliability & network strengthening (Scope a)	Substation rehabilitation; MV/LV reinforcement; switchyard upgrades (backbone enabling RE flow)	8.38	Eligible under 2.9 (distribution systems that support delivery of very-low-carbon electricity; strengthening backbone).
Results Area 2: Energy access & end-use efficiency	RA2 a) New grid connections;	33.50	2.9 for grid (energy access via grid). Apportionment is applied in line with the criteria for eligible activity 2.9 under the MDB Common Principles: original AIIB share 50.00 × 0.67 = 33.50.
	RA Clean-cooking technologies for households; Productive-use efficient equipment; LED street-lighting	33.80	off-grid access/mini-grids; 9.5 for stand-alone high-efficiency appliances/equipment (productive-use & efficient cooking devices); 9.3 for LED street-lighting (universally aligned). *No grid-mix apportionment applied to these items.*
Total project finance contributing to Mitigation		**75.68**	
Percentage of AIIB Financing (USD 100m)		**75.6%**	

a: Costs here are pro-rated to reflect the share of AIIB finance for the project in the total project cost.

B2. Climate Adaptation Finance

170. The estimate for climate adaptation finance follows a **proportional approach** (Type 1, adaptation activities under RA1, in line with joint MDB methodology for tracking adaptation finance and AIIB internal guidance. The total project finance contributing to adaptation is estimated at **USD1.88 million** (refer Table 15), which represents **1.88 percent** of the total AIIB financing.

171. As discussed above under mitigation finance estimate, adaptation finance to be reported from this project considers that the USD1.88 million AIIB finance under RA1 also supports

mitigation (i.e., it targets mitigation and adaptation dual benefits). Therefore, 50 percent of this amount, USD0.94 million shall be reported as adaptation finance.

Table 21: Estimate of AIIB Adaptation Finance Contributing to Adaptation

Project Component (Adaptation activity)	Target Climate Risk	Estimated Adaptation Costs (USD m)	Adaptation Finance Justification Type-1 proportional: 15% of activity cost
Results Area 1: Substation rehabilitation	Extreme heat & heatwaves; wildfire; strong wind/storms	0.75	Structural measures (heat-tolerant equipment, ventilation/HVAC & temp/PD monitoring; wildfire defensible space/RoW practices; wind/storm bracing & anchorage; surge/earthing) *15% of activity cost × AIIB pro-rata. Base = USD15.0m; project-level adaption = 15% × 15.0 = 2.25m; AIIB 33.3% = 0.75m*
Results Area 2: Overhead lines reinforcement	Extreme heat & heatwaves; wildfire; strong wind/storms	1.13	Structural adaptations include insulated ABC on exposed spans, selective undergrounding in urban bottlenecks, higher wind-load classes, and coordinated surge protection. *Base = USD22.5m; 15% = 3.375m (project); AIIB 33.3% = 1.13m*
Total project finance contributing to adaptation		**1.88**	
Percentage of AIIB Financing (USD 100m)		**1.88%**	

Table 22: Total Climate Finance Calculations

Description	Results Area 1	Results Area 2	Total
Project finance contributing to climate action (USD million)			
Adaptation	0.75	1.13	1.88
Mitigation	8.38	67.30	75.68
Mitigation and adaptation	1.88	0.00	1.88
Reported climate finance (USD million)			
Adaptation finance (USD million)	0.94	0.00	**0.94**
Mitigation finance (USD million)	7.44	67.30	**74.74**
Dual benefits	1.88	0.00	**1.88**

172. As shown in Table above, the total climate finance reported for the Project is USD75.68 million (75.68 percent of total AIIB finance for the project), consisting of USD74.74 million and USD0.94 million as mitigation and adaptation finance, respectively,

with USD1.88 million targeting mitigation and adaptation dual benefits.

C. GHG Assessment

173. Through grid reinforcement and extension under RA1, the project is expected to meet 40% of consumers' power demand that would otherwise have remained unserved by the grid under the without-project scenario. Of this 40% unserved demand, 50% would otherwise have continued to be met by diesel generators under the without-project scenario and will instead be displaced by grid power under the with-project scenario. The difference in emission factors between diesel power generation and grid power supply will lead to a net reduction in GHG emissions of 134,377 tCO2e over the period 2025 to 2050.

174. Under RA2, GHG emissions reduction is expected to be delivered by (1) grid electrification of households; (2) off-grid electricity access, and (3) clean cooking.

a) Through connecting a total of 200,000 households to the grid, the project will meet their power demand that would otherwise have continued to be met by diesel power generation under the without-project scenario. This displacement is expected to result in a net reduction in GHG emissions of 2,090,345 tCO_2e over the period 2025 to 2050.

b) The installation and operation of a total of 50,000 off-grid SHSs to meet households' power demand will displace fossil fuel consumption, such as kerosene lamps and diesel-powered lighting. With lifecycle GHG emissions of the SHSs accounted for, this displacement is expected to result in a net reduction in GHG emissions of 35,853 tCO_2e over the period 2025 to 2033.

c) The provision of 100,000 clean cooking technologies to households and 310 to institutions will facilitate fuel and technologies transitions, through shifting from charcoal-based tier 2 stoves to LPG-based tier 5 stoves, from charcoal-based tier 2 to tier 3 stoves, and from traditional wood-based tier 0 stoves to wood-based tier 3 stoves. This shift is expected to result in a net reduction in GHG emissions of 158,475 tCO_2e over the period 2026 to 2034.

175. Overall, through all components under RA1 and RA2, the project is expected to contribute to climate change mitigation by reducing a total of 2,419,051 tCO2e over the period 2025 to 2050, equivalent to an annual average of 93,040 tCO2e/year and 372,160 tCO2e over project period.