MISSION 300
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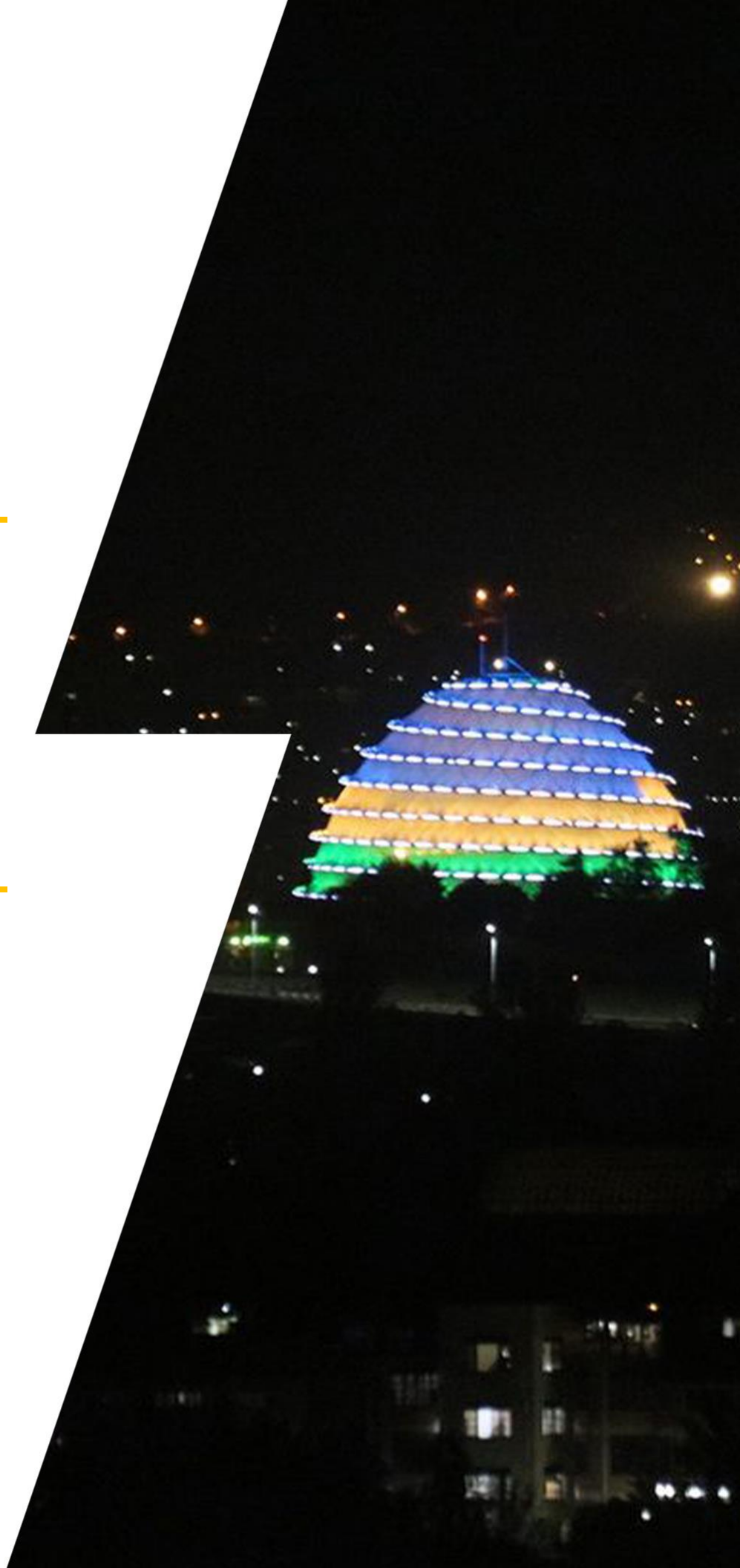
NATIONAL ENERGY COMPACT
FOR REPULIC OF RWANDA



Preamble

This National Energy Compact for Rwanda follows the approach in the Africa Region M300 Energy Compacts and reflects the commitment of the Government of Rwanda to critical actions needed to achieve affordable, reliable, and clean energy services and substantially increasing the share of renewable energy in its energy mix. The National Energy Compact outlines the challenges in meeting the targets and presents a credible action plan to address the challenges towards 2030.

The Rwanda National Energy Compact therefore outlines the pathway to establish a modern, inclusive, and sustainable energy sector that drives socio-economic development, enhances livelihoods, and mitigates environmental impacts. It envisions a future where all Rwandan citizens and industries have access to reliable, affordable, and clean energy services, contributing to national prosperity and climate resilience.

The electricity sector in Rwanda has gone through transformational changes in the last 12 years, which resulted in big increases in demand and access rates and in installed generation and network (transmission and distribution) capacity, as well as in significant improvement in its operational performance. For electricity access over the past decade, Rwanda positioned itself as a regional leader in electrification. As of June 2025, the electricity access rate reached 84%（59% grid connected and 25% off-grid), up from just 18% in 2012. This rapid expansion has been driven by ambitious government programs, targeted investments in infrastructure, making Rwanda's electrification pace one of the fastest in Africa. Rwanda is also accelerating clean cooking targets to reduce reliance on biomass and reduce pressure on forests and reduce diseases related to unclean energy eventually enabling healthy families but also achieve different NDC's under the Paris agreement.

Therefore, the Rwanda Energy Compact adopts a holistic and integrated approach structured around 7 objectives highlighted below:

1. Increase generation capacity and expand clean energy infrastructure with the least cost approach.
2. Achieve universal last mile access to electricity.
3. Enhance network stability and strength.
4. Increase access to clean cooking and invest in clean cooking infrastructure and technologies.
5. Advance regional integration and power trade.
6. Ensure sector financial sustainability and improve utility operational performance.
7. Unlock private investment.

To achieve this, Rwanda's vision and ambitions and policy direction offer hope and prioritize the power sector as reflected in some key documents. Rwanda's energy sector is also guided by multiple policy frameworks that align with national and international objectives, including the National Strategy for Transformation (NST-2), Rwanda Vision 2050, the Sustainable Development Goals (SDGs), and the African Union's Agenda 2063. Central to this is the Rwanda Energy Policy (REP) 2025, which emphasizes transparent governance, encouraging private investment, and strengthening regulatory capacities to expand electricity access and promote renewable energy. The NST2 goals focus on increasing electricity generation, improving access, and reducing biomass reliance for cooking, while Vision 2050 aims for a significant rise in per capita energy consumption to enhance living standards. The current Energy Sector Strategic Plan (ESSP) also aligns with Rwanda's Green Growth and Climate Resilience Strategy (GGCRS), prioritizing energy security and low-carbon energy supply to foster sustainable development and environmental protection, the National Electrification Plan (NEP) (revised in 2025, yet to be approved and adopted) focusing on expanding electricity access across the country with a clear indication of the demarcation between on-grid and off-grid areas, and the clean cooking strategy , which is under review.

Call for Partnership:

The Government of Rwanda acknowledges that achieving the ambitious targets set forth in this National Energy Compact will require the mobilization of substantial resources and strong partnerships. This includes close collaboration with development partners, the private sector, and international climate finance institutions.

Abbreviations & Acronyms

AFD	Agence Française de Développement (French Development Agency)
AfDB	African Development Bank
AIIB	Asian Infrastructure Investment Bank
AMI/MDM	Advanced Metering Infrastructure / Meter Data Management
BADEA	Arab Bank for Economic Development in Africa
CDMU	Compact Delivery and Monitoring Unit
CMS	Customer Management System
CNG	Compressed Natural Gas
DMS	Distribution Management System
EAPP	Eastern Africa Power Pool
EDCL	Energy Development Corporation Limited
EIA	Environmental Impact Assessment
EIB	European Investment Bank
EICV	Integrated Household Living Conditions Survey (Enquête Intégrale sur les Conditions de Vie des ménages)
EMS	Energy Management System
ESSP	Energy Sector Strategic Plan
EUCL	Energy Utility Corporation Limited
GDP	Gross Domestic Product
GGCRS	Green Growth and Climate Resilience Strategy
GIS	Geographic Information System
IPP	Independent Power Producer
KEXIM	Export–Import Bank of Korea
KPI	Key Performance Indicator
LCPDP	Least Cost Power Development Plan

LPG	Liquefied Petroleum Gas
LV	Low Voltage
MINALOC	Ministry of Local Government
MININFRA	Ministry of Infrastructure
MoE	Ministry of Environment
MV	Medium Voltage
NEP	National Electrification Plan
NGO	Non-Governmental Organization
NISR	National Institute of Statistics of Rwanda
NST-1	National Strategy for Transformation (NST1)
OPEC	OPEC Fund for International Development
PASA	Programme of Advisory Services and Analytics
PPA	Power Purchase Agreement
PMU	Project Management Unit
PUE	Productive Users of Electricity
RAEB	Rwanda Atomic Energy Board
REG	Rwanda Energy Group
RURA	Rwanda Utilities Regulatory Authority
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SCADA	Supervisory Control and Data Acquisition
SDG	Sustainable Development Goals
SE4All	Sustainable Energy for All
WAMS	Wide Area Monitoring System
WB	World Bank

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Declaration of Commitment

The Government of Rwanda reaffirms and commits to do the following;

- Increase Generation capacity from 466MW to 1032MW by 2030 through investment in new generation power plants targeting solar, nuclear and hydro, rehabilitate and upgrade existing power plants and leverage on power trading with neighboring countries and ensure an increase in renewables of 60% in generation mix by 2030.
- Accelerate universal access to electricity through on-grid and off-grid solutions, the government is committing to achieve 100% access by 2030 with 75% on grid and 25% off-grid and ensure all productive users of electricity and cells (utugari) are connected.
- Increase access to clean cooking energy from 6% to 31% by 2030. The Government commits to ensure access to clean and affordable cooking solutions and fuels to both households and institutions using multi technology approach by targeting tier 5 (Electricity, gas) in urban areas and tier 4 and tier 3+ in rural areas.
- Create and enabling environment for private sector participation and investment in energy sector development by reducing barriers and mobilizing US$ 1billion

The Government of Rwanda reaffirms its commitment to an inclusive and sustainable energy sector that drives socio-economic development, enhances livelihoods, and mitigates environmental impacts. It envisions a future where all Rwandan citizens and industries have access to reliable, affordable, and clean energy services, contributing to national prosperity and climate resilience. Therefore, in the Rwanda Energy compact the Government commits to implement different programs and reforms through the pillars detailed below;

PILLAR 1

EXPAND ENERGY INFRASTRUCTURE AT COMPETITIVE COSTS

To achieve and sustain over time security of electricity supply Rwanda will work on;

- Enhancement of the existing institutional setup and planning tools for electricity generation and transmission expansion planning, strengthening the capacity of the sector in the development-driven planning approach and systematic update of the LCPDP, prioritizing larger and efficient power plants
- Enhancing grid stability by investing in grid-forming using Virtual Synchronous Machines (VSM), Upgrade and reinforce transmission network capacity to handle planned generation growth from solar PV, gas, and other sources, ensuring all new solar projects are complemented by Battery Energy Storage Systems (BESS) for grid stability and dispatchability and upgrading transmission voltage from 110kV to 220kV to enable higher power transfer capacity and improve system reliability at competitive costs
- Review and improvement of competitive procurement arrangements (auctions and other processes) to ensure timely least-cost implementation of projects.
- Review and eventual update of the Assessment Plans for dissolved methane and peat, and other energy resources such as hydropower, nuclear, geothermal, wind and BESS, proposed in the Resource Study

PILLAR 2

LEVERAGE THE BENEFITS OF REGIONAL POWER INTEGRATION

Rwanda is a beneficiary to regional power interconnections which have increased the country's energy security. Rwanda commits to:

- Carry out the analysis of options to enhance power exchanges with neighboring countries and participation in the Eastern Africa Power Pool (EAPP).
- Preparation of roadmaps to implement most suitable regional transmission projects and participation in the EAPP Day-Ahead-Market (DAM) once operational in 2026.
- Enhance energy cooperation framework for development and exploitation of energy resources with neighboring countries.

PILLAR 3:

ACHIEVE UNIVERSAL ACCESS TO ELECTRICITY AND INCREASE ACCESS TO CLEAN COOKING SOLUTIONS

To achieve universal access to electricity in Rwanda by 2030, with optimized life cycle (investment and operation and maintenance) costs to ensure sustainable service delivery as per applicable level and quality standards, Rwanda commits to the following actions:

Under Policy & Regulations:

- Approve the revised 2025 National Electrification Plan
- GoR reviews and eventually updates connection policy (connection charges to be paid by new electricity consumers and related subsidization regime) to eliminate any barrier to electrification of low-income households created by their affordability constraints.

Under Technical:

- Update technical standards for design and construction of distribution networks in all types of areas to be used for rehabilitation, reinforcement, upgrade and extension projects (based on

recommendations provided in 2024 NEP prepared by NRECA).
- Accelerate the technical and financial planning and implementation of least lifecycle cost grid electrification programs as per the outcomes of 2025 version of NEP, to achieve the "steady state" arrangement for sustainable delivery of electricity service to most households and other structures in the country.

Under clean cooking:
- Review, update and adopt the clean cooking strategy
- Support cooperatives and private sector in fuel production to access blended financing, building their capacity to increase readiness to access finance, awareness campaigns to increase uptake on clean cooking
- Enforce standards and improve laboratory testing
- Construction of centralized kitchens to support public schools

PILLAR 4

FOSTER GREATER PRIVATE SECTOR PARTICIPATION TO UNLOCK ADDITIONAL RESOURCES

Private sector plays an important role already in generation, off-grid and clean cooking, but for the GoR to reach targets Rwanda commits to;

- Carry out a study to identify barriers for private investment in the power sector and improve the provision of credit enhancement and risk mitigation options.

PILLAR 5:

WORK TOWARD FINANCIALLY VIABLE UTILITIES THAT PROVIDE RELIABLE SERVICE

To ensure financial sustainability of the utility and the power sector of Rwanda**,** the following measures will be implemented:

- Adoption of a methodology for setting and periodically adjusting the Revenue Requirement (RR) of EUCL under a multi-year tariff regime by the Regulatory Authority
- Enhancing transparency of the regulatory process through public disclosure of the approved methodology and main steps in each application.
- RURA will review and improve end-user tariff structure to:
  - Incorporate fixed, demand and energy charges to all tariff categories.
  - Implement a reactive power pricing regime with bonuses and penalties to enable optimization in use of capacity of networks to transmit active power and postpone investments to expand that capacity.
- RURA will strengthen regulations on service quality and their enforcement through: (i) real time monitoring of the performance of EUCL through access of records of information systems and other applications used by the utility for its operations; and (ii) application of compensation to affected consumers.

CROSS-CUTTING ASPECTS

1. Gender mainstreaming & youth participation

This Compact will mainstream gender equality by ensuring a gender responsive approach to energy access initiatives and the Government will ensure Youth Inclusion by actively increasing youth participation in energy policy and workforce development, with the goal of creating a skilled, empowered generation that drives innovation and inclusive growth.

2. Enhancement of sector digitalization

Furthermore, NST2 Priority 7 underscores the importance of accelerating digital transformation, enhancing digital skills, and promoting wide-scale adoption of technology across all sectors. In alignment with this priority, Rwanda plans to establish a state-of-the-art IT infrastructure and continue to roll out smart technologies including SCADA/DMS/EMS, GIS, CMS, and AMI/MDM. By June 2030, Rwanda through REG aims to achieve full corporate integration through the full deployment of modern business management systems such as IBMS, Revenue Protection, Customer Management Systems, Distribution Management Systems, Smart Meters, and GIS. To prevent silos and technology lock-in, REG's digitalization journey will take place in close coordination with Rwanda's broader digital development, and leverage existing assets, and data platform, while prioritizing interoperability.

Priority Investment Areas

Priority Area	Type of Support Needed
Generation to meet security of electricity supply	Investment finance, transactional support, technical assistance, project preparation and packaging, private capital mobilization, results-based finance, risk mitigation instruments
Universal electricity access and increased access to clean cooking solutions	Investment finance, programmatic funding, innovation grants, subsidies and grants technical assistance, private capital mobilization, results-based finance, climate finance, risk mitigation instruments, investment of infrastructure for e-mobility
Network reliability and reduction of the power transmission and distribution losses, regional interconnection	Investment finance, transaction support, technical assistance, project preparation, private capital mobilization
Financial and operational performance improvement of utilities	Policy-based finance, performance-based incentives, capacity building
Private sector participation and institutional reform	IPP scale-up support, transaction advisory, blended finance, technical assistance, data systems development, regulatory strengthening
Cross-cutting areas	Investing in digital projects and solutions, development of environmental standards and streamlining strategies for inclusion.

Indicative Funding Needs from the public and private sectors 2026- 2030 (US$ million)

Source	Generation	Transmission	Distribution	Regional Integration	Grid electri-fication	Off-grid electrification	Clean Cooking	Utility Viability	Total
Public	303.70	215.66	380.95	197.65	491.48	30	458.38	54.08	2,131.9
Private	801.66	-	-	-	-	34	86.76	-	922.29
Total	**1,105.36**	**215.66**	**380.95**	**197.65**	**491.48**	**64**	**545.14**	**54.08**	**3,054.18**

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Compact Targets and Action Plan

Compact indicators and key timelines for implementation

Indicator	Baseline (2025)	Target by 2030
Increase generation capacity	466MW	1032.2MW
Increase share of renewable energy	52% share of renewable energy	60% share of renewable energy
Increase access to electricity	84% (59% grid and 25% off-grid)	100% (75% Grid & 25% off-grid)
Increase access to clean cooking	5.6% (Electricity, Gas)	31%
Private capital mobilized	USD 0.2bn	USD 1bn

Pillar 1: Expand Energy Infrastructure at Competitive Costs

Indicator / Reform Area	Baseline (2025)	Target (2030)	Key Actions & Timeline	Responsible institutions
Integrated power system planning	No	Development-oriented Least-Cost Planning Model adopted, resource assessment plans updated	• Adopt a model of development-oriented Energy Planning by June 2027 • Update Least-cost Power Development plan by June 2027 • Conduct Feasibility study of nuclear power plant by 2028 • Conduct/update Geothermal, hydropower and wind assessment studies by 2029 • Develop Action Plans for each resource by 2029	MININFRA, EDCL MINECOFIN, MININFRA,
Project development for enhancing security of electricity supply	466MW	1032.2 MW	Development/commissioning of 500MW Solar power capacity and BESS • Hire a transaction advisor and an E&S consultant for a solar IPP project by June 2026, • Procurement of IPP by Jan 2027. • Commission 100MW of solar capacity in Bugesera & Rwabusoro by 2029 through competitive procurement of a solar IPP • Commission a utility-owned 43.5MW/3-hour BESS by 2028; Commission 200MW from the 2nd Nyabarongo II floating solar power plant by 2029 • Commission 200 MW Floating Solar + BESS (400 MWh) at Lake Sake - Pre-feasibility study available: Drafting Terms of Reference, Tendering process through open competition, Construction + Commercial Operation Date (COD): June 2028 Development/commissioning hydropower plants: • Commission 43.5MW Nyabarongo 2 HPP by 2027 • Commission 9.7MW Rukarara VI HPP by 2028	MINECOFIN, MININFRA, REG (EDCL, EUCL) Private sector

				• Rusizi III Regional HPP 206 MW - EPC contractor hired by 2027 and construction ongoing at 40% estimated by 2030 • Rusizi IV Regional HPP 287MW – Studies completed by 2027 and fund mobilization commenced • Gas to Power Ltd methane power plant (185MW) construction started by 2030 • Nuclear 110MW - construction started by 2030	
			Rehabilitation & optimisation	Re-activation of Gishoma peat power plant 15 MW by Dec 2026 Commission additional 50MW HAKAN peat to power plant by 2028 – Improve and acquire new technologies peat mining 5MW SPLK additional capacity by Dec 2028 and 40MW by 2029 – Sign and negotiate a new agreement with Shema power for additional capacity by 2026 Ntaruka running at full capacity (3 MW → 11.2 MW) by Dec 2028 Extension of Kivuwatt (8MW) by 2029	MINECOFIN, MININFRA, REG (EDCL, EUCL)
Transmission & network reinforcement	Transmission Capacity 1213 MVA, HV lines length 1158km (HV) 34 Sub-stations	Transmission Capacity 2063 MVA, 1540km 45 Sub-stations		Construct 2 new substations by 2030 & rehabilitate/reinforce existing 6 substations by 2029 Rehabilitate, upgrade, and reinforce overloaded distribution networks. MV 356.95km, LV 1602.9km, 290 Transformers Upgrade transmission voltage from 110 kV to 220 kV to enable higher power transfer capacity and improve system reliability by 2030 Update the transmission master plan by 2027. EUCL internal planning team to draft the document by 2026 and get management approval in 2027	MINECOFIN, MININFRA, REG (EDCL, EUCL)

Pillar 2: Leverage The Benefits of Regional Power Integration

Indicator/ Reform Area	Baseline (2025)	Target by 2030	Key Actions & Timeline	Responsible institutions
Regional power trading	100MW	200MW	Import 26MW from Tanzania (Phase 1) by 2027, and 100MW (Phase II) by 2030. Agreement to be signed by Dec 2026 Upgrade network for regional power trading incl. interconnection transmission lines capacity (Projects in the Annex) by 2030 Conduct analysis of options to enhance power exchanges with neighboring countries and participation in the Eastern Africa Power Pool (EAPP) by December 2028	MININFRA, MINECOFIN, REG (EUCL, EDCL)

Pillar 3: Achieve Universal Access to Electricity and Increase Access to Clean Cooking Solutions

Indicator/ Reform Area	Baseline (August 2025)	Target by 2030	Key Actions	Responsible institutions
Achieve Electricity universal access	59% grid 25% off-grid	75% grid 25% off-grid	Approve the updated National electrification plan by July 2026 Review and update the electricity connection policy by 2028 Update technical standards for design and construction of distribution networks by December 2027 Develop and implement a maintenance plan for off-grid solutions after post warrant period by June 2027	RURA, MININFRA, MINECOFIN, REG (EDCL & EUCL
Productive use of energy penetration	89%	100%	Develop a plan to support PUE's in both grid and off-grid areas by identifying all PUE[1] that need energy by January 2027 Promote e-mobility and ensure 218 charging infrastructures are available through public and private investments by Jan 2027	MININFRA, REG, MINECOFIN
Scale up clean cooking for households & Institutions	5.6% for LPG, Gas and Electricity 50 schools with improved kitchens	39% LPG, Gas & Electricity 6 centrali-zed kitchens	Review, update and adopt the clean cooking strategy by March 2027 Enable private sector in fuel production to access blended financing: continuous organizing cooperatives, building capacity to increase readiness to access finance, awareness campaigns on existing financing instruments by Dec 2027 – 5 Private sector companies supported and 2 cooperatives supported Enforce standards and improve laboratory testing by 2028 Construction of 6 centralized kitchens for schools serving over 120,000 students across seven priority districts Gasabo, Nyagatare, Rubavu, Kicukiro, Gicumbi, and Kamonyi by 2028	MINECOFIN, MINEDUC, MoE, MININFRA, REG (EDCL & EUCL

[1] In the context of Rwanda, as per the Energy Sector Strategic Plan (ESSP), PUE connections refer all non-residential connections that use electricity and thermal energy for activities that enhance economic and social welfare.

Pillar 4: Incentivize Private Sector Participation to Unlock Additional Resources

Indicator / Reform Area	Baseline (August 2025)	Target by 2030	Key Actions	Responsible institutions
Transparency in solicited and unsolicited, tendering process, licensing & permits	Uncoor-dinated procedures across institutions	Simplified and investor-friendly regulatory environment	Coordinate with RDB on the ongoing revision of the PPP Law	MINECOFIN, MININFRA, RDB, RURA, REG
Private Capital Mobilized	Approx USD 0.1 billion	USD 1 Billion mobilized	Prepare project pipeline for private sector participation by June 2027 (solar projects in Bugesera, Rwabusoro (100MW), 200MW Nyabarongo and 240 MW for Lake Sake) Review & standardize PPA framework in collaboration with other stakeholders by June 2027 Conduct structured market sounding and stakeholder consultations with private developers, financiers, and investors to identify key risks and barriers to private sector participation by December 2026	MINECOFIN, MININFRA, RDB, RURA, REG

Pillar 5: Work Toward Financially Viable Utilities That Provide Reliable Service

	Baseline (August 2025)	Target by 2030	Key Actions	Indicator / Reform Area
Achieving Financial Self-Sufficiency of the Power Sector	2014 sector reforms	Sector subsidies do not exceed 5%	RURA adopts a methodology for setting and periodically adjusting Revenue Requirement (RR) of EUCL under a multi-year tariff regime by December 2027 RURA enhances transparency of the regulatory process through public disclosure of the approved methodology by 2029 RURA reviews and improves end-user tariff structure by incorporating fixed, demand and energy charges to all tariff categories, Implement a reactive power pricing regime by 2029 RURA reviews, updates and approves regulations on service quality and their enforcement by 2029 Review and improve competitive procurement arrangements by 2028	MININFRA, REG, MINECOFIN
Improving Operational Performance of Power Sector	16% losses	14% losses	Incorporate and systematically use AMI functionalities to all customers with monthly consumption above 100 kW by 2030. 30% by 2027, 60% by 2029 and 100% by 2030 Smart Automated Distribution grids operational and the launch of the SCADA-DMS by Dec 2026 Reinstating public reporting/ disclosure of energy sector performance indicators and quarterly statistics (even monthly) by 2027 Complete mapping/indexing of existing customers supported by a Geographic Information System (GIS), by 2029 Review and update existing contractual arrangements between the utility and vendors by 2029 Prepare an Action Plan to improve reliability in operations including incorporation of digital solutions by 2029	MININFRA, REG, MINECOFIN

Compact implementation timeline (2026-2030)

Pillars	Outcomes	Baseline 2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	Responsible institutions
Pillar 1: Expand Energy Infrastructure at Competitive Costs	Achieving security of Electricity Supply by development of new projects plants and import	455.96MW	466MW	499.2MW	742MW Nyabarongo II: 43.5MW 200 MW Floating Solar + BESS (400 MWh) at Lake Sake	1052.4 MW 100 MW Solar Park for Bugesera and Rwabusoro Rukarara VI 9.7MW 200MW Nyabarongo II floating solar plant	1032.2 MW	MININFRA . MINECOFIN REG/EDCL Private Developers Regional Utilities for imports
	Rehabilitation & optimisation			Re-activation of Gishoma peat power plant (15MW) 10 MW additional Hakan peat plant with new mining equipment 5 MW SPLK additional capacity 4.1 MW Renew SNEL import contract — Mururu 1 8.2 MW Ntaruka running at full capacity (3 MW → 11.2 MW)		40 MW Hakan Peat Rehabilitation of Ntaruka HPP 8MW (3MW already available and 8MW addition after optimisation of the plant)		
	Resource studies	World Bank studies	Solar sites identified and study for solar grid integration completed	Nuclear FS completed Hydropower assessment study completed	Geothermal study completed		Other sources like wind studies conducted	MINECOFIN, WB, RAEB
	RE Share increase	49%	51%	53%	55%	57%	60%	REG/EUCL
	Reduce losses in the power system (T&D)	16.1%	15.9%	15.2%	14.7%	14.7%	14.2%	REG, RURA, MININFRA, MINECOFIN
Pillar 2: Leverage the Benefits of Regional Power Integration	Increase regional power trading	100MW	100MW	126.7MW	176MW	200MW	200MW	Regional Utilities, REG/EUCL/EDCL, MININFRA, EAPP

Pillar 3: Achieve universal access to electricity and increase access to clean cooking solutions	Increase spatial access to electricity country wide	On-grid: 58.89%	60%	63%	65%	70%	74%	REG/EDCL/EUCL, MINALOC
		Off-grid: 25.38%	25.63%	25.78%	25.80%	25.90%	26%	
		PUE: 86%	89%	92%	94%	97%	100%	
	Increase the number of households & institutions using clean & efficient cooking technologies	Clean technologies for HH 5.4% Efficient cookstoves HH 34%	5.4% 34% 2 centralized kitchens constructed	24% 51% 4 centralized kitchens constructed	31% 55%	36% 59% 6 centralized kitchens constructed (cumulative)	39% 61% 6 centralized kitchens constructed (cumulative)	REG/EDCL Schools Large scale users MINEDUC
	Support companies/cooperatives to produce fuel for cooking i.e. pellets, briquettes , CNG, Ethanol	3 Companies /cooperatives	6	8	10	12	15	MININFRA REG/EDCL, MoE
Pillar 4: Incentivize private sector participation to unlock additional resources	Create an enabling environment for the private sector involvement	PPP Law revision ongoing	barriers to private investment in the power sector identified, improvement of the provision of credit enhanced		Establish project preparation and de-risking facilities	Scale up blended finance and guarantees	Private sector leads new investment in off-grid and clean cooking	RDB, REG/EUCL, MININFRA
Pillar 5: Financially viable utilities that provide reliable service	Regular reviews of the end user tariff RURA adopts (approves and systematically applies) a methodology for setting and periodically adjusting Revenue Requirement (RR) of EUCL under a multi-year tariff regime			Pursue phased tariff reform towards cost recovery	Improve revenue collection and reduce technical losses	Incorporate fixed, demand and energy charges to all tariff categories Implement a reactive power pricing regime	Methodology Published	RURA, REG/EUCL
	Mechanism to reduce the generation cost			Engage IPPs and Donor partners on the refinancing of IPPs			Finalizing the study on the roadmap to cost reflective tariff	REG/EUCL
	Install Smart meters across the grid	20,000 Smart meters installed			2,000 Smart meters installed to large consumers	10,000 Smart meters installed to large consumers	8,000 Smart meters installed to large consumers	REG/EUCL

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Country & Sector Overview

Country and Power Sector Context

Rwanda, a small (26,338 km²), densely populated (14 million inhabitants), landlocked country in East Africa, has achieved remarkable progress in the last 30 years. Driven by prudent economic management, strong governance, and a clear national vision, the country has averaged 8% annual gross domestic product (GDP) growth and reduced poverty rates from 56.7% in 2006 to 27.4% in 2024. Strategic investments in human capital, infrastructure, and technology have resulted in sustained economic growth and significant improvements in living standards. Despite the remarkable achievement, to achieve its ambition of becoming a middle-income country, Rwanda will need to accelerate job creation and raise productivity across sectors. Addressing infrastructure gaps, strengthening innovation, and improving resource allocation will be critical to unlocking higher growth.

Energy Sector Overview

The energy sector plays an essential role in sustaining this progress and to contributing further to the socio-economic transformation agenda. Reliable, secure, sustainable and affordable energy is key for economic growth, industrialization, social inclusion, environmental sustainability and national stability. Over the past decade, Rwanda's electricity sector has undergone a remarkable transformation, with significant gains in installed capacity, access, network infrastructure, and operational performance. However, persistent challenges related to security of supply, financial sustainability, and efficiency continue to constrain the sector's ability to fully support the country's ongoing growth.

The power sector of Rwanda is vertically integrated, with a state-owned utility and private sector participation in generation. The Ministry of Infrastructure (MININFRA) is responsible for power sector policy, development and performance oversight, while the Rwanda Utilities Regulatory Authority (RURA), established in 2001, oversees economic and service quality (i.e. technical) regulation. A legal reform approved in 2014 separated electricity and water sectors, creating the Rwanda Energy Group (REG), a holding company fully owned by the Government of Rwanda (GoR), and its two subsidiaries Energy Utility Corporation Limited (EUCL) and Energy Development Corporation Limited (EDCL).

EUCL is the single transmission and distribution utility, supplying electricity to consumers. It operates public generation and network assets as well as purchasing power from independent power producers (IPPs) through long-term power purchase agreements (PPAs), utilities in neighboring countries and multi-national hydropower plants (HPPs) jointly owned by Rwanda and other countries. EDCL is responsible for planning, developing and implementing publicly owned energy projects, while also assisting MININFRA in planning sector expansion and development.

GoR's vision and ambitions, policy direction and priorities for the power sector are reflected in some key documents, including: (i) the Energy Sector Strategic Plan (ESSP) 2024–2029, (ii) the Energy Policy (EP) issued February 2025, (iii) the National Electrification Plan (NEP) (revised in 2024, to be approved and adopted July 2026); and (iv) the Least Cost Power Development Plan (LCPDP; 2024 Review).

Rwanda's electricity generation in FY2024/25 was 1,568.5 GWh, including hydropower (31.35%), domestic methane based thermal (33.85%), domestic peat based thermal (9.96%), other thermal (0.37%), solar (1.13%), jointly owned HPPs (15.8%) and imports via interconnectors (7.6%). Rwanda's power generation mix has improved significantly over the past decade, shifting away from costly and volatile imported fossil fuels (diesel and HFO). During this period, installed capacity increased from 88 MW in 2010 to 466.4 MW in FY2024/25 (321.3 MW domestic and 145.1 MW from imports and shared plants), in response to electricity demand growing at over 10% annually. Demand is expected to continue rising, driven by urbanization, industrialization, and expanded access.

Private sector participation in generation accounts for nearly 63% of the installed generation capacity, ranging from hydropower plants with less than 1MW capacity to a lake methane power plant of 56MW capacity. Most capacity has been procured through negotiated arrangements, with EUCL acting as the single buyer of privately generated power. The Government aims to maintain strong private sector participation while shifting toward competitive procurement in line with the 2016 PPP law.

EUCL operates a 1,158 km transmission network (110/220 kV) with regional interconnections, and a 37,728 km distribution network (FY2024/25). System reliability remains a challenge (SAIDI 11.35 hours (10.72 in previous FY); SAIFI 16.71 (15.4 in previous FY)), with losses at 16.3% (of injected energy in transmission network, with about 10% technical losses), largely driven by aging and overloaded infrastructure (particularly in long distance low-voltage lines), highlighting the need for network rehabilitation and expansion to improve reliability and grid stability.

Rwanda has been one of the leading performers in

electrification in Sub-Saharan Africa in the last decade, with electricity access rising from 18% in 2012 to 84% in 2025 (59% grid and 25% off-grid**).** The total number of connections grew from 175,000 in 2010 to over 2.7 million in 2025 (of which 1.9 million grid connections). This rapid expansion has been driven by ambitious government programs, targeted investments in infrastructure, making Rwanda's electrification pace one of the fastest in Africa and puts Rwanda on track to be among the first countries in Sub-Saharan Africa to achieve universal access.

While Rwanda has made strong environmental progress and largely avoids deforestation linked to biomass use, continued reliance on biomass still poses significant supply, health, and social challenges. Biomass, mainly firewood and charcoal, provides 93.4% of Rwanda's cooking energy, but supply is already constrained, with a deficit exceeding 4 million m^3 annually. To reduce the reliance on biomass gradually, the government is promoting clean fuels such as electricity, LPG and biogas, with a long-term goal of transitioning households to modern, efficient energy solutions by 2035 that will improve health outcomes and reduce time burdens on women and children.

Digitalization is central to modernizing the sector and improving efficiency. REG is advancing network upgrades, including a Distribution Management System (76% complete), which will enable real-time monitoring, automation, improved reliability, and more efficient network planning while reducing losses.

Major Challenges and Opportunities

Rwanda's energy sector has gone through series of transformational stages, however the sector continues to face major bottlenecks that constrain and affect the economic and national development of the country. The four major and interrelated challenges in the electricity sector, include;

- Security of electricity supply
- Operational performance of the utility
- Financial self-sufficiency in the power sector to recover operating costs incurred for efficient performance in all segments of the value chain
- Reaching and sustaining universal access to electricity service by 2030

Details of these challenges (and corresponding opportunities) are reflected in the pillars presented below.

PILLAR 1:

EXPAND ENERGY INFRASTRUCTURE AT COMPETITIVE COSTS

Rwanda is targeting to reach 1032.2MW of installed electricity generation capacity by 2030 to meet growing demand and support sustainable development, from the current 466MW. However, available generation frequently falls short of peak demand, with around 220MW available against peak demand of approximately 265MW, requiring increased reliance on regional imports. Historically, the sector has faced structural challenges including dependence on emergency diesel generation, a fragmented generation mix dominated by small-scale hydropower, fuel constraints, maintenance issues, transmission bottlenecks or the weak reserve margins and limited availability of firm capacity. The Least-Cost Power Development Plan (LCPDP) aims to meet projected electricity demand at minimum cost while maintaining adequate reserve margins, based on demand-driven planning that reflects the link between energy supply and economic growth. However, this has been constrained by conservative demand forecasts and limited reserve margins, reducing the system's ability to absorb shocks and respond to rapid demand growth. In addition, delays in project implementation and underperformance of some plants have further constrained supply expansion and increased reliance on imports.

To address these constraints, Rwanda is moving toward a more development-oriented and forward-looking approach to generation planning and expansion. Least-cost planning is key, and its effectiveness will depend on improving demand forecasting, using more realistic assumptions, strengthening stakeholder consultation, and linking planning more closely to implementation through clearer project prioritization, strengthened resource assessments, more detailed preparation studies, and realistic delivery timelines. Where needed, the planning model itself will also be refined, including through more granular data and improved modelling of variable renewable energy. Meeting future demand will require scaling up generation investments across renewable sources, including solar, hydropower, nuclear, geothermal, and emerging technologies, alongside regional projects such as Rusizi III and IV. Priority will be given to larger and more efficient generation projects to reduce costs, improve reliability, and achieve economies of scale, as the current system remains characterized by over 30 small plants producing limited capacity.

Efficient planning and procurement of projects will be critical to deliver this expansion at least cost and on time. To date, delays in project implementation have contributed to higher costs and slower delivery. Strengthening procurement frameworks, improving

project preparation and bankability, and enhancing coordination across institutions will be essential to attract private sector participation and reduce risks. At the same time, rehabilitation and upgrades of existing plants and continued investment in transmission and distribution infrastructure, alongside improvements in energy efficiency and demand-side management, will be necessary to ensure that new generation capacity translates into reliable, affordable, and sustainable power supply, with an increased in the share of renewable energy in the energy mix, that enables job creation and increase of productivity in other sectors.

Rwanda will also prioritize investment in generation: (i) through refinancing some of the existing plants to increase government share to reduce cost of generation and (ii) development of new plants through private and public investments.

Challenges	Description
High cost of generation/tariff for different private owned plants	60% of private owned plants with high tariff & less flexible conditions
Least-Cost Power Development Planning approach	Forecasts demand and plans generation proportionally but leaves limited reserve margins to absorb shocks or unexpected increases in demand.
A proliferation of mini and micro hydro-power plants	Lack of economies of scale, seasonal variability
An interventionist approach	Reliance on emergency diesel generators since 2004, with some only recently replaced through electricity imports in 2023.
Inadequate generation capacity versus demand	Rapidly growing demand from industry, agriculture, households, and electric mobility is outpacing available supply
Transmission infrastructure gaps	Old and overloaded transmission and distribution lines causing losses to the utility
Old and overloaded distribution network	Old distribution network causing technical losses
Insufficient digital technology solutions	Enhancement of performance of protection and control equipment and optimization of resolution of customers' complaints, as well as management of non-technical losses through energy balances.
Frequent outages	Of recent Rwanda has faced several power outages leading to poor quality of service to customers and loss of business for the private sector

PILLAR 2

LEVERAGE THE BENEFITS OF REGIONAL POWER INTEGRATION

Rwanda benefits from regional power interconnections that enhance energy security with existing interconnections to Uganda, Tanzania, Burundi and Democratic Republic of Congo and imports making up almost 8% of the energy supply annually (in GWh); however, power trade remains constrained by inadequate transmission infrastructure, limited grid synchronization, insufficient financing for regional projects, and delays in operationalizing the East African Power Pool (EAPP) market. Addressing these constraints presents a significant opportunity to strengthen regional integration, improve reliability, and access more affordable and diversified sources of electricity.

PILLAR 3

ACHIEVE UNIVERSAL ACCESS TO ELECTRICITY AND INCREASE ACCESS TO CLEAN COOKING SOLUTIONS

Building on its strong electrification performance in the last decade, Rwanda is well on track to achieving its target of universal electricity access by 2030. Reaching the remaining unserved population will require extending connections to dispersed and hard-to-reach areas, as well as addressing affordability constraints that limit uptake among low-income households. Maintaining sustained access has further emerged as a challenge in the off-grid sector, due to sustainability of the solutions post-warranty. The revised National Electrification Plan (NEP), expected to be approved in 2026, targets a balanced mix of grid (75%) and off-grid (25%) solution, meaning acceleration of both last-mile grid densification in already electrified areas and distributed solutions for remote communities bringing electricity to an additional 2 million households. Implementation will need to address financing gaps for off-grid systems, post-warranty sustainability of solar home systems, and evolving settlement patterns.

In the last decade, access to productive use areas has expanded significantly, enabling essential services like healthcare, education, and community centers to function effectively, thereby enhancing the overall quality of life for residents. The Government of Rwanda is committed to connect all productive use of energy and reach 100% by 2030. However, electricity consumption remains relatively low, partly due to affordability constraints and relatively high tariffs. Unlocking the full development impact of electrification will require scaling productive uses of energy across agriculture, agro-processing, small enterprises, and digital services. Joint solar and digital device financing facilities for instance could simultaneously decrease the digital divide while also raising the commercial viability of energy interventions by raising energy demand. Targeted interventions, such as integrated financing solutions for equipment, cold chains, e-mobility, and digital technologies, offer an opportunity to increase demand, improve incomes, and enhance the sustainability of electrification investments for consumers, the sector and society as a whole.

Distributed renewable energy (DRE), particularly standalone solar systems, has played a central role in expanding access in remote areas, but further scale-up will depend on strengthening the enabling environment. Key challenges include limited financing and unclear long-term integration with the grid. Ongoing efforts to develop strategies for productive use applications and captive generation, alongside measures such as improved incentives and clearer grid expansion plans, present opportunities to expand DRE deployment and support demand growth.

Access to clean cooking remains low, with continued reliance on biomass posing significant health, social, and supply challenges. While LPG access is estimated at around 5%, the sector remains fragmented, with limited access to finance, weak fuel supply chains, and affordability constraints for modern alternatives such as LPG and electricity. Rwanda aims to significantly scale up adoption of improved and modern cooking solutions by 2029/30, with clean fuel-based stoves projected to increase from about 3% in 2023/24 to 39%, and improved cookstoves (Tier 3+) from 9% to 61%. Key priorities include expanding local fuel production and distribution infrastructure, strengthening private sector participation (including over 20 energy service companies already active), and scaling deployment of clean cooking solutions across both households and institutions such as schools and health facilities.

Achieving these targets will require mobilizing financing from both public and private sources, including results-based and carbon financing, while improving coordination across institutions and strengthening regulatory frameworks. Enhancing consumer awareness, supporting local manufacturing, and improving affordability, particularly for rural and low-income households, will be critical to sustain uptake and accelerate the transition to cleaner, more efficient cooking solutions.

Key challenges in clean cooking include; i. Inefficient production and use of wood fuels resulting in the depletion of forest resources, which, in turn, has an adverse environmental impact in terms of accelerating climate change, threatening biodiversity and increasing erosion. ii. Adverse impacts on the health of wood-fuels users, especially in rural households. iii. Low awareness and adoption of clean cooking technologies in many rural households. iv. Inadequate affordability of best quality alternatives in many families due to the higher capital and running cost of electricity, LPG and other clean fuel options compared to traditional biomass options.

Challenges	Description
Un-served areas	Areas outside planned settlement will be connected through off-grid. The current National land masterplan is regularly revised causing some delays in connection Funding limitation for off-grid
High cost of electricity	Electricity consumption averages about 16.6 kWh per month, significantly lower than neighboring countries. Consumption is possibly deterred by the high retail tariffs affecting mostly productive users of energy category and industries/business
Post-warranty for solar home systems	Households connected to stand alone solar systems may face issues of spare parts that are obsolete and requiring funds to replace them but are unable due to limited financial capacity
Outdated connection policy	Barrier to electrification of low-income households created by their affordability constraints.
Clean cooking access remains low	Access is around 5% for LPG; the market is fragmented, and consumer financing and supply chains remain underdeveloped
Limited coordination and policy enforcement	Clean cooking programs are largely fragmented across different institutions.
Lack of fuel and fuel production in the country	Limited funding in Fuel production both by Government and private sector
Lack of innovation and infrastructure	The private sector is not innovative enough to bring new technologies and funding for infrastructure for clean cooking is clear

PILLAR 4:

INCENTIVIZE PRIVATE SECTOR PARTICIPATION TO UNLOCK ADDITIONAL RESOURCES

Rwanda recognizes that private capital is vital to achieving its energy goals, as private investments already drive over 60% of generation capacity through independent power producers (IPPs) and play a key role in off-grid electrification and clean cooking. The Government's target to mobilize at least USD 1 billion in private investment by 2030 underlines its commitment to deepen private sector engagement across grid-connected generation and storage, off-grid systems, clean cooking value chains, and enabling infrastructure like e-mobility charging networks. All these areas will see enhanced involvement of private sector, provided a supportive investment climate is in place.

Despite Rwanda's openness to public–private partnerships, several constraints continue to limit private investment at scale. These include perceived bankability risks, notably foreign exchange exposure, payment and off-taker risks affecting PPA financing, and limited availability of credit enhancement. Project preparation can be lengthy especially when they require land acquisition extending development beyond project timelines. In parallel, access to long-term local financing remains constrained, increasing reliance on foreign currency debt, while off-grid and clean cooking enterprises face early-stage market and demand risks that inhibit rapid scale-up.

Rwanda is strengthening its policy, regulatory, and institutional framework to lower transaction costs and improve investor confidence. Priority reforms include streamlining PPP processes, adopting standardized contractual and procurement frameworks (including model PPAs), and improving inter-agency coordination through more effective one-stop investor interfaces. These measures are intended to accelerate project development, enhance transparency, and improve overall bankability without introducing new commitments beyond those already identified in the action framework.

At the same time, Rwanda will reinforce risk mitigation and financing mechanisms to crowd in private capital across grid, off-grid, and clean cooking markets. This includes expanding access to credit enhancement, blended finance, and results-based financing instruments, and leveraging climate and carbon finance where applicable, to address payment, currency, and early-market risks. Together, these reforms will support a robust pipeline of IPPs, off-grid operators, clean cooking enterprises, and emerging infrastructure providers, enabling private investment to scale.

Rwanda's strategy under this pillar spans the full energy value chain. For grid-connected generation and storage, a transparent pipeline of projects based on least-cost

planning, such as solar PV with battery storage, hydro, and other renewable energy, will be prepared for competitive tendering. For off-grid electricity access, the Government will reinforce the role of private companies in delivering solar home systems by implementing supportive regulations (e.g. clear demarcation of off-grid service territories) and targeted incentives for viability-gap funding. Likewise, the clean cooking sector will benefit from better-coordinated policies and financing – for instance, aligning standards and consumer awareness with supply-side measures – to support private distributors of modern stoves and clean fuels. The Government will partner with development financiers to scale up RBF grants and concessional financing that help companies expand their distribution networks for efficient cookstoves, sustainable biomass fuels, LPG, and electric cooking devices. Private sector will be encouraged to invest in the energy charging infrastructure for E-mobility.

Challenges	Description
Currency convertibility and PPA bankability risks	Foreign Exchange risks limit private interest; payment guarantees are insufficient for many developers
Guarantee support	Households are not supported in the replacing systems that are faulty during the guarantee period
Complex approval processes	Project development timelines are extended by land and licensing issues.

PILLAR 5

WORK TOWARD FINANCIALLY VIABLE UTILITIES THAT PROVIDE RELIABLE SERVICE

This pillar focuses on strengthening the financial health, operational efficiency, and service performance of the utility through improved revenue collection, cost control, asset management, and performance-driven operations. The Government commits to ensure that utility operate on sustainable financial principles while maintaining secure, reliable, affordable and sustainable electricity supply to Rwandans. The following measures will be taken by the government to ensure financial viability of the utility:

- Continuous monitoring of utility business and investment strategy implementation
- Conduct cost-of-service studies and tariff reviews to ensure that electricity pricing is cost reflective. This will be done gradually
- Focus on improving the competitiveness of financing for energy projects (especially generation projects),
- Pursuing diversified financing options and strategic partnerships that support innovation and cost effectiveness,
- Promote digitalization and innovation by leveraging smart grid technologies, advanced data analytics for network performance optimization, and Internet of Things (IoT) solutions to enhance operational efficiency and service reliability,
- Implement Demand-Side Management: Introduce time-of-use tariffs to shift demand to off-peak hours, encourage the use of smart meters, and provide incentives for energy-efficient appliances,
- Promote a culture of schedule adherence and project delivery excellence through strengthened project management, clear accountability frameworks, and systematic performance monitoring, while enforcing operational discipline across all utility activities,
- Strengthening regulations on utility service quality and their enforcement through: (i) real time monitoring of performance of the utility through access of records of information systems and other applications used by the utility for its operations.

The Government of Rwanda is committed to ensuring financially viable utilities that prioritize energy security and provision of reliable, affordable, and sustainable electricity services. However, historically tariff revenues were insufficient to cover total operating costs, with tariff shortfalls being addressed through Government subsidies. In October 2025 a new tariff was approved with a resolution expanding the lifeline (subsidized) block applied to all consumers in the residential category from 15 to 20 kWh/month and setting significant increases in rates of all categories (45% for residential customers, 61% for commercial users, and 17% to 31% for industrial consumers). This decision by the regulator moved the sector closer to recover operating costs through tariff revenues, however some of the challenges still persist.

Improving the financial viability of the utility depends fundamentally on reducing the underlying cost of supply and translating efficiency gains into a coherent tariff and fiscal framework. Least-cost planning, competitive procurement of generation and storage, and standardized

contracting have been used to lower average generation costs, reduce system losses, and stabilize cash flows. In Rwanda, sustained cost discipline, particularly in new generation, and power purchases, creates the conditions for tariffs that are both affordable for consumers and sufficient to cover efficient costs, thereby strengthening the utility's balance sheet and reducing reliance on budgetary transfers.

Predictable and transparent tariff trajectories are essential to restoring and maintaining utility creditworthiness while crowding in private investment. Cost-reflective tariffs, complemented by targeted and well-budgeted social support where needed, improve revenue adequacy and reduce the accumulation of arrears and contingent liabilities. Improved utility financial performance lowers perceived payment risk for IPPs and service providers, reduces financing costs, and diminishes the need for sovereign guarantees or ad-hoc fiscal interventions. By aligning tariff policy with efficiency gains and prudent fiscal risk management, Rwanda can ensure that lower generation costs translate into durable affordability outcomes, increased private investment confidence, and a financially sustainable utility capable of supporting long-term system expansion and energy access goals.

Improve Network Reliability and Reduction of Power Losses

Ensuring the reliability of Rwanda's power network is a central goal for Rwanda by 2030. As of June 2025, power network losses were 16.3%, with the aim to reduce this to 14.2% by 2029/30. Achieving this will involve investments in grid infrastructure modernization, regular preventive maintenance, distribution network reconfiguration, and advanced technologies, including smart grid solutions. The plan also focuses on improving the System Average Interruption Frequency Index (SAIFI) and the System Average Interruption Duration Index (SAIDI). SAIFI was at 21 interruptions per year in 2024, with a target to reduce it to 18.3 by 2029/30, while SAIDI, measuring average hours without power, is expected to decrease from 14.43 to 12 hours through infrastructure upgrades, system automation and climate adaptation.

Enhance Energy Efficiency

Low energy efficiency across the power sector is mainly caused by outdated/overloaded equipment, limited demand side management, and limited enforcement of efficiency standards constraining system reliability and increasing overall supply costs. To address this, targeted efficiency measures will be implemented, including strengthening appliance standards, promoting efficient industrial and commercial energy use, effective network upgrades, and scaling demand side management programs to reduce losses and enhance system performance.

End-users of energy across all sectors can make an important contribution to minimizing the cost and environmental impacts of the overall energy system by ensuring energy is used efficiently. For the electricity sector, the way energy is used (e.g. the time of day) can also be an important factor in the overall system cost, and consumers can help minimize these costs by reducing demand during peak hours. Accordingly, energy efficiency and demand side management issues include the following: i. Low level of awareness among end users about energy conservation practices, options and benefits and insufficient information about improved energy technologies; ii. Insufficient incentives, including financing mechanisms to invest in efficient, modern technologies and practices to introduce fuel/technology substitution, e.g., electricity, LPG, kerosene, solar, and more efficient fuel technology for wood-fuels; iii. Dominance of energy-inefficient technologies, including traditional stoves; lights and other appliances. iv. Inadequate energy efficiency standards and lack of monitoring framework for proper management of energy efficiency.

Challenges	Description
Tariffs remain below cost recovery	Despite reforms, revenues do not yet cover OPEX and debt service
Accumulated arrears and low collection rates	Public and private customer arrears remain there despite efforts made by the utility
High technical and commercial losses	Despite several investments in Transmission, technical and commercial losses still persist (16.3%)
Fragmented accountability and legacy debts	The utility has gone through several reforms and this has resulted in different legacy debts
Revenue collection shortfalls	Billing inefficiencies, customer payment delays, and illegal connections reduce revenue
Aging and overloaded infrastructure	MV and LV power lines, substations, transformers that exceed their design capacity due to rapid urbanization and demand growth (especially in Kigali and others urban areas) and some that are approaching end of lifetime resulting in frequent service failures, high maintenance costs, reduced reliability, and stress on existing infrastructure
Insufficient investment capacity	Funding gaps limit electricity network upgrades, rehabilitation and modernization
Customer Service and Satisfaction	Delays in service delivery, unreliable supply, and poor complaint resolution

CROSS-CUTTING TOPICS

Digitalization

The Government aims to strengthen synergies with Rwanda's digital transformation and AI agenda through cross-sector coordination

To ensure that REG/EUCL's digitalization agenda remains coherent with Rwanda's broader national digital development, a formal cross-sector coordination mechanism will be established between the Ministry of Infrastructure, the Ministry of ICT and Innovation, RURA, and RISA. This body will convene on a regular basis to align on interoperability standards, explore infra-sharing opportunities, resolve cross-sector implementation bottlenecks, and track progress against the digital integration commitments set out in this Compact. Effective cross-sector coordination will be particularly important as Rwanda pursues its ambitions in artificial intelligence (AI) and data center development, both of which carry significant and rapidly growing energy demands that will need to be anticipated in generation planning, grid investment, and tariff design.

The progressive digitalization of Rwanda's energy infrastructure, spanning SCADA, DMS, EMS, and WAMS systems, will significantly expand the operational technology (OT) attack surface of the electricity network. As grid operations become increasingly software-dependent, cybersecurity must be treated as a foundational requirement rather than a downstream consideration. Rwanda will therefore ensure that all digital infrastructure deployments under this Compact adhere to recognized OT security standards, and that cybersecurity requirements are embedded in vendor procurement criteria from the outset. REG/EUCL will work in close coordination with the Rwanda Information Society Authority (RISA) to align energy sector cybersecurity practices with national frameworks, conduct periodic vulnerability assessments of critical grid systems, and establish incident response protocols for cyber events affecting grid operations. Capacity building for utility staff on OT cybersecurity will be integrated into the broader digital skills development programme envisioned under NST-2 Priority 7.

The deployment of AMI/MDM, CMS, and GIS systems will also generate significant volumes of customer and consumption data, and the planned integration with national platforms such as Nida, Social Registry, and Irembo will further expand the scope of data flows across government systems. To ensure public trust and regulatory compliance, REG/EUCL will develop a data governance framework governing data ownership, access controls, retention periods, and citizen consent, aligned with Rwanda's national data protection legislation. This framework will be established prior to the activation of cross-platform integrations and will be subject to periodic review by RURA in coordination with RISA.

Risk Analysis and Mitigation Strategy

Risks	Rationale	Evidence From the Past	Level of Occurrence	Mitigations
Technical Risks	These risks involve technical aspects of energy infrastructure, such as delays, failures, and inadequate maintenance.	The Shema Methane, Hakan Power, and Kivuwatt Methane Power Plants faced delays due to technical challenges, regulatory issues, and geological complexities, increasing costs and extending timelines.	Medium	• Conduct thorough feasibility studies and technical assessments. • Implement robust project management, including monitoring and quality control. • Invest in workforce training to address technical challenges.
Financial Risks	Financial risks affect project success through budget overruns due to inaccurate cost estimations, unforeseen expenses, and scope changes.	The Kivuwatt Methane Gas and Rusumo Hydro Power projects experienced budget overruns and delays due to bureaucratic hurdles and challenges in securing funding.	Medium	• Develop realistic budgets and projections. • Diversify funding sources and explore public-private partnerships. • Establish contingency funds to mitigate unforeseen expenses.
Environmental and Climate Risks	Environmental risks relate to the negative impact of energy projects on ecosystems, with climate change effects like floods and landslides impacting infrastructure.	The Nyabarongo Hydropower projects raised concerns about altering river flows, disrupting habitats, and threatening biodiversity due to dam construction.	High	• Adhere to stringent environmental standards. • Conduct robust environmental impact assessments (EIAs). • Design climate-resilient infrastructure.
Regulatory Risks	Regulatory risks stem from changes in government policies and legal frameworks, which can create uncertainty for project development.	Changes in regulatory risks in the energy sector are influenced by changes in government policies, regulations, and legal frameworks, which can impact the investment climate and project viability.	Medium	• Maintain coordination among relevant government authorities. • Advocate for supportive policies and regulatory incentives. • Form partnerships with stakeholders to influence favourable regulatory environments.

4

Monitoring and Evaluation Framework for the Compact

The M&E framework provides a structured system to measure progress, assess outcomes, and guide decision-making. This involves regular data collection, analysis, and reporting on key initiatives, using predetermined benchmarks and Key Performance Indicators (KPIs) to track progress.

Reporting mechanism

The reporting framework will ensure comprehensive monitoring, evaluation, and accountability throughout the implementation of the energy compact period. It establishes measurable indicators for key objectives like electricity access, clean cooking adoption, and power network reliability. Data collection will be systematically managed by MININFRA, REG and NISR. Regular reports, including quarterly and annual updates, will be shared with stakeholders, ensuring transparency. Stakeholder meetings and workshops will be held to foster collaboration and feedback, enabling continuous improvement and adaptation of strategies to changing conditions.

Compact Monitoring and Evaluation Strategies

Indicators	Units	Targets by 2029/2030	Proposed M&E Strategies
MW installed generation capacity	MW	1032.2MW	Regular Progress Tracking: Monitor capacity installation. Performance Monitoring: Site visits and technical assessments. Collaboration: Work with REG and MININFRA. Utilization of Performance Indicators: Track MW installed, project completion, and adherence to timelines. REG annual report Collaboration with Government Agencies: Work with MININFRA and REG. Data Collection and Analysis: Analyze data for progress and policy adjustments.
Households with access to electricity	%	100%	Baseline Assessment and Surveys: Use NISR EICV l surveys for off-grid progress. Regular Surveys: Use EICV surveys to assess electricity access Collaboration with Key Stakeholders: Partner with MININFRA, REG, NGOs, and private sector. Data Collection and Verification: Field inspections and mobile technology use.
MW imported from regional trading	%	200%	Report Analysis: Monitor generation capacity through reports. Collaboration with Energy Providers and Regulators: Partner with REG and MININFRA. Regular Progress Tracking: Track progress with updates
Number of households using efficient biomass cook stoves	Cook Stoves	113,072 6 centralized Kitchen	Data Utilization from EICV: Track clean cooking adoption. Collaboration with MININFRA and REG: Engage in promotion and monitoring. Engagement with NGOs: Leverage NGO networks for promotion. Monitoring and Promotion Synergy: Combine data analysis with promotional activities.
Number of households with access to clean non-biomass stoves	Cook Stoves	45,551	Data Utilization from EICV: Monitor clean stove usage. Collaboration with MININFRA and REG: Promote adoption. Engagement with NGOs: Support adoption through advocacy.

Losses in the transmission and distribution networks	16%	14.2%	Regular Audits and Assessments: Evaluate infrastructure performance. Collaboration with REG, RURA and MININFRA & MINECOFIN: Analyze and improve network performance. Data Collection and Analysis: Track losses and assess interventions.
Private Sector Participation and Institutional Reform			Report of barriers of private sector published Private sector funding mobilized tracked and reported
Financially viable utility			RURA Methodology disclosed Reduction and operation efficient of the utility reports published

INSTITUTIONAL ARRANGEMENTS

To guarantee the timely and effective implementation of the Compact action plan, the Government will establish a dedicated Compact Delivery and Monitoring Unit (CDMU) reporting directly to the Prime Minister's Office. This direct line of command gives the CDMU the authority to coordinate all relevant ministries, agencies, and other stakeholders.

The CDMU will be comprised of a Steering Committee SC and a Secretariat. Co-chaired by the Ministers of Infrastructure and Finance and Economic Planning. The Steering committee will coordinate and mobilize other stakeholders including Ministries, Agencies, utilities, regulators, private sector and civil society.

Proposed Compact Delivery and Monitoring Unit (CDMU)

CHAIR OF STEERING COMMITEE

Minister of Infrastructure/Minister of Finance and Economic Planning

STEERING COMMITEE MEMBERS

PS-MININFRA, PS MOE, CEO-REG, MD-EDCL & EUCL, DG RURA, CIO RDB, MINECOFIN-Head of National Projects & quality assurance, DG-ENERGY/MININFRA

TECHNICAL CDMU Team

Technical team, includes M&E, Energy Planning

ANNEXES

ANNEX I: ON-GOING AND PLANNED PROJECTS

Power Generation

Short & Medium-term Projects	Capacity (MW)	Financing requirements (M USD)	Funding Source	Status	CoD
Gishoma peat power plant		1.326531	Public	Funded	2026
Ntaruka partial rehabilitation		4.761905	Public	Unfunded	2027
Jabana 1 Diesel Power Plant		3.401361	Public	Unfunded	2027
Hakan		25	Private	Unfunded	2026
Ntaruka rehabilitation		25.4031	Public	Unfunded	2027
Nyabarongo II hydropower project	43.5 MW	230.7128	Public	Funded	2027
RukararaVI project	9.7 MW	45.9479	Private	Funded	2027
Ongoing small hydropower plants	15.1 MW	67.725	Private	Funded	2026-2030
100MW/147MWh Rwanda Solar Park	100 MW	165	Private	Unfunded	2028
202MW/400MWh Nyabarongo 2 Solar PV	202 MW	267.93	Public	Unfunded	2028
Kivuwatt extension	8 MW	150	Private	Unfunded	2028
SPLK additional 5-8MW	5 MW	0	Private	Funded	2027
MW Gasmeth to power	185 MW	149.99	Private	Unfunded	2030
Floating Solar Lake Sake/BESS	200 MW	198	Private	Unfunded	2028

Study/Assessment	Funding Needs (USD)
Rwanda's Energy Transition and Investment strategy/Plan 2027-2050	1,000,000
Rwanda's Power system masterplan, 2027-2050 (with, short, medium, and long term - Generation, Transmission and load centre	1,000,000
Studies to support solar (IPP development) and BESS (*supplementary to ongoing efforts in the current PASA*); Power system analyses to determine energy storage needs for Rwanda (*BESS v/s pumped storage*);	Funded
Pumped Storage Projects (40 MW Butamwa, 40 MW Juru and 10.5 MW Lake Sake Hydropower Project	1,000,000
Studies for new regional integration projects for Rwanda	Funded
Feasibility study for Nuclear energy	1,000,000
Total	**4,000,000**

Power Transmission

No.	Project Name	Components	Length / Capacity	Estimated Cost (USD)	Starting Year	Funding Source	
						Public	Private
1.	Replacement of a 15MVA 6.6/110 Transformer No1 in Mukungwa Switchyard	Upgrade of Mukungwa Switchyard	From 15MVA to 31.5MVA	1,750,000	2027	Public	
2.	Relocation of Kilinda SS	Relocation of Kilinda SS	From 6MVA to 10MVA	970,665.64	2028	Public	
3.	Replacement of 110/30kV 10MVA by 110/30kV 20MVA at Mururu I SS	*Demolishing of 110/30kV 10MVA *Installation of 110/30kV 20MVA	20MVA	1,715,136	2028	Public	
4.	110kV Gicumbi-Nyagatare	Construction of Transmission Line	43	47,775,744	2029	Public	
5.	110kV Nyabarongo II-Nzove	Construction of Transmission Line. Construct Nzove line bay at Nyabarongo II. Construct Nyabarongo II-line bay and additional Transformer Bay at Nzove.	16.55	39,414,988.80	2029	Public	
6.	110kV Rusizi Substation cut-in cut-out	Construction of Transmission Line, Construction of Rusizi SS	0.661 2X20MVA	25,436,160	2028	Public	
7.	110kV Musanze SS-Ntaruka cut in cut out	Construction of transmission line. Extension of Ntaruka switchyard (20% contingency included in total project cost due to the landscape at Ntaruka HPP potentially driving the cost higher than the standard 110-line bay construction of USD300K). Construction of Musanze IP line bay at Musanze SS.	20.3	16,588,800.00	2030	Public	
8.	Extension of Bugarama Substation	Extension of Bugarama to accommodate a new 20MVA,110/30kV transformer and associated 30kV MV lines	20MVA	3,500,000	2029	Public	
9.	110kV Nyarutarama Substation cut-in cut-out	Construction of Transmission Line, Construction of Nyarutarama SS	20km, 3x30MVA	44,775,000	2029	Public	
10.	Masaka Substation	Construction of Masaka SS	2x50MVA	18,000,000	2030	Public	
11.	Upgrading of Kabarongo Transformer	Construction of Transmission Line, Construction of Nyarutarama SS	2*30MVA	3,500,000	2030	Public	
12.	Upgrade of Rubavu SS	Upgrading of Rubavu SS	1*50MVA	3,000,000	2028	Public	
13.	220kV Karongi-to-Gasmeth 2 Power	Construction of Transmission Line	1.5 km	600,000	2027	Public	

14.	220kV Kigoma-Mont Kigali SS	Construction of Transmission Line	40.5 km	4,316,000	2030	Public	
15.	220kV KPI-to-Rubavu SS	Construction of Transmission Line	10.79km	4,316,000	2028	Public	
		Sub-total		**215,658,494.44**			

Power Distribution

SN	Project Description	Project Scope	Project Objective/Rationale	Estimated Budget (USD)	COD	Funding Source	
						Public	Private
1	Kigali MV & LV Distribution network strengthening (Kigali hub branches)	Extension and/or Upgrade of 564.9km of MV lines and 1916.2km of LV lines and installation of 444 distribution transformers,	Improve power supply reliability, quality and efficiency in the supplied areas of Kigali Hub	55,033,800	2028	Public	
2	MV & LV Distribution network strengthening in Karongi, Nyamasheke, Rutsiro and Rusizi districts	Extension and/or Upgrade of 216.11km of MV lines and 399.4km of LV lines and installation of 213 distribution transformers,	Improve power supply reliability, quality and efficiency in the supplied areas of Western Hub	15,191,555	2028	Public	
3	MV & LV Distribution network strengthening in Huye, Nyamagabe, Gisagara, Nyaruguru, Nyanza, Muhanga, Ruhango districts	Extension and/or Upgrade of 67.2 km of MV lines and 344.9 km of LV lines and installation of89 distribution transformers,	Improve power supply reliability, quality and efficiency in the supplied areas of Southern Hub	7,562,300	2028	Public	
4	MV & LV Distribution network strengthening in Rwamagana, Nyagatare, Gatsibo, Ngoma, Kayonza, Ngoma districts	Extension and/or Upgrade of 270.2km of MV lines and 205.3km of LV lines and installation of 319 distribution transformers,	Improve power supply reliability, quality and efficiency in the supplied areas of Eastern Hub	16,504,000	2028	Public	
5	MV & LV Distribution network strengthening in Musanze, Rubavu, Ngororero, Burera, Nyabihu, Gakenke districts	Extension and/or Upgrade of 58.5km of MV lines and 312.7km of LV lines and installation of 76 distribution transformers,	Improve power supply reliability, quality and efficiency in the supplied areas of Northern Hub	6,901,000	2027	Public	
6	Rehabilitation and upgrade of low voltage network (Musanze, Huye and Rubavu)	Rehabilitation and Upgrade of 50km, 0.4kV Overhead Distribution Lines in Musanze Town	Increased efficiency, stability and reliability of power supply	2,500,000	2028	Public	
		Rehabilitation and Upgrade of 50km, 0.4kV Overhead Distribution Lines in Rusizi Town		2,500,000	2028	Public	
		Rehabilitation and Upgrade of 30km, 0.4kV Overhead Distribution Lines in Huye Town		1,500,000	2028	Public	

		Rehabilitation and Upgrade of 50km, 0.4kV Overhead Distribution Lines in Rubavu Town		2,500,000	2028	Public
7	Construction of 30/15kV Substations and associated feeders connections to limit extension of 15kV network	Construction of three 30/15kV Substations and associated MV feeders Upgrade and connections at Nyagatovu (Rwamagana) and Ruyenzi (Kamonyi), Shyorongi (Rulindo) and Poids Lourds (Rubavu)	Improve power reliability and efficiency through creation of redundancy supply between the 30kV and 15kV network and to limit extension of 15kV network	12,000,000	2030	Public
8	Upgrading/ reconductoring existing MV feeders	139.4km of different MV lines constructed with 35sqmm cable size will be upgraded to 70sqmm or 120 sqmm i.e. (20km on Kibuye feeder, 35.4km on Rukarara feeder in Nyaruguru district, 29.1 on Rukarara feeder in Gisagara and Huye Districts, 54.9km in Gakenke district.	To reinforce power supply and network reconfiguration	14,248,800	2029	Public
9	Construction of new 30kV feeders from Ongoing and planned Substations	Construction of new 30kV feeders i.e. 2.5km from Ongoing Gisagara substation, 2km from planned Gicumbi Substation, 5.5km from planned Huye substation, 3km from planned Muhanga substation, 3km from planned Nyagatare substation, 6km from planned Kirehe substation	To reinforce power supply and network reconfiguration	3,650,720	2028	Public
10	Construction of new 3 MV Switching Cabins in Rubavu and Kigali and associated MV lines	3 MV Switching Cabins (Gihira/Rubavu (1), and Kigali(2) at Simba and Nyamirambo	To reinforce power supply and network reconfiguration	4,500,000	2029	Public
11	Construction of 35km from Nyagatare SS to supply Gabiro commercial farm	30kV line with steel poles and towers and associated connections and switching devices	Improve power supply to Gabiro commercial farm	5,250,000	2027	Public
12	Upgrade of existing 15 cabins to MV switchgears (RMUs) in Kigali	Construction of 15kV cabins, installations of 15kV MV compact and extendable Ring Main Units (RMUs), transformers and associated connections	To reinforce power supply and network reconfiguration	12,800,000	2030	Public
13	Construction of 7 new smart cabins in Kigali and upcountry (Bumbogo/KSEZ, Busanza, Nyabisindu, Gaculiro, Golf/KFH, Buhinga, Kanzenze and Sake)	Construction of 15kV cabins, installations of advanced 15kV MV switchgears, distribution transformers and associated connections	To reinforce power supply and network reconfiguration	14,500,000	2028	Public
14	Rehabilitation of old MV underground cables in Kigali	Rehabilitation of old MV cables in different locations of Kigali, Including old MV cables from	Increased efficiency and reliability in the area supplied	4,500,000	2030	Public

		HV/MV substation to the first pole of the feeder.				
15	Construction of 30kV line from Bugesera SS to Sake via Rukumberi, and upgrade of existing MV lines of Zaza feeder	30kV line with steel poles and towers and associated connections and switching devices	Increased efficiency and reliability in the area of Sake, rukumberi, etc of Ngoma district	1,500,000	2029	Public
16	Construction of new MV lines loop ties/links to improve on the existing Radial network-countrywide	Construction of new MV line loop ties/links to improve on the existing Radial network-Upcountry	To enable load transfer/ N-1 solution	10,000,000	2029	Public
17	Construction of 15kV line from Gahanga SS to Busanza via Muyange	MV lines with Steel and/or concrete pole	To reinforce power supply and network reconfiguration	540,000	2028	Public
18	Upgrade/ reconductoring of 15kV line from Nzove SS to Nzove IP	MV line with steel poles and towers (existing & new)	To reinforce power supply and network reconfiguration	48,000	2026	Public
19	Upgrade/ reconductoring of 15kV line from Jabana SS to Rutongo Mining	MV line with Steel poles (existing and new)	To reinforce power supply and network reconfiguration	510,000	2028	Public
20	Construction of new 15kV line from Shango SS to Rutongo Mining and associated MV distibution cabin	MV line with steel poles and towers (new), new smart cabins	To reinforce power supply and network reconfiguration	975,000	2028	Public
21	Rehabilitation of Gicumbi 30kV network	MV lines with Steel, wooden, concrete poles	To reinforce power supply and network reconfiguration	1,920,000	2028	Public
23	Undergrounding MV&LV power lines	Change of Overhead to Underground Network (especially in Kigali) and other developed urban areas	To improved operation efficiency and safety	183,816,037	2032	Public
		TOTAL (USD)		**380,951,212**		

Access to Electricity

	Year	New grid connections	Off-grid connections	Total connections
Total Targeted Connections by 2030 (Cfr NEP Grid Densification + Expansion + Minigrid) and 2030 not Planned for	2025/26	185,772	50,000	235,772
	2026/27	250,414	25,000	275,414
	2027/28	211,110	0	211,110
	2028/29	33,778	0	33,778
	2029/30	0	0	0
Connections Through Existing Program	N/A	681,073	75,000	756,073

Additional Expected Connections through National Compact Program	131,252	196,877	328,129

Investments requirements for Universal access (last mile) in USD

	Unit Cost/Household (USD)	Households Targeted (#)	Investment Requirement (USD)
Grid	1,000	131,252	131,252,000
Off-Grid (50W+6 Lamp)	500	196,877	98,438,710

Regional Interconnections

S/N	Required Interventions	Rationale	Cost estimate (USD)	Technical studies	Funding Source	
					Public	Private
1	**Generation**					
1.1	Installation of Automatic Generation Control (AGC) at Rusumo HPP.	Rusumo HPP isn't installed with AGC despite its important role in interconnecting 3 grids i.e. Rwanda, Burundi and Tanzania. The lack of AGC system at Rusumo HPP requires the system Operators from the three national dispatch control centers to control the system load and frequency variations manually by voice commands with generation operators at the power plants which is ineffective, inefficient and virtually difficult to maintain 50Hz.	$5,500,000	Feasibility study and engagement with Rusumo Power Company Limited is required to confirm the required works and the associated cost.	Public	
1.2	Rehabilitation of Ntaruka HPP and associated switchyard.	This power plant with its associated substation/ switchyard helps also to supply power to the part of Uganda via Cyanika border. Rehabilitation of the Ntaruka HPP gives the utility the opportunity to enhance the stability and security of renewable energy source and improve cross-border power supply. The Plant has an installed capacity of 11.25MW but is currently only capable of operating at a capacity of 9MW. Given how hold the plant is, most parts are obsolete, and it is almost impossible to find the spare parts. Based on its status and current performance, it has been found necessary to rehabilitate the power plant to restore the plant capacity to its maximum capacity and upgrade the control systems and other electro-mechanical equipment.	$30,000,000	Feasibility study is ongoing	Public	
2	**Transmission**					
2.1	Installation of 2nd circuit on 220kV transmission line Rusumo-Kirehe-Bugesera-Shango (128km) and associated	The transmission line is in operation with one circuit strung. The line is evacuating the power from Rusumo HHP (a shared power plant) and it can also serve as interconnection with Tanzania and Burundi. Steps have been taken towards a bilateral agreement for power trade between Rwanda and Tanzania. This agreement aims to enhance regional integration and cooperation, potentially	$15,500,000	Existing 220kV towers are designed and tested for 2 circuits though one circuit is currently strung. Design of towers available	Public	

	line bays equipment	leading to increased power exchange. Therefore, the installation of Second circuit here proposed will bring in redundancy benefits, increased transmission capacity and enhanced reliability for interconnected power systems between now and future.			
2.2	Installation of 2nd circuit on 220kV transmission line Shango-Rubavu - Mugunga(Goma) 98km and associated line bays equipment	The transmission line is in operation with one circuit strung. On the side of Rwanda, the Shango substation is ready and Rubavu to be commissioned by end of October, 2025. The construction works of Mugunga substation (on the side of DRC) is also ongoing. Once the two projects are completed, this will serve as the path/route for power trade between two countries. Therefore, the installation Second circuit here proposed will bring in redundancy benefits, increased transmission capacity and enhanced reliability for interconnected power systems between now and future.	$11,800,000	Existing 220kV towers are designed and tested for 2 circuits though one circuit is currently strung. Design of towers available.	Public
2.3	Construction of 220kV transmission line Kamanyola-Bwishyura (approx. 93km)	This project involves the construction of a 220kV transmission line between Kamanyola and Bwishyura, along with the extension of the Bwishyura substation. This transmission line will facilitate the evacuation power from Rusizi III and as well as the interconnection between Rwanda-Burundi and DRC through a shared 220kV switchyard.	$35,353,201	REOI has been launched in April, 2025, hiring consultant firm for updating FS, Detailed design, ESIA, ESMP and RAP. and preparation of tender document for the constrcution of 220kV line Kamanyola-Bwishyura and extension of Bwishyura Substation which is under commissioning (under separate project).	Public
3	**Substations**				
3.1	Installation of second 220/110kV power transformer at Shango, 93.8MVA	220/110kV Shango substation is the receiving/sending end for power import/export between Rwanda and Uganda currently with one 220/110kV power transformer in this case considered as single failure point and increased/prolonged downtime during fault and maintenance. Shango substation is also linked/connected with Rubavu Substation (interconnection with DRC). The installation of second transformer will help overcome the anticipated operational challenges and capacity limitations during power exchange/trade. The project mainly consists of: a. 93.8MVA ,220/110kV power transformer b. One (1) 220kV transformer bay c. Extension/upgrade of Telecoms/Control/Protection/SCADA systems d. Installation of WAMS enables (PMUs)	$4,500,000	N/A - (Existing substation can accommodate a second power transformer)	Public

3.2	Installation of second 220/110kV,93.8 MVA power transformer at Rubavu and 110/30kV, 2x50MVA power transformers	Rubavu substation is the receiving/sending substation for power import/export between Rwanda with eastern part of DRC currently with one 220/110kVA transformer in this case considered as single failure point and increased/prolonged downtime during fault and maintenance. The installation of second transformer will help overcome the anticipated operational challenges and capacity limitations during power exchange/ trade between countries. At the same time the substation will also serve/ distribute electricity to load centers/ bulk load in Rubavu and cross border areas. The project mainly consists of: a. 93.8MVA, 220/110kV power transformer b. One (1) 220kV transformer bay c. Extension of 110kV bus bar d. 110/30kV, 2x50MVA power transformers (major load off-taker) e. Two (2) 110kV transformer bays f. Extension of 30kV switchgear panels with bus coupler g. Telecoms/Control/Protection/SCADA systems h. Installation of WAMS enables (PMUs)	$11,500,000	N/A - (Existing substation can accommodate a second power transformer)	Public
3.3	Installation of second 220/110kV, 93.8MVA power transformer at Bwishyura	Bwishyura substation is the receiving/sending substation for power import/export between Rwanda with eastern part of DRC currently with one 220/110kVA transformer in this case considered as single failure point and increased/prolonged downtime during fault and maintenance. Particular, Bwishyura Substation be receiving point of power from Rusizi III. The installation of second transformer will help overcome the anticipated operational challenges and capacity limitations during power exchange/trade. The project mainly consists of: a. 93.8 MVA power transformer b. One (1) 220kV transformer bay c. Extension/upgrade of Telecoms/Control/Protection/SCADA systems d. Installation of WAMS enables (PMUs)	$3,500,000	N/A - (Existing substation can accommodate a second power transformer)	Public
3.4	Installation of second 220/110/30kV, 40/20MVA power transformer at Gisagara SS	Avoid a single failure point and increased/prolonged downtime during fault and maintenance. Gisagara substation can be a receiving/sending end for power import/export between Rwanda and Burundi. a. 40/20, 220/110/30kV MVA power transformer b. One (1) 220kV transformer bay c. Extension/upgrade of Telecoms/Control/Protection/SCADA systems d. Installation of WAMS enables (PMUs)	$4,500,000	N/A - (Existing substation can accommodate a second power transformer)	Public

4	**System Studies and Capacity Building**				
4.1	Grid stability and Vulnerability Assessment including management of reactive power.	The power system of Rwanda has tremendously increased in size and developed to resist stochastic component outage under the N-1 security principle, however, recently many natural disasters, external faults from the interconnected grids have brought unprecedented challenges to the current power systems configurations, triggering over frequency, under frequency and high voltage scenarios that cause sustained power outages or total blackouts. There is need for a deep stability and vulnerability assessment of the Rwandan grid with all the existing and planned interconnections. Under this study, the consultant will also develop and harmonize the operating guidelines/rules/procedures and other requirements for the operations of the interconnectors include frequency regulation, coordination of operations, etc to assure a secure operation of interconnected power systems in addition to reliable infrastructure, efficient markets, favorable regulatory frameworks, and strong regional cooperation which are crucial and supportive key elements to the power trade.	$1,500,000	N/A	Public
Sub/total 1 (USD)			**123,653,000**		

S/N	Required Interventions	Rationale	Funding (USD)	Technical studies	Funding Source	
					Public	Private
1	**Transmission lines and/or Substations**					
1.1	Relocation of 110/30kV Kilinda substation and associated 110kV lines bays	Kilinda substation is a key component of Rwanda's electricity transmission network, particularly for evacuating power from Rukarara and Nyabarongo I hydropower plants. It's a 110 kV substation that receives power via transmission lines from these hydropower plants and then transmit and distributes it further. Currently it is a substation that is at risk of collapsing due to land sliding and there is a need of relocating it to a safer location. The collapse of this substation can cause a major disturbance not only to national grid but also to the interconnections. And as the mentioned hydropower plants can't be evacuated this will lead to the exploitation of non-renewable sources that will largely contribute to CO2 emissions. Relocation will consist of; a. 110kV double busbar b. 110kV bus coupler c. Four (4) 110kV line bays d. One (1) 110kV line bay (future) e. One (1) transformer bay f. One (1) transformer bay (future) g. Telecoms, Control and protection systems h. 30kV switchgears panels i. Installation of WAMS enables (PMUs)	$8,000,000	Preliminary investigation was done. A detailed feasibility study is required	Public	

1.2	Construction of 110kV transmission line Bugesera-Gasogi and cut-in-cut out 110/15kV Masaka substation 2x50MVA,	The construction of this transmission line and associated substation would bring to have a complete ring of 110kV system around Kigali, improve the evacuation of Rusumo and Hakan and as well as a major off-taker bulk supply location in Kigali city. a. Construction of 110kV line from Bugesera-Gasogi substations linking Jabana and Gikondo substations and associated line bays b. 110/15kV substation with 2x50MVA power transformers (by cut in cut out for the above transmission line) c. Two (2) transformers bays d. Space for future transformer bay e. MV switchgears panels f. Installation of WAMS enables (PMUs) g. Telecoms, SCADA, Control and protection systems	$19,500,000	A detailed feasibility study is required	Public
1.3	Construction of 110/30kV Remera substation 2x50MVA	Increased transmission capacity and enhanced reliability of power supply in Kigali city and as well as a major off-taker bulk supply location in Kigali city. The project components shall be: a. Construction of 110kV transmission line and associated line bays b. 110/15kV substation with 2x50MVA power transformers c. Two (2) transformers bays d. Space for future transformer bay e. 30kV switchgears panels f. Telecoms, SCADA, Control and protection systems g. Installation of WAMS enables (PMUs)	$21,600,000	A detailed feasibility study is required	Public
1.4	Construction of 110/30kV Nyarutarama substation 2x50MVA	Increased transmission capacity and enhanced reliability of power supply in Kigali city and as well as a major off-taker bulk supply location in Kigali city. The project components shall be: a. Cut in cut out of 110kV line currently linking Jabana and Gikondo substations and associated line bays b. 110/15kV substation with 2x50MVA power transformers c. Two (2) transformers bays d. Space for future transformer bay e. 30kV switchgears panels f. Telecoms, SCADA, Control and protection systems g. Installation of WAMS enables (PMUs)	$17,000,000	A detailed feasibility study is required	Public
1.5	Extension of 110/30kV Bugarama substation 2x30MVA	The existing Bugarama Substation is currently supplying power to the cement factory which is one of the big consumers in Rwanda with bulk load around 15MW using only one installed 20MVA transformer 110/30kV. Taking into consideration that this substation is located in few kilometers from Burundi and DRC borders, it can also help in cross boarders' supply, in addition to that the cement factory plan also to increase their current load in future, therefore, extension and upgrade of this substation with 2x30 MVA power transformers shall be required:	$6,500,000	A detailed feasibility study is required	Public

		a. Extension of existing 110kV busbar b. 110kV bus coupler c. One transformer bay 1x30MVA d. Future transformer bay 1x30MVA e. 30kV switchgear panels, f. Telecoms, SCADA, Control and protection systems g. Installation of WAMS enables (PMUs)			
2	**System Studies and Capacity Building**				
2.1	To conduct a detailed network study for Kigali city in line its Master plan 2050	By conducting a comprehensive electrical network study that is aligned with the Kigali Master Plan 2050, the city can ensure that its energy infrastructure is robust, reliable, and sustainable, supporting the city's long-term vision of becoming a regional urban center. The study would involve assessing current electrical infrastructure, forecasting future energy demands, and recommending upgrades to meet the city's growing needs. This includes considering the master plan's focus on sustainable development, green growth, e-mobility and mixed-use developments.	$ 1,000,000	N/A	
2.2	Training of operations planning Engineers in Power System Simulation & Modelling	Our engineers currently have limited expertise in advanced power system simulations, which hinders their ability to effectively analyze complex scenarios. It is therefore essential to provide them with specialized training to conduct comprehensive power system simulation studies. Strengthening these skills will enable them to contribute more effectively to the safe and reliable operation of interconnected power systems, as well as to their planning and design.	$400,000	N/A	Public
Sub/Total 2 (USD)			**74,000,000**		
TOTAL ESTIMATE (USD)			**197,653,000**		

Clean cooking (USD Million)

Technology Description / Year	2026	2027	2028	2029	2030	Total	Funding Source	
							Public	Private
Clean Cooking	96	103	110	119	117	545		
Electricity	76	75	74	75	77	377		
Grid investments for e-cooking component	45.79	45.33	44.88	66.73	88.25	290.98	Public	
Investments for the off-grid	29.73	29.43	29.14	8.60	-11.62	85.28		Private
LPG	6	6	7	6	5	30		
Local	2.45	2.45	2.45	1.99	1.53	10.87		Private
Upstream	3.73	3.94	4.15	3.73	3.09	18.64		Private

Subsidies	14	22	30	38	36	140		
Electricity	0.55	0.73	0.91	1.08	1.46	4.73	Public	
LPG	10.23	12.80	15.35	17.87	12.58	68.83	Public	
Biogas	0.06	0.08	0.10	0.11	0.04	0.39	Public	
Charcoal	8.92	11.46	13.98	16.48	16.48	67.32	Public	
Com. Firew.	- 8.44	- 6.95	- 5.44	- 3.90	- 3.30	-28.03		Private
Pellets	0.74	0.96	1.17	1.38	1.12	5.37	Public	
Biomass ICS	-	-	-	-	-	0	Public	
Ethanol	2.27	3.03	3.76	4.49	7.17	20.72	Public	

Utility Viability

SN	Project Description	Project Scope	Project Objective/Rationale	Estimated Budget (USD)	COD	Funding Source	
						Public	Private
1.	Deployment of smarts meters	Supply of 20,000 meters and accessories for installation	Improve revenue collection	6,000,000	2030	Public	
2.	Expand fiber optic coverage	Retrofitting and extension of fibre optic networks	To enable distribution automation	7,832,528	2029	Public	
3.	Construction of Transformer repair and testing workshop	Construction of transformer repair and testing facility	Repair and testing defected transformers	2,500,000	2029	Public	
4.	REG Control Centre	REG/EUCL has a SCADA system which was developed and installed by PSI Ag, a German Company in 2010. Current system has its own weaknesses and REG/EUCL is mobilizing resources to upgrade. - Some of those weaknesses include key energy management aspects which current system cannot provide: • short circuit calculation and overall faults analysis, • Outage management/reporting, • State estimation and load flow calculations, • Contingency analysis, • AGC (Automatic Generation Control).	It is essential that an alternative site be secured to host SCADA as back up. Key components of the backup would include the following: • Building/the backup site. Software. • Computer servers (data, workstations, etc.). • Displays/bigger screens or BARCO Rear Projector. • Firewalls. • Switches/Routers. • Indoor and out cameras. • Standby power supply (generators and UPS). • GPS for synchronization.	34,500,000	2030	Public	

		Even though REG/EUCL is mobilizing funds to upgrade the existing system, the critical component of replicating existing system as backup needs to be addressed.	• Air conditioners xi.SDH communication system, site equipment and required interfaces. • Etc. The above and other details shall be detailed to give the right quantities of each.			
5.	REG Training Centre (REG TC)	Resource Mobilization & Purchase of land. Architectural designs & construction Procurement of equipment & materials. Staffing & Curriculum development. Launch/Start of operations.	• The REG TC will contain the following key infrastructure: • 2 classrooms • 1 Mock network/external training field • 9 State-of-the-art Laboratories; MV lab ; HV lab, Meters lab, Cables, isolators,& lines lab; Protection lab, Distribution Transformers lab; Solar lab; hydro lab, Clean cooking/Biogas; LPG lab/Geothermal lab; 6 administrative offices; 1 Technical warehouse; 1 restaurant	3,248,941	2027	Public
		TOTAL (USD)		**54,081,469**		

ANNEX II: INVESTMENT REQUIREMENTS MEDIUM TO LONG-TERM MILLIONS IN USD FOR LONG TERM GENERATION PROJECTS

Long-term Projects	Capacity (MW)	CoD	Financing requirements (M USD)	Funder	Status
Hydropower: Rusizi III (68 MW)	68	2031	306.00	Public/Private	Unfunded
Rusizi IV (98 MW)	98	2035	441.00	Public/Private	Unfunded
Nuclear Small Modular Reactor: 110MW	110	2032	770.00	Public	Unfunded
40 MW Butamwa HPSP	40	2034	196.90	Public	Unfunded
40 MW Juru HPSP	40	2034	148.70	Public	Unfunded
Nuclear power: 1,610 MW	1,610	2033-2050	11,270.00	Public	Unfunded
Solar PV+BESS: 2,701 MW	2,701	2033-2050	7,022.60	Public/Private	Unfunded
Geothermal:			100.00	Public/Private	Unfunded
Green Hydrogen: 100 MW	100	2035-2050	732.50	Private	Unfunded
Natural gas	1,675	2036-2050	5,478.93	Private	Unfunded

LET'S CONNECT 300M PEOPLE IN AFRICA TO ENERGY BY 2030

MISSION300

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