REPUBLIC OF RWANDA

MINISTRY OF INFRASTRUCTURE

ENERGY POLICY

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LIST OF ACRONYMS AND ABBREVIATIONS

CFL	Compact Fluorescent Lamp
CSOs	Civil Society Organizations
EAC	East African Community
ESSP	Energy Sector Strategic Plan
GDP	Gross Domestic Product
GHG	Green House Gases
GoR	Government of Rwanda
ICS	Improved Cook Stoves
IPP	Independent Power Producer
JADF	Joint Action Development Forums
LPG	Liquefied Petroleum Gas
LED	Light Emitting Diode
MIGEPROF	Ministry of Gender and Family Promotion
MINALOC	Ministry of Local Government
MINECOFIN	Ministry of Finance and Economic Planning
MINICOM	Ministry of Trade and Industry
MININFRA	Ministry of Infrastructure
MoU	Memorandum of Understanding
MW	Megawatts (unit of electricity generation capacity)
NDC	Nationally Determined Contributions (under UNFCCC)
PPA	Power Purchase Agreement
PPP	Public-Private Partnership
RDB	Rwanda Development Board
RD&D	Research Development and Dissemination
REG Ltd	Rwanda Energy Group Ltd
REFIT	Renewable Feed-in Tariff
REMA	Rwanda Environment Management Authority
REP	Rwanda Energy Policy
RET	Renewable Energy Technology
RPPA	Rwanda Public Procurement Authority
RSB	Rwanda Standards Board
RURA	Rwanda Utilities Regulatory Authority
SWG	Sector Working Group
SDG	Sustainable Development Goal
TVETs	Technical and Vocational Education Training Centers
TJ	Terajoules (unit of energy)
UNFCCC	United Nations Framework Convention on Climate Change
VAT	Value Added Tax
WASAC	Water and Sanitation Corporation Limited

FOREWORD

Energy is intrinsic to most of the challenges and opportunities the world faces today. Whether one speaks of maintaining national stability, economic growth, protecting ecosystems or promoting social equity, they all hinge at least to some degree on access to secure and sustainable energy. In Rwanda, energy is a critical productive sector that can catalyse broader economic growth and contribute significantly to facilitating the achievement of the country's socio-economic transformation agenda.

This Energy Policy has been elaborated to guide and influence decisions on the development and use of Rwanda's energy resources in a transparent and sustainable manner. The policy framework outlined herein comprises a set of governing laws and regulations, strategic directions and guiding principles that Rwandan institutions and partners shall adopt and adhere to, in subsequent implementation of actions. The vision of the energy sector is to become one of Rwanda's most dynamic sectors and investment destinations. In addressing both demand and supply side issues across all key sub-sectors, this policy will contribute to realizing that vision. The energy policy sets out clear policy actions, founded upon three essential government principles:

i. A resolve for transparent and effective sector governance
ii. Easing doing business and reducing barriers to private investment
iii. Enhancing institutional, organizational, and human capacities as well as the legal and regulatory framework.

This policy is well aligned to the country's overall long-term economic policies and calls upon various institutions to undertake measures that support private sector growth and socio-economic transformation as reflected in the Visions 2035 and 2050.

The Ministry of Infrastructure is grateful to all stakeholders who provided very useful inputs into enriching this Policy document and the Technical Team both at the Ministry of Infrastructure and other sister Ministries, who worked hard to complete the development of this document.

Dr. GASORE Jimmy
Minister of Infrastructure

EXECUTIVE SUMMARY

Energy is essential in supporting socio-economic transformation and has a systemic link to the growth of other sectors of the economy, such as manufacturing, construction, mining and quarrying, agro-processing, transport, and tourism.[1] To achieve sustainable economic growth and broadly shared prosperity, an enabling environment and policy framework is needed to facilitate new energy investments that meet the needs of consumers for affordable energy services. This framework also needs to move progressively towards cost-reflective pricing so that investments in the energy sector can generate fiscal revenues,[2] and avoid acting as a drain on the country's resource envelope.

Ensuring access to modern, sustainable, and affordable energy services is integral to Rwanda's economic development, poverty eradication and socioeconomic transformation agenda.[3] Lack of modern and affordable energy services stifles income-generating activities and hampers the provision of basic services such as health care and education. Smoke from polluting and inefficient cooking, lighting, and heating devices is a leading contributor to respiratory diseases and death in Rwanda.[4] Where provision of cost effective, appropriate solutions to the poor is enabled, particularly in rural areas, poverty reduction and health benefits can occur. Additionally, shifting consumption from biomass- based energies to clean energies like electricity and LPG reduces pressure on forest resources, protecting land arability and mitigating climate change through sustainable environmental conservation.

The Rwanda Energy Policy supports the achievement of SDG 7 targets and Visions 2035 and 2050 by tackling key challenges and opportunities in the sector. Firstly, relatively high energy prices need to be addressed so that the energy sector can become a key pillar or engine of economic growth. Secondly, in the household sector, reliable and affordable energy services for cooking, lighting, heating, brewing, firing, boiling, ironing, and operating electric appliances are needed to maintain human security, good health and quality of life. Thirdly, a modern, more service-industry based, industrialized economy requires predictable, sufficiently available, competitively priced energy commodities. This drives agricultural mechanization, increasing returns per hectare and people's disposable income. Fourthly, diversifying away from dependence on petroleum products to drive the transport sector will

[1] According to the Ministry of Trade and Industry, Rwanda's 2013 industrial production expanded by 11% compared to 4.6% for the economy as a whole. This growth was primarily driven by the construction sector and mining activities.

2 through taxes, levies, and other duties imposed on various sector activities such as petroleum products imports and electricity consumption

[3] According to the UN Foundation almost 3 billion people rely on traditional biomass for cooking and heating, and about 1.5 billion have no access to electricity, with 1 billion more having access only to unreliable electricity networks.

[4] Air pollution from polluting and inefficient cooking, lighting, and heating devices accounted for 8.1 million deaths globally. State of Global Air Report. Health Effects Institute and UNICEF 2021

help reduce the country's vulnerability to petroleum price impacts on macroeconomic balances. Fifthly, distributed energy solutions (including clean cooking solutions and off grid electricity systems) can support business creation, productivity, and entrepreneurship in rural areas. This can help to widen the tax base and support Rwanda's socioeconomic transformation agenda by boosting youth productivity and employment. Finally, energy and environment are closely interrelated. Climate impacts that can adversely affect energy infrastructure (e.g. the performance of hydropower) need to be managed. There is also a need to manage the impacts of energy sector activities on the environment and to ensure international commitments are met.[5]

The energy sector is complex with multiple sub-sectors and cross-cutting issues. This policy does not set out new sector targets. Instead, it offers high level guidance and an overarching framework and governance structure to coherently pull together various sub-sector commitments made in other policy and strategy documents. In particular, this includes the Energy Sector Strategic Plan (ESSP) which sets out detailed short-term actions to progress toward long-term goals and objectives. While the ESSP and Rwanda Energy Policy are mutually reinforcing, the latter provides high-level direction on the longer-term goals, priorities, and approaches needed in the sector. This policy sets out the underpinning national laws and regulations which provide a solid legal foundation determining the conduct, rights and operational constraints affecting the market-place and policy delivery in specific energy sub-sectors.

[5] E.g. as set out in Rwanda's UNFCCC Nationally Determined Contributions (NDC)

CHAPTER ONE: POLICY CONTEXT

1.1. COUNTRY OVERVIEW

Rwanda is a land-locked country of 26,338 km^2 in area with a population of 13,798,561.[6] It is a densely populated country in comparison to other African countries. In the financial year 2022-2023, GDP was 1,060USD/capita. Rwanda's economy has been growing at an annual average rate of 6.5% in the period between 2014-2023. Ensuring access to affordable and modern sources of energy is essential to achieve the Visions 2035 and 2050 objectives.

1.2. RATIONALE FOR A RWANDA ENERGY POLICY AND SECTOR CHALLENGES

Since 2015, new challenges have risen as well as new emerging realities and technology developments such as electric mobility, nuclear and radiation subsector development, hydrogen, autonomous power generation and use of natural gas for industrial and household use which have created gaps in the existing policy thus a necessity for the update of the policy. In addition, there are critical elements in the energy sector where the existing policy had been silent about and these include street lighting access, regulation of the gas subsector, security and relocation of energy infrastructure/vandalism of electricity equipment and illegal connections, land and socio-economic impacts, land for right of way (Transmission and Distribution Infrastructure).

Consequently; a revised, long-term approved energy policy that is widely recognized by stakeholders will help with coordination of the sector and contributing institutions. The current document reflects a revision to a national policy that was drafted in 2015. Prior energy policies include the 2004 Energy Policy that largely responded to emergency energy security considerations, rather than addressing a broad range of issues.

A general policy shift is therefore required due to underlying changes in the country. The economy has experienced stable growth, and power supply crises have stabilized. Rwanda's population is growing quickly and is projected to reach 16.4 million people by 2030. This will drive significant growth in demand for essential energy services in the household sector for cooking, lighting, heating, brewing, firing, boiling, ironing, and operating electric appliances. At the same time, Rwanda currently has low levels of access to modern energy carriers such as electricity and LPG. This constrains efforts to achieve medium-term thematic and macroeconomic objectives of the country which include attaining middle income status by 2035 and high-income status by 2050.

The current electricity tariff is heavily subsidized. This creates a drain on public finances, and distorts financial signals for private investors. Nevertheless, electricity tariffs remain relatively high compared to other countries in the region reflecting the high cost of existing electricity generation projects in the country. High costs and unreliable supply make access to electricity for households less affordable, and dis-incentivize stronger industrial growth and business

[6] https://www.statistics.gov.rw/publication/size-resident-population

expansion. This latter challenge is perceived as most critical in the manufacturing, mining, and agro-processing sectors. Power cuts, unstable power supply conditions, and uneven power quality are additional constraints to industrial sector growth.

The National Strategy for Transformation calls for an increase in private sector investment in Rwanda's emerging energy systems and markets. Leveraging private sector capital, engagement and partnership requires new policy actions and strategies within a transparent and stable policy framework

The following critical sector challenges need to be addressed:

i. Need for energy security and a sound demand-supply balance;
ii. Low levels of access to modern energy services including electricity and clean cooking;
iii. Inadequate infrastructure requiring significant scale-up in investment;
iv. High cost of electricity generation;
v. Vulnerability to climate change.

The policy responds to these challenges by addressing the following institutional needs:

i. A robust legal and regulatory framework;
ii. Improved stakeholder coordination and information sharing among the various projects, government bodies, the private sector and civil society organizations to ensure effective partnership;
iii. Improved human capacity development to support implementation and delivery on set targets;
iv. Improved energy planning information system (energy supply and demand analysis) with adequate financial resources to plan for and monitor the energy sector;
v. Appropriate research and development (R&D).

1.3. ENERGY SUB-SECTORS OVERVIEW AND CHALLENGES

The energy sector in Rwanda consists of a number of subsectors with each playing a key role in Rwanda's transition to a middle-income country by the end of the decade, and each with their own set of challenges to address as set out below.

1.3.1. Electricity

The use of electricity is required for both low consumption devices and large consumers. 55.9%[7]of households currently have access to on-grid electricity. The Government intends to provide universal access to electricity using both on-grid and off-grid by 2030, requiring a rapid scale-up in access rates in the next few years. The priority for on-grid solutions is to extend the network to areas with low access rates, provide access to productive and heavy users of electricity. For remote areas far from the grid, off-grid may be preferred as a short-term solution.

Total installed electricity generation capacity is currently 406.4 MW. Of this more than 27% comes from hydrological resources, followed by Methane gas at 21.1% while diesel-powered

[7] REG Annual Report June 2024

generators contribution has reduced to 7% after decommissioning 30MW in 2023. The rest comes from other sources

Key issues in Rwanda's electricity sub-sector include:

i. The need to rapidly increase access to electricity means that supply is occasionally unable to match fast-growing demand during peak hours. This is driving a need for high levels of investment in electricity generation, transmission and distribution including interconnection to facilitate and enhance the energy trade.
ii. However, the cost of supply is currently high. Contributing factors include:
    - Unfavourably-priced long-term PPAs, costly transmission and distribution infrastructure, and continued dependence on costly diesel and heavy fuel oil plant for baseload and standby for emergency.
    - Large technical and non-technical electricity losses, estimated at over 18% for 2023/2024, sometimes coupled with low operational efficiency, inadequate maintenance and financing for network improvement.
    - Dependence on imports of electricity generation and supply equipment affects projects cost and delivery time.
iii. Electricity tariffs are therefore subsidized to make them affordable to support universal access goals. This creates a burden on national budgets.
iv. Electricity generation sources that are vulnerable to climate change like hydro and peat.
v. Scattered settlements which increase investment cost for grid expansion together with the operations and maintenance of electricity systems.
vi. Low electricity consumption per capita

1.3.2. Renewable Energy Technologies

Renewable energy share of on-grid electricity generation in 2023 stood at 49.63%, comprising hydro (37.95% of total production), solar (1.3% of production) and shared hydro resources at 10.38%.[8] Renewables are also the dominant source for off-grid electricity such as solar home systems and mini-grids. The sub-sector faces a number of challenges including:

i. Low public awareness about the efficacy and potential of renewable energy technologies (RETs).
ii. Little production of equipment and underdeveloped markets in RETs components and services because the lack of financial capacity to cover the high initial investment.
iii. Inadequate mechanisms to monitor standards and ensure quality control of RETs. The poor quality of some technologies available on the market reduces their lifetime and damages the image of RETs.
iv. Inadequate financing mechanisms to support uptake.
v. Inadequate data available on the potential of indigenous renewable energy sources (geothermal, solar, wind, peat, methane gas, mini and micro hydro).

[8] REG Annual Report 2023/2024

vi. Shortage of local actors capable of carrying out projects financially, technically, and in terms of management.
vii. Institutional, policy, fiscal and regulatory barriers.

1.3.3. Petroleum and Gas

The petroleum subsector's objective is to ensure safe, sufficient, reliable, sustainable and affordable supply of petroleum and LPG. Currently, Rwanda depends entirely on imported fuel products, because its petroleum resources are yet to be commercially proven and developed. Rwanda plans to expand domestic exploration and production, boosting investment in supply and storage infrastructure, and promoting sound management of downstream resources.

Rwanda imports all its petroleum products requirements. The key market players are private companies which import products for local distribution and re-export. Petroleum products are mainly used in the transport, commercial, power generation and industrial sectors. The consumption of the petroleum products in Rwanda stands at an average of 571 million litres per annum as of 2023, which constitutes about 13% of total national imports. Consumption has been steadily rising in the past seven years and will continue to rise on account of increased transport vehicles and expansion of the fleet for the National airline. Considering the historical annual growth of 6% for petroleum products, the average monthly consumption is estimated at 60 million litres of petroleum fuels in 2024.

The petroleum sub-sector issues include the following:

i. The evolution of international market prices impacts negatively on the balance of payments of oil-importing and renders the cost of energy supply unbearable;
ii. High transport costs due to insufficient transport facilities and being landlocked;
iii. Inadequate quality control of the fossil fuel products, posing an increasing hazard to public health and the environment.
iv. Inadequate/lack of petroleum and gas strategic storage facilities to cushion the country from external shocks and price fluctuations.

1.3.4. Clean Cooking and Biomass

Rwanda has had considerable success over recent years in addressing issues related to environment. It is one of only a few countries in Africa where there is not a major link between biomass use and negative environmental effects of deforestation, although there is still a biomass supply deficit. The social and health problems emanating from the use of biomass also need to be solved. The Government is therefore promoting the use of alternative fuels such as electricity, LPG, ethanol, and biogas from animal and plant waste. This will not only save lives but also free up the time spent by women and children in collecting firewood, giving them more time to study and undertake more productive commercial activities.

The biomass energy subsector covers mainly wood, charcoal, biogas and biofuels. Biomass resources are exploited in the form of firewood, charcoal or agricultural residues mainly for

cooking purposes by households and also in some industries. Country-wide, biomass fuel (charcoal and wood) usage accounts for 93.4% of national cooking energy needs. Biomass is already in short supply with the country facing a biomass deficit of over 4 million m^3 per year.[9] The Long-term strategy is to transition from wood and charcoal fuel consumption to clean and efficient fuel and technologies by 2035.

Rwandan households will not eliminate the use of wood fuels in the short run. Instead, as the economy develops wood fuels will be phased out where it makes sense. This will be supported with the introduction of enabling frameworks for use of modern clean alternatives, particularly in urban and semi-urban areas. Issues of 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.

1.3.5. Energy Efficiency and Demand Side Management

End-users of energy across all sectors can make an important contribution to minimising the cost and environmental impacts of the overall energy system by ensuring energy is used efficiently. For the electricity sector, the manner in which energy is used (e.g. the time of day) can also be an important factor in the overall system cost, and consumers can help minimise 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 modern efficient technologies and practices and 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.

[9] Biomass Energy Strategy ,2019

CHAPTER TWO: POLICY FRAMEWORK

PART A: VISION, MISSION AND GOALS

2.1 VISION

The vision of the energy sector is to contribute effectively to the growth of the national economy and thereby improve the standard of living for the entire nation in a sustainable and environmentally sound manner.

2.2 MISSION

The mission of the energy sector is to create conditions for the provision of sufficient, safe, reliable, efficient, affordable and environmentally appropriate energy services to households and to all economic sectors on a sustainable basis.

2.3 OVERARCHING POLICY GOALS

The overall goal of the policy is to ensure that all residents and industries can access energy products and services that are sufficient, reliable, affordable, and sustainable.[10] Specific core global objectives of the energy policy include:

i. Ensuring the availability of sufficient, reliable, affordable and sustainable energy supplies for all Rwandans.
ii. Creating an enabling environment for increased private sector participation in energy supply and service provision.
iii. Encouraging and incentivizing more rational, efficient use of energy in public institutions, and amongst productive and household end-users.
iv. Ensuring the sustainability of energy exploration, extraction, supply, and consumption so as to prevent damage to the environment and habitats.
v. Promoting safe, efficient, and competitive production, procurement, transportation, and distribution of energy.
vi. Developing the requisite institutional, organizational, and human capacity to increase accountability, transparency, national ownership and decentralized implementation capacity for sustainable energy service delivery.

Collaborating with the private sector and other stakeholders, the Government will work towards meeting national, regional, and global targets to enhance access to modern, clean and affordable energy services. Rwanda is a signatory to the United Nations Sustainable Energy for All Initiative (SE4ALL) and the Regional Strategy on Scaling up Access to Modern Energy Services adopted by the EAC Council of Ministers. This policy aims to increase availability and affordability of electricity and clean fuels through a sound enabling environment for;

[10] Sustainable energy use is the practice of providing energy solutions in a manner that meets the needs of the present without compromising the ability of future generations to meet their needs (Renewable Energy and Efficiency Partnership, August 2004). Not all energy resources are renewable in human lifetimes. For this reason, wasteful or inefficient use of resources could well lead to reduced security and affordability for future generations of Rwandans.

i. Off-grid energy service provision including the development of distributed, small- scale renewable energy solutions and business models.
ii. Clean fuels energy service provision, including the development of infrastructure and distribution for LPG, biogas and other clean cooking alternatives.

2.4 KEY POLICY PRINCIPLES AND PRIORITIES

The following principles summarize Government's guiding approach to energy development. They reflect a need to balance and protect the interest of citizens and energy consumers, private investors, and other stakeholders. They give high-level policy prescriptions on how Rwanda's energy resources should best be exploited, distributed, and utilized. These foundational principles promote an enabling environment for successful achievement of commitments reflected in the ESSP and future sub-sector action plans in the development of specific policy directives and guidelines.

1) Building decentralized energy policy implementation capacity

Government commits to strong national ownership over decision-making and will undertake measures to empower local companies and Rwandan experts in fulfilling the vision of the sector. This entails having a much stronger focus on building domestic human, organizational, and institutional capacity. Local authorities are encouraged to include and monitor obligations for providing improved energy services and access to clean energy technologies. Moreover, energy issues should be regularly addressed in relevant integrated development Steering Committees and Joint Action Development Forums (JADF).

2) Promote value-for-money and increased market competition

Government shall establish transparent and competitive procurement processes and guidelines for all energy projects. This is important given the increased role of the private sector in the delivery of energy projects and services. Competitive bidding of all energy-related projects, including independent power production (IPP) activities, shall therefore henceforth be the *default* procurement option. This is vital to realize more market transparency and to ensure value-for-money in the use of public funds.[11] Provided a project still conforms to value-for-money principles, exceptions may be warranted in cases of:

i. *Urgent need*. Ensuring continuity of supply or providing services rapidly due to emergency situations;
ii. *Public security*. Where the project may directly pose a risk to public security or involves matters pertaining to state security;
iii. *Technological uniqueness*. For example, when provision of the service necessitates technology for which unique intellectual property, trade secrets, or other exclusive rights are owned or possessed by a single firm or entity;

[11] It should be noted in this context that the application of a REFIT tariff for power procurement through IPPs would comply with this principle, as there would be little room for negotiation of the set and transparent terms and conditions.

iv. *Other compelling reasons in the national or public interest*. Projects in these categories may be procured through unsolicited proposals through the signing of a MoU between a private party and the contracting authority, in accordance with the public procurement law.

3) "Smart" subsidies aligned to social protection principles

In order to improve the effectiveness of social protection interventions, a gradual shift away from indiscriminate subsidies toward "smart subsidies"[12] shall be pursued for all energy related interventions. Smart energy subsidies and welfare support measures to ensure affordability of energy services should therefore be primarily targeted to vulnerable groups within the limits of the Government's capacity.

4) Promoting private sector participation

Meeting Vision 2050 goals entails an increase in the absolute level and relative share of projects being privately financed. Government shall facilitate private sector participation in all phases of energy project development and delivery, including construction, financing, installation, maintenance and operations, particularly in the electricity supply and clean cooking sectors through the following actions:

i. **Streamline investment promotion processes for IPPs** by clarifying the steps, prerequisites, and outcome milestones for each stage of the investment process.
ii. **De-risk investments through upstream resource assessments, mapping and pre-feasibility studies** to reduce high up-front risk before energy resources are confirmed. Government may also invest in feasibility studies and demonstration projects for technologies not yet commercially "proven" or bankable.
iii. **Accelerate and facilitate energy sector Public-Private Partnerships (PPPs)**, for complex activities where risks are high and innovation can be harnessed from private sector actors.
iv. **Empower local enterprises to engage in energy sector** by, for example, streamlining the legal and regulatory framework to attract more local private investors and operators and standardizing "local content" guidelines especially in manufacturing sector.
v. **Provision of dedicated power lines to Special Economic Zones and Industrial Parks,** to ensure power reliability and stability for industries.

[12] "Smart subsidies" refer to mechanisms that target specific groups including the poorest, most vulnerable end-users.

PART B: OBJECTIVES AND ACTIONS IN KEY SUBSECTORS

This section translates the general policy goals and principles set out above into more specific policy objectives and actions for each main energy sub-sectors.

2.5 ELECTRICITY SUB SECTOR

2.5.1 Electricity generation

Issue: Power generation faces several challenges including**:** electricity demand-supply imbalance, high cost of power generation, and vulnerability to climate change.

Policy objective: To ensure sufficient, reliable, sustainable and more affordable power supply, and improve security of supply to meet demand.

Policy Actions:

i. Revise and upgrade the existing policy, legal, regulatory, institutional, and financial frameworks to support the rapid development of the electricity industry;
ii. Diversify power generation resources over time and increase the share of clean power in the total mix over time;
iii. Ensure supply is closely aligned to projected demand[13], and better align investment planning and funding mobilization more closely to a power generation road map and master plan, a least-cost power development plan, and an electricity sub-sector action plan;
iv. Enhance regional cooperation and trade in electricity, including investment in transmission network development, take regional import/export options into account when developing power master plans, buy or sell power from the future regional power market to further improve security of supply;
v. Streamline IPP processes and fast track project delivery by securing long-term funding for planned projects through a medium-term budget expenditure framework, developing new information management systems to streamline procedures, and building greater capacity in planning, procurement, and negotiating power transactions. Concessional agreements should be aligned with the existing legal and regulatory framework.
vi. Ensure energy storage technologies such as pumped storage, battery storage, fly wheels, fuel cells, hybrid systems among others are in place;
vii. Create enabling environment for new alternative energy sources such as nuclear energy and hydrogen for electricity generation in the long term. Due to the cross-cutting nature of nuclear energy applications, the institution in charge of nuclear energy, shall develop a dedicated Nuclear Energy Policy and Law that covers the use of nuclear energy in electricity generation, food and agriculture, health, industry and mining.

[13] Least Coast Power Development Plan Dec 2023 projected demand for electricity by 2035 to grow by 10% to be at 662MW

Sources of Power Generation

This section sets out key issues and actions relating to specific sources of power generation. The available energy resources for power generation in Rwanda are: hydropower, solar, peat, methane gas, wind, geothermal and bio fuels:

Hydro power: Rwanda has hydro resources throughout the country. Currently, hydropower makes up 27% of total installed capacity, and about 31% of hydro capacity consists of installations of less than 5 MW. Hydropower development has different challenges including; vulnerability to variations in hydrology and climate change, leading to reduction of water levels in reservoirs and thus reducing the contribution of hydro power in the energy mix; inadequate storage capacity in existing power generating reservoirs, long lead time of hydro power projects, inadequate hydrological data and competition for land and water uses between various sub-sectors of the economy.

Policy Actions:

i. Develop a hydro risk mitigation mechanism to address risks such as droughts.
ii. Ensure a coordinated approach for the management of water reservoirs.
iii. Ensure conservation of hydro power water catchment areas.
iv. Ensure increased storage capacity for hydro power reservoirs.
v. Implement hydro power projects as multi-purpose projects.

Solar: Rwanda has strong solar resource potential in some parts of the country. However, current and planned on-grid solar capacity represents only a small fraction of total generation, and there is scope for increasing its contribution.

Policy Actions:

i. Support hybrid solar and storage technologies to manage intermittency.
ii. Provide incentives to promote local production and use of efficient solar systems.
iii. Develop and review of standards for solar technologies and equipment.
iv. Provide a framework for connection of electricity generated from solar energy to national and isolated grids, through direct sale or net metering,
v. Attract investments in solar systems to reduce reliance on importation.

Wind: Rwanda has a generally poor wind resource over much of the nation. Nevertheless, there are certain areas where the wind physical resource may be good enough to be tapped cost-effectively. More data on wind regime and differentiated uses could help exploit these resources due to fast changing technologies.

Policy Actions:

i. Conduct detailed wind energy resource assessment and update the wind atlas.
ii. Undertake Research Development and Dissemination (RD&D).

Geothermal: Estimated technical potential of geothermal resources in Rwanda is between 50 and 90 MW, though no conclusive determination of the suitability of these resources for generation of electricity has been found to date, there is a role for more research in this area.

Policy Actions:

i. Support geothermal resource assessment to manage the geothermal exploration risk and attract investors.
ii. Promote RD&D and capacity development for geothermal development

Methane Gas: Methane gas physical resource has been well characterized at a volume of 40 billion m^3 or 1.4 million tera joules (TJ) of energy. Rwanda's share of this resource is 0.7 million TJ of energy. Commercial-scale exploitation of Lake Kivu methane began in 2015 with the 26.4 MW power plant. This has increased to 82.4 MW with an additional 56MW by 2024. Methane gas development involves high resource exploration and development risks, including potential exposure of the lake ecosystem to danger. Currently methane resource is also being exploited for other applications such as cleaning cooking, production of fertilizers etc.

Policy Actions

i. Ensure monitoring of Lake Kivu exploration and development activities.
ii. Ensure resource exploitation is efficient and minimises leakage.
iii. Expedite the utilization of the exploited methane gas for other applications.
iv. Promote research & development and capacity development for both exploration and lake monitoring activities.

Waste to Energy: Waste-to-Energy (WtE) is the process of converting waste products to either heat or electricity, through direct combustion or by processing the waste into fuel. The only current generation of electricity from waste in Rwanda is one grid-connected plant with a capacity of 0.07 MW fuelled by gasification of rice husks. There have been no comprehensive studies in Rwanda that have quantified the resource potential of waste as a feedstock for generation of electricity and more data will need to be collected.

Policy Actions:

i. Facilitate electricity from waste by supporting domestic and community-based waste to energy plants among urban, rural population and institutions.
ii. Provide appropriate incentives for local manufacture of waste to energy plants and equipment, large scale production, storage and distribution.
iii. Undertake Research Development and Dissemination (RD&D).

Peat: Rwanda has extensive peat resources with an estimated 23-33 million dry tonnes of exploitable deposits, representing a technical potential of 121-161 MW of capacity. However, Peat mining and use for power generation has different sustainability challenges including; environmental impacts, vulnerability to climate change, limited resource availability and peat ash disposal. Some of these challenges have led to the existing peat-fired plants not performing at their installed capacity

Policy Actions:

i. Support hybrid power generation systems involving peat and other energy sources to manage the effects caused by the limited resource availability

ii. Promote research and capacity development for efficient peat power generation,
iii. Provide appropriate incentives to attract investments to capitalise on ash and the by-products of peat.

2.5.2. Electricity Access

Policy objective: Enhance access to sustainable, modern energy services for all Rwandans and ensure sustainable interconnectivity with neighbouring countries. This policy priority is reflected in political commitments and targets that Rwanda has made at the global, regional, and national level to provide universal access to electricity to all Rwandans. This objective will be achieved through a mix of Grid and Off Grid electrification. Separate objectives and actions for on-grid and off-grid access are detailed below.

Policy Action: Develop and update a least cost national electrification plan and Transmission and Distribution Power Masterplans.

a) On-grid access: Power Transmission and Distribution Network

Issue: Extension of transmission and distribution network is critical in achieving universal access to electricity through provision of reliable and sustainable grid power supply. The existing transmission and distribution network is facing various challenges including: power losses, limited availability of the power plants during the failure of the evacuation line, frequent voltage drops. This is mainly due to lack of proper rehabilitation, and maintenance, vandalism, aging infrastructure and limited investment in new transmission and distribution infrastructure. In addition, the Rwanda national grid is isolated from the transmission networks of the neighbouring countries creating a weak link for power trade.

Policy Objective: The main policy objective is to ensure access to affordable, reliable and sustainable power supply.

Policy Actions:

i. Timely investment in construction, rehabilitation and expansion of the transmission and distribution infrastructure;
ii. Enhance regional cooperation and trade in electricity, including investment in transmission network development, to further improve security of supply;
iii. Transmission and Distribution network reliability, quality and resilience;
iv. Reduction of power losses in transmission and distribution networks;
v. Develop least cost network expansion;
vi. Establish a framework to allow open access to distribution networks.
vii. Making electricity services more affordable and extending consumer credit for grid connection fees.
viii. Revise and upgrade the existing policy, legal, regulatory, institutional, and financial frameworks to support the rapid development of the grid electrification.
ix. Ensure access to electricity in all productive uses and social sites;

b) Off grid Electrification

Issue: Given the required investment and time to achieve universal access through grid connection, the government will leverage the use of off grid connection (Solar Home Systems and mini grids) to achieve this target. This will be done by targeting areas far from the grid and where the population is living in scattered areas. In addition, off grid deployment increases the footprint of renewable energies thus reducing emissions and further mitigation of climate change and health effects.

To implement this the government will partner with private sector in the dissemination of standalone solar home systems and development of mini grid systems. However, the off-grid subsector faces different challenges including: affordability; low quality of systems supplied and services, limited investment and inadequate legal and regulatory frameworks. Mini-grid developments in particular face high capital costs resulting in high tariffs, long payback times, low returns and limited availability of secondary markets for mini-grids assets.

Policy Objective: The main policy objective is to ensure access to affordable, reliable, sustainable power supply through either Standalone Systems or Mini grid systems to unserved/remoted area.

Policy Actions:

i. Create enabling environment for private developers of mini-grids by identifying eligible sites through clear national least cost electrification planning.
ii. Piloting new approaches and scaling up innovative partnerships to increase energy access through appropriate distributed renewable technologies;
iii. Increase flexibility and competition through measures to simplify licensing and increase the attractiveness for private operators to service the off- grid electricity market;
iv. Develop financial support mechanisms for off-grid service provision and consumption including productive use of electricity to include; agricultural processing and food service businesses, health facilities, schools
v. Establish a mechanism to allow low-income and vulnerable households to access modern energy services through off grid solution systems as a basic necessity.
vi. Establish legal and regulatory framework to regulate the off-grid sector.

2.5.3. Street Lighting

Issue: Street and public place lighting is a critical factor for providing a safe environment and effective movement of vehicular and pedestrian traffic at night and the discouragement of illegal and anti-social acts. It contributes to improved road safety, for both pedestrians and drivers, reduction in criminality in the cities and towns and also to improving the general business and living climate of urban and peri-urban areas. Lack of proper coordination and management of street lighting significantly contributed to inappropriate resource allocation as well as significant burden to electricity consumers through end user tariff non-conformity to appropriate standards.

Policy objective: To establish principles upon which street and public place lighting will be managed and maintained for safety of all road users, pedestrians and cyclists.

Policy Actions:

i. Develop a comprehensive strategy on the deployment of nation-wide street lighting, with guidelines on roles and responsibilities of central and local government, and a coordinated plan and financial mechanism for installation, operation and maintenance.

ii. Co-ordinate national and community street lighting initiatives to drive investments and fund maintenance to help achieve national street lighting goals

iii. Promote new technologies such as Smart-grid and Automation in new and existing street lights leading to optimized operation, energy efficiency and reduced CO_2 and other greenhouse gas emissions.

iv. Establish Standards, Minimum Performance Energy Standards and comprehensive regulatory framework governing street and public lighting in planning, installation, operation, maintenance, and mechanisms to promote security and prevent vandalism and theft.

2.5.4. Electric Mobility

Issue: The growing concern of the current transport system on environment and climate change issues requires the adaptation of electric mobility technologies to include: use of electric vehicles, electric trains, cable cars that use electricity.

Policy objective: To support the deployment of electric mobility in order to reduce carbon emissions by promoting use of different modes of electric mobility, reduce petroleum import bill, increasing domestic electricity demand and addressing urban air pollution.

Policy Actions:

i. Develop the required energy infrastructure to support the development of the e-mobility subsector

ii. Provide enabling environment for development of charging infrastructure in order to facilitate easy access of charging stations.

iii. Establish standards, guidelines and regulations governing electric mobility.

2.5.5. Tariffs and Security of Energy Infrastructure

a) Consumer tariffs

Issue: The price of electricity to consumers is high (for the region), but is currently not cost reflective and heavily subsidized. This is mainly attributed, to high cost of generation,

Policy Objective: The policy aims to achieve a sustainable transition to a cost-reflective, yet affordable electricity tariff.

Policy Actions:

i. Disaggregating tariffs by end-user categories in order to ensure that they fairly reflect the relative contributions to the cost base;

ii. Develop and establish electricity tariff methodology

iii. Ensure least cost planning for power generation and transmission and competitive procurement of electricity generation development;
iv. Increasing operational efficiencies and savings on the required revenues of the utility;
v. Ensure the tariff is regularly reviewed putting in consideration market dynamics;
vi. Reducing the long-run marginal cost of power generation through increased imports and exploitation of alternative technologies; and
vii. Implementing loss reduction and demand-side management programs to shave peak demand load and grid reserve margin requirements
viii. Incentivise manufacturing sector to manufacture electricity equipment and mitigate impact of currency fluctuation on tariff
ix. Increase local debt/ equity funding for both for power generation investments and on private players on competitive basis.

b) Security and relocation of Energy Infrastructure

Issue: Illegal power line connections of electricity can be dangerous to life and property due to the nature of its installation. These connections are installed by non-expert persons and some of the safety precautions are not followed through. Electricity theft is a problem for the electricity supply industry with huge consequences in loss of revenue.

Vandalism of power equipment has been related to social economic conditions. However, in the recent past years it is prevalent due to increased metals market demand and incidents targeting power infrastructure have escalated.

Policy Objective: To reduce/prevent the rise in electricity theft and illegal electricity connections

Policy actions:

i. Establish mechanism to fight against theft of electricity, illegal connections, relocation of utilities and any kind of vandalism of power infrastructure;
ii. Review and enforce legal provisions with respect to energy related offences in order to prevent the electricity theft and illegal power line connections;
iii. Establish regulations and standards assuring the security of power infrastructure;
iv. formalize connections, and adequate implementation of the revenue protection programme;
v. increased training/ capacity building for electricians and consumer awareness campaigns to increase safety of the energy infrastructure.

2.5.6. Autonomous Power Generation

Issue: Autonomous power generation at the premises of the consumer for their own consumption is explicitly allowed under the law, and can be a cost-effective approach for some applications. However, there is a need to ensure that growth in autonomous generation does not adversely affect other consumers, for example through inappropriate tariffs for back-up supply from the grid. There is also a need to incorporate private autonomous generation within the overall system planning to avoid a situation where it may cannibalise demand and adversely affect the economics of the public electricity system.

Policy Objective: To rationalise and clarify the role of private or self-generation power plants in the electricity system.

Policy Actions:

i. Establish regulatory framework for autonomous generation in accordance with the existing laws.

ii. Ensure the role and impact of autonomous generation is adequately included in power system planning to assess overall costs, benefits and long-term implications.

iii. Establish effective tariff structure that takes these costs and benefits into account

2.6. ENERGY EFFICIENCY AND DEMAND-SIDE MANAGEMENT

Issue: Rwanda has growing household and industrial demand for electricity, in a context of limited natural resources relative to other countries in the region. An important focus of the current policy is therefore on energy efficiency[14], energy conservation, and demand-side management activities. Fundamentally, it is cheaper to use energy more intelligently and efficiently than to meet demand by expanding energy production unnecessarily.

In addition, Rwanda has a pronounced peak demand load. This is a key cause of power disruptions, because the existing power reserve margin is low. It is also a key driver for new generation capacity investment. Measures that encourage efficient end-use technologies, sound and optimally timed energy consumption practices, and other demand-side management activities will play a critical role in shaving peak demand and maintaining the affordability and reliability of energy services.

Policy Objective: The policy objective of the energy efficiency and demand-side management is to constrain uncontrolled future energy consumption growth and to support realizing Rwanda's Green Economy vision.

Policy Actions:

i. **Adopt new laws, regulations and codes that mandate energy efficiency measures,** including an Energy Efficiency Law (to be incorporated in the Energy Law) as a framework to upgrade existing technical guidelines. Responsible institutions shall introduce measures to promote energy efficient lighting, new building codes, and provisions for energy-smart and energy-efficient technologies and practices. These will be aligned with other relevant strategies including the Rwanda National Cooling Strategy and Action Plan.

ii. **Develop a regional standards and labelling scheme for common appliances.** RSB in collaboration with RURA and MININFRA shall establish an ongoing working group to harmonize energy efficient labelling practices and standards for appliances sold and imported in Rwanda and the EAC to ensure that consumers are better informed of the energy performance of appliances that they purchase.

[14] Improving energy efficiency means using less energy to produce the same desired output.

iii. **Restructure electricity tariff methodology to incentivize efficiency:** A "demand charge" tariff component for all customers served through medium- voltage lines will be initiated to provide an incentive for industries to conserve power and shift consumption away from peak periods. Explore time of use tariffs for households to encourage electricity use (including electric cooking) at times of the day to flatten the national load curve.

iv. **Establish a demand-side management program or unit within the Utility** to undertake planning, monitoring and load management activities to reduce demand spikes and encourage end-users to shift consumption from peak times. This program shall also implement policies for reducing demand load under the direct control of the Utility.

v. **Encourage and incentivize energy audits** among commercial and industrial users to assess energy efficiency potential. MININFRA shall investigate a financing facility to incentivise audits and investing in the implementation of the audit recommendations.

vi. **Devise and implement "green" public procurement guidelines and strategies.** RPPA, REMA, and MININFRA shall collaborate to develop energy efficiency guidelines and sustainable procurement policies relating to their own energy use. These shall focus on equipment with a high-energy footprint such as use of LED and CFL lamps.

2.7. CLEAN COOKING AND HEATING

Biomass for cooking and water heating represents by far the largest use of energy in Rwanda, accounting for 93.4% of total energy demand in the country, making this one of the most urgent and important sectors to address in achieving a sustainable and modern energy system. In the medium-term, the policy vision foresees extensive technology transition among households, public institutions, and industries to modern energy technologies and carriers including ICS, biogas, electricity, LPG, "green charcoal", ethanol, and biomass pyrolysis stoves. Coordinated measures across multiple institutions and agencies are needed to achieve this. MININFRA will continue to provide technical assistance through REG Ltd to the districts. With support and guidance of MINALOC, district authorities will be required to incorporate delivery of sustainable energy technologies into their annual performance contracts in order to promote more ownership. Districts will play a pivotal role in education and awareness-raising, and the extension of government subsidy mechanisms and micro-finance schemes. MINALOC shall monitor district development plans more closely for meeting clean cooking targets and strategies. RSB shall elaborate updated national ICS standards with the support of REMA, MININFRA, and the private sector and other stakeholders**.**

Issue: Inefficient production and use of wood-fuels results 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. It also has an adverse impact on the health of wood-fuel users, especially in rural areas.

Policy Objective: Facilitate households' and institutions' transition from cooking and heating using traditional biomass towards modern efficient cooking technologies to achieve a more sustainable wood fuel demand and supply balance, and to deliver related social, health, and

environmental benefits.

Policy actions:

i. **Review and develop strategies and action plans** to increase access to cleaner cooking technologies, through capacity building and market transformation.

ii. **Address affordability** through social marketing/behavioural change, new business models and partnerships with financial institutions to address barriers presented by the fact that people are able to collect wood fuel and biomass residues at no cost.

iii. **Subsidy reform.** In cooperation with MININFRA, MINECOFIN shall reform the design, targeting and administration of subsidies for clean cooking technologies to improve the impact and scale-up potential of existing programs.

iv. **Improve coordination** of sustainable cooking energy programs across relevant institutions in order to accelerate delivery and improve impact, and strengthen monitoring of progress.

v. **Scale up use of cooking gas** by ensuring availability of storage facilities and last-mile distribution infrastructure for CNG/LPG cooking gas**.**

vi. **Updated standards** for different clean cooking technologies such as biogas digesters and installations and Improved Cook stoves shall be formulated and adopted according to ISO and IEC standards to increase consumer choice and affordability.

vii. **Integration of cooking gas infrastructure in building code.** Ensure review of building code to integrate centralised and semi-centralised cooking gas infrastructure.

2.8. PETROLEUM AND GAS

Rwanda's petroleum sub-sector covers upstream (petroleum exploration, development and commercial production) and downstream (transportation for crude and refined products, refining, storage, distribution and marketing) activities. Existing policies provide for; facilitation of investments to prove Rwanda's national resources using public funds; developing streamlining procedures for resource exploration and joint ventures; establishing legal, regulatory and licensing framework; developing technical standards and environmental management protocols; and opening up the market to greater competition. A Downstream Petroleum Policy was adopted by Cabinet in late 2012 and revised in 2021 giving guidance on the transportation, refining, storage, distribution and marketing of petroleum products.

Issue: The sub-sector is characterized by three main challenges: unreliable supplies and uneven product quality, insufficient storage and distribution capacity, and high exposure to global price volatility. Globally, petroleum exploration and development activities have become progressively more capital intensive, technologically complex, and environmentally sensitive. Thus, it is essential that national policies are aligned to international best practice to ensure international companies and investment partners with the right level of expertise operate in a manner that ensures environmental sustainability and mutually beneficial cooperation from the extraction of Rwanda's non-renewable mineral rents.

Policy Objective: To ensure safe, sufficient, reliable, sustainable and affordable supply of petroleum and LPG. This entails expanding domestic exploration and production, boosting

investments in supply and storage infrastructure, and promoting sound management of downstream resources and markets.

Policy Actions: The Rwanda Energy Policy reinforces the implementation of existing sub-sector policies through the following actions:

i. Accelerate regional cooperation and strategic infrastructure development;
ii. Ensure adequate storage infrastructure to maintain appropriate strategic reserve levels for all Petroleum products (including automotive gas oil, premium motor spirit, jet fuel and LPG);
iii. Establish standards for different petroleum products;
iv. Improve LPG market and distribution infrastructure.
v. Conduct regular assessments to determine demand for strategic storage infrastructure capacity increase.

PART C: OBJECTIVES AND ACTIONS ON CROSS-CUTTING ISSUES

2.9. CAPACITY BUILDING

Issue: Vision 2050 calls for the creation of a Knowledge Based Economy built upon continuous upgrading of skills. Lack of institutional and technical capacity is a bottleneck to economic growth and achieving the sector vision under the Energy Policy.

Policy Objective: Build sustainable national capacity throughout the energy sector in both the private sector and across the government agencies.

Policy Actions:

i. Develop clear strategies and operational guidelines on skills development, transfer, utilization, and retention in line with MININFRA's Capacity Development Strategy to support sector development plans.
ii. Collaborate with responsible institutions to adopt and align curricula development in higher learning institutions and TVETs to the sector strategy and workforce gaps.
iii. Promote local content development in all aspects of energy sector operations where it is beneficial to Rwanda.

2.10. REGIONAL AND INTERNATIONAL COOPERATION

Issue: Cooperation and integration with regional and international economic partners create opportunities to improve energy security, address common sector challenges, reduce energy costs, sharing best practices in energy management.

The Policy Objective: Optimize benefits accruing from participation in regional and international integration of energy resources.

Policy Actions:

i. Support regional and continental initiatives and investments for integrating energy infrastructure to maximize benefits accruing from exploitation of energy resources and power trade;

ii. Facilitate international cooperation in education, research, exchange of energy data and capacity development in the Energy Sector.

2.11. ENERGY DATA COLLECTION AND STATISTICS

Issue: Although proper data systems are costly, good data is required for energy policy formulation, integrated energy planning, capacity development and for guiding decision making for energy development programs.

Policy objective: Establish and maintain an efficient energy sector data and information system.

Policy Action:

i. Establish an energy sector management information system or depository that can serve as a central mechanism for integrated energy data collection, management and dissemination. This system can be used as a key input to energy sector planning and models that take into account all available energy resources and primary consumption patterns to match investments with future demand.
ii. Enhance the capacity of the responsible institutions to collect, maintain and disseminate energy data.

2.12. ENERGY STANDARDS

Issue: Energy standards are critical in management of the different elements of energy sector ranging from electricity generation, transmission and distribution, clean cooking, energy efficiency petroleum and gas distribution.

Policy Objective: Develop energy standards to ensure; value for money, quality, safety and health of consumers of energy services, interoperability of energy systems, sustainability and seamless operation of electricity networks.

Policy Actions: To achieve the above objective, the government shall;

i. Promote stronger public awareness-raising to inform target audiences of existing energy technologies and standards
ii. Support the development of energy standards
iii. Strengthen institutional capacity in monitoring and enforcement of energy standards

2.13. RESEARCH, DEVELOPMENT AND TECHNOLOGICAL INNOVATION

Issue: Energy-related research and development in Rwanda has been at very low levels, and most energy technology is imported (e.g., up to 80% of all power related equipment, such as turbines for hydro projects). This can be addressed by investing in scientific and technological infrastructure to develop appropriate energy technologies, efficiency measures, and locally appropriate guidelines for sustainable resource extraction and development.

Policy objective: Promote research, development, technological transfer and innovation in the energy sector.

Policy Actions:

Collaborate with relevant government and other responsible agencies including academia to enhance cooperation on practical energy research and technological innovation matters;

i. Encourage private sector, academic institutions and CSOs to undertake research in developing and adopting new energy technologies to inform future investment decisions, especially related to cleaner energy resources;
ii. Promote industrial training and practical skills related to energy through technical and vocational colleges as well as through practical pupillage programs;
iii. Develop specific mechanisms to encourage more academics and researchers, particularly in the higher education sector, to focus their research on topics aligned with national energy priorities.

2.14. ENERGY SECURITY AND DISASTER MITIGATION

Issue: Progress has been made over the years to ensure energy security. However, the sector still needs to ensure electricity demand-supply balance, address the high cost of power generation, and vulnerability to climate change. In addition, there are vulnerabilities to petroleum and gas supply shocks due to the fact that Rwanda is a net importer of both fuels. Such shocks may result into economic, political and social instability.

Policy Objective: Ensure energy security and reduce disaster related effects on energy supply infrastructure and resources.

Policy Actions:

i. Promote energy security through development of domestic energy resources and strengthened regional energy trade;
ii. Diversify the energy mix (including power generation portfolio) to decrease reliance on any one single resource;
iii. Boost domestic power production capabilities to keep power imports to within a reasonable range to mitigate supply risk linked to political insecurity or technical system failures beyond Rwanda's control;
iv. Ensure sufficient level of energy commodity reserve stocks or capacity;
v. Improve the preparedness for, and resilience to, market shocks and price spikes;
vi. Ensure consistent availability of public funds committed to co-finance major energy infrastructure projects with the private sector, as part of financing plans and strategies;
vii. Gradually reduce reliance on external development partner contributions to be more self-reliant;
viii. Reduce vulnerability of energy system to potential severe natural disasters by conducting vulnerability assessments.

2.15. INTEGRATED PLANNING

Issue: The energy sector is complex encompassing diverse forms and carriers. It is therefore important that clear linkages and investment strategies are made through integrated planning processes, both within the energy sector and linked to other sectors. Though progress has

been made in this regard, more is still required to improve on coordination in terms of planning and implementation of energy sector projects and programmes. Improved integrated planning processes will create positive synergies and economies of scale between new infrastructure investments and minimize unnecessary costs.

Policy Objective: Promote inter-sectoral and cross-sectoral consultative energy planning and power utility reforms.

Policy Actions:

i. Ensure development and alignment of energy master plans, programmes and projects with other sectoral plans.
ii. Ensure new investments in the electric power sector are in line with a least-cost power development plan. Supply levels shall be matched to sound demand forecasts, taking into account reserve margin requirements, regional trading opportunities, flexibility to meet demand shocks, and strategies for industrialization, agro-processing, and urbanization.
iii. Ensure synergy in data sharing and management between government departments, agencies and other stakeholders to inform energy planning processes.

2.16. LAND AND RIGHT OF WAY

Issue: To develop new energy infrastructure, it is essential to have clear laws and regulations governing the occupancy of the land under right of way. This includes the buffer zones for energy infrastructure (including transmission and distribution lines, substations, power plant, petroleum and gas storage facilities) and payment of compensation to persons affected by the projects.

The policy objective is to establish clear direction and efficient management of rights of way and buffer zones for installed, under construction and non-developed areas on over-ground and underground energy infrastructure.

Policy Actions:

i. Ensure land acquisition for energy infrastructure development is conducted in accordance with the relevant laws and regulations including the National Land-Use and Development Master Plan, and the expropriation law.
ii. Ensure measures for safety and protection from health hazards within the right of way.
iii. Establish laws, regulations, and guidelines prescribing or updating preventive measures to be adhered to in the protection of right of way of energy infrastructures

2.17. ENVIRONMENT, SOCIAL, HEALTH AND SAFETY

Issue: Exploitation of energy resources can lead to severe impacts on the environment and may result in greenhouse gas (GHG) emissions. Climate change can have a severe impact on energy security including supplies of biomass and electricity. For example, hydropower resource (most dominant source for power generation) is sensitive to the amount, timing, and geographical patterns of precipitation and temperature. In addition, development of energy projects and utility operations are associated with various health and safety risks.

Project Objective: Enhance environment, health and safety management in energy sector related activities.

Policy Actions:

i. Enforce national environmental, social, health and safety standards and laws governing the Energy Sector
ii. Meet international energy commitments including Rwanda's Nationally Determined Contributions (NDCs) under the UNFCCC.
iii. Strengthen institutional capacity in monitoring and enforcement of laws and regulations on safety, occupational health and environmental management.
iv. Mainstream ecosystem and biodiversity management in energy sector by ensuring all electrical systems are disposed in an environment friendly manner.
v. Ensure compliance with international standards for nuclear plant siting, construction, operation, decommissioning and waste management to ensure proactive preventive approach to managing the environmental, health and safety risks.
vi. Harmonize approaches to climate technology transfer and adoption with the existing national and international commitments on environment and Climate Change.

2.18. GENDER MAINSTREAMING IN THE ENERGY SECTOR

Issue: Energy issues are of concern to all. However, women are some of the most important actors in the energy sector, in terms of their contact, use and management of renewable energy sources, which in their very crude or primary form are used mostly by women. Biomass (primarily wood fuel and charcoal) constitutes 66% of the total energy consumed in Rwanda. The negative health impacts of indoor air pollution from traditional biomass fuels on women, girls and babies remain a critical issue.

Policy Objective: To mainstream these gender concerns in the energy sector and align them with proper health, safety and environmental standards.

Policy Actions:

i. Ensure employment and training opportunities in the Energy Sector are based on gender equality and equity
ii. Promoting gender-based schemes for enhancing women participation and ownership of RETs
iii. Facilitate formation of women groups to participate in provision of goods and services required in the Energy Sector,
iv. Address knowledge gaps in gender and energy, through research and advocacy programs and providing information support to improve women's access to energy services in Rwanda;
v. Incorporate meaningful roles to women in the planning, design and execution of energy programs, including those relating to energy efficiency and conservation;

CHAPTER THREE: STRATEGIC, LEGAL, REGULATORY AND INSTITUTIONAL FRAMEWORK

The Rwanda Energy Policy is a framing document that sets out the overall long-term vision and goals for the energy sector, as well as specific objectives and actions at sub-sector level. It is closely aligned to the medium-term goals, as set out in Annex III. This section describes the wider framework that underpins implementation of this Policy. This includes a set of more detailed strategy and planning documents (Section 3.1), laws and regulations (Section 3.2), and the institutional roles and responsibilities for implementing the policy (Section 3.3).

3.1. STRATEGIC PLANNING FRAMEWORK

The key strategy document underpinning implementation of the Rwanda Energy Policy is the Energy Sector Strategic Plan (ESSP). The ESSP is a focused action plan that measures short-term progress toward long-term goals and objectives. It also takes into account anticipated resource constraints and risk/uncertainties in the implementation strategies. Falling underneath the ESSP, and in parallel to the least cost power development plan, sub-sector implementation Action Plans owned by the relevant ministries (and generally not subject to Cabinet approval) shall be elaborated. These shall be developed for seven priority areas in the electricity sub-sector, including: hydropower, methane gas, geothermal, bioenergy, solar power, peat and efficiency and demand-side management. The action plans shall be aligned to the overall policy.

Other key energy policy and strategy documents include:

- Biomass Energy Strategy (2019), setting out a sustainable path to clean cooking
- Rural Electrification Strategy (2016), setting out the pathway to achieving national electricity access targets
- Energy Efficiency strategy (2019)
- Downstream Petroleum Policy (2021)

3.2. LEGAL AND REGULATORY FRAMEWORK

Rwanda has a clear legal and regulatory framework for the energy sector as detailed in **Annex III.** This includes laws, regulations and technical guidelines on the electricity, petroleum, biomass and energy utilisation sub-sectors, as well as covering cross cutting issues. This framework plays a fundamental role in boosting investors' confidence in Rwanda and attracting more private sector operators. The action agenda for strengthening the legal and regulatory framework to align with the policy includes revising current legislation and putting in place new laws, regulations, and technical guidelines and standards. This includes potential new laws specific to promoting renewable energy and energy efficiency. Consolidation and integration of various laws and regulations into a unified energy law shall be pursued. New legislation shall be benchmarked with other East African countries, and attempts made to harmonize regional frameworks wherever possible.

3.3. INSTITUTIONAL FRAMEWORK

Given the complexity of the sector and its diverse resource base, the mandate of developing the sector is shared across multiple institutions. There is continuous need and efforts to streamline the institutional framework to enable integrated resource planning and support improved inter and intra institutional decision-making, avoiding duplication of efforts. The following table outlines the key institutions and their respective roles. Their responsibilities in relation to specific energy sector objectives are elaborated in Annex II.

Institution	Energy Sector Role / Responsibility
Ministry of Infrastructure (MININFRA)	Lead Ministry responsible for developing energy policies and strategies, and for monitoring and evaluating projects and program implementation. In charge of setting an enabling policy and legal framework for the sector, including a suggested general approach to the optimal use of state subsidies in the sector, budget preparation, resource mobilization (together with MINECOFIN), and political oversight over government programs designed to expand energy access and service provision. Also, in charge of developing and managing petroleum related infrastructure.
Ministry of Finance and Economic Planning (MINECOFIN)	Leads on resource mobilization to support energy investment and related financing requirements. MINECOFIN ensures the fiduciary framework to manage grants, loans, and other concessional finance from development partners.
Ministry of Trade and Industry (MINICOM)	Oversees the downstream petroleum subsector, including the downstream petroleum policy, establishing and developing petroleum-related legislation, setting the strategic reserve requirement, and creating an enabling environment for petroleum products trade.
Ministry of Environment (MoE)	Ensures the conservation, protection and development of the environment in compliance to the national environment policy and law.
Ministry of Education (MINEDUC)	Builds the competency and human resources base for sector development and helping to link sector policies and strategies to research, technology development, and innovation.
Ministry of Local Government (MINALOC)	Coordinates implementation of discrete enabling policies to drive local economic transformation, maintaining the district's energy infrastructure, and decentralized / grassroots service delivery.
Ministry of Foreign Affairs and International Cooperation (MINAFFET)	Follows commitments signed by Rwanda on energy programs and projects to ensure Rwanda and Partner States deliver on them. The Ministry advocates on energy-related government positions and interests in regional meetings and forums.
Ministry of Emergency Management and	Leads government efforts in averting and management of energy security and disaster-related effects on energy supply infrastructure and resources
Rwanda Atomic Energy Board (RAEB)	Accelerates nuclear development in food and agriculture, health, electricity generation, pharmaceuticals and biotechnology, industry, environment, geology and mining. Promotes and supports the peaceful use of nuclear

	energy including construction and maintenance of nuclear energy installations.
Rwanda Mines, Petroleum and Gas Board (RMB)	Manages the upstream development of petroleum and gas resources and the development of mineral sector including those used in energy and electricity generation such as peat and coal.
Rwanda Water Board (RWB)	Ensures availability of sufficient well managed water resources for sustainable development including conserving, protection and management of water resources for reliable hydro power supplies.
Rwanda Development Board (RDB)	Leads investment mobilization and promotion for the energy sector, acting as a gateway and facilitator including local financial institutions and foreign direct investment. RDB also issues Environmental Impact Assessments and is expecting to also host a centralized agency for PPPs across government.
Rwanda Utilities Regulatory Authority (RURA)	Ensures consumer protection from uncompetitive practices while ensuring that such utilities operate in an efficient, sustainable, and reliable manner. Mandate extends to public utilities involved in renewable and non-renewable energy, electricity, industrial gases, pipelines and storage facilities, and conventional gas extraction and distribution. RURA also enforces the electric grid code, ensuring quality of service standards for power, assessing and reviewing energy tariff structures, licensing power generation, transmission, and distribution companies as well as retail petroleum filling stations and related storage facilities. RURA is also mandated to develop regulatory tools about electricity and licensing electricity trade -domestic and international (import and export), establishing the tariff methodologies and setting the end-user tariff, and reviewing and approving PPAs.
Rwanda Energy Group Ltd (REG Ltd)	Translates energy sector policies and programs into the implementation of tangible projects, and to efficiently operate and maintain the country's power generation, transmission and distribution systems.
National Industrial Research Development Authority (NIRDA)	Leads research on energy mix to feed the growing industries and provision of the necessary information after thorough research on which industries employ clean efficient energy needs.
Rwanda Environment Management Authority (REMA)	Coordinates, oversees and implements environmental policy. Generally speaking, all infrastructure development is subject to environmental impact assessment. REMA is mandated to enforce environmental compliance in the development of energy resources.
Rwanda Standards Board (RSB)	As an agency under the Ministry of Trade and Industry, RSB develops national technical regulations including national technology and performance standards. RSB plays an increasingly important role in establishing, publishing, and disseminating national standards for energy technologies such as biogas digesters and solar appliances.
National Commission of Science and Tech. (NCST)	NCST with aid from higher institutions of learning, will continue to oversee the scientific tools and provide modern necessary technology to be employed in the energy sector.

CHAPTER FOUR: POLICY MONITORING AND IMPLEMENTATION PLAN

The Rwanda Energy Policy will ensure high-level ownership and institutional co-ordination to achieve the Vision 2050 goals and targets. An overview of the institutional division of responsibility is set out in the Policy Implementation Matrix provided in **Annex I.** This demarcates clear lines of institutional accountability and demonstrates the political will behind the process of energy sector development and increasing private sector participation.

MININFRA shall regularly monitor and evaluate the implementation of the policy so as to ensure its benefits reach all Rwandans. They will oversee government-wide policy implementation and enforcement, while helping to continually refine guidelines and processes to promote integrated energy planning. In this regard, they will regularly monitor and engage with other Ministries and agencies listed in the Policy Implementation Matrix.

High level oversight of policy implementation will be the mandate of the Economic Cluster under the Chairmanship of MINECOFIN, and if necessary, the PS Forums shall be used to raise awareness of areas where policy implementation is lagging. Additional technical working groups and subsector coordination mechanisms will be established under the Energy Sector Working Group (SWG) to ensure dialogue and awareness of the key policy objectives among key stakeholders such as MINECOFIN, REG Ltd, RDB, RURA, MoE, RSB, and representatives of private sector chambers or associations. The SWG will support MININFRA in policy monitoring, evaluating progress against sector performance and intended policy outcomes. This may include initiating and/or endorsing impact evaluations and interim policy reviews in conjunction with regular performance assessments against sector delivery targets.

The financial implications of this policy are complex, since it involves an array of institutions and a number of measures that are both already budgeted, as well as new measures. The ESSP estimates that roughly US$ 4 billion is required to finance Rwanda's energy goals over five years. MININFRA has elaborated an extensive draft Medium Term Expenditure Framework for negotiation with MINECOFIN which fully incorporates all elements envisioned in the policy and strategy, disaggregated by energy sub-sector.

An appropriate mix of financing resources will be used to implement the policy and strategy. To reach sector targets, significant levels of new private sector investment are required. This will be leveraged through strategic public investments in upstream resource and project development activities, as well as through risk reduction tools. Among intended investment risk mitigation strategies include the provision of sovereign guarantees for those projects deemed absolutely necessary to support strategic infrastructure by MININFRA and the RDB Strategic Investment Unit.

In addition, as outlined in the Investment Code, a number of new measures shall be instituted to enhance the attractiveness of investors to fund energy projects, and energy is treated as a strategic sector. It is assumed that many energy projects in Rwanda will require a minimum amount of 30% equity, with the balance raised between commercial and concessional debt as well as grant funding, whether up front or paid upon delivery of predetermined output results.

Wherever possible, climate finance mechanisms will be drawn upon to co-finance appropriate financing structures for specific investment projects and major government programs in the sector. Increased engagement between policy makers and domestic banks, pension funds, and insurance companies will be pursued in order to identify promising areas for domestic capital investment growth. A more detailed financing strategy for the implementation of the policy is elaborated in the ESSP.

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Annex I: Policy Implementation Plan and Cost

Pillar	Policy action	Unit	Baseline	Targets		Estimated Budget (2035) (Bn Rwf)
			2023/24	2029/30	2034/35	
Electricity Generation	**Policy objective:** To ensure sufficient, reliable, sustainable and more affordable power supply, and improve security of supply to meet demand.					
	Periodic review of the Least Cost Power Development Plan to ensure supply is closely aligned to projected demand and investment power generation road map and master plan	No of least cost plan reviews	1	5	5	2
	Hydro Power					
	Develop hydro power projects (regional, national, multipurpose and micro) to increase electricity generation capacity.	MW of hydro power added	148	Nyabarongo II HPP (45 MW) Muvumba (2MW) Micro Hydro (34MW)	Rusizi III (68 MW) Rusizi IV (95MW) Nsongezi 12MW	1,024
	Rehabilitate and upgrade existing hydro power plants	Number of existing HPP rehabilitated	ToRs for feasibility study on rehabilitation of Ntaruka	Ntaruka HPP (9.9MW) Rusizi II (12MW) Nshili (0.4MW)	Mukungwa (12 MW) Nyabarongo I(28MW)	62.3
	Solar					

Pillar	Policy action	Unit	Baseline	Targets		Estimated Budget (2035) (Bn Rwf)
			2023/24	2029/30	2034/35	
	Develop solar power plants to increase electricity generation capacity	MW added	12.05	30	20	100
	Wind					
	Conduct feasibility study on development of wind energy resources for electricity generation	Level of progress of wind resource assessment	Rwanda resource assessment 2022	Wind atlas map is updated and Wind feasibility study is conducted		0.5
	Develop wind power plants to increase electricity generation capacity	MW	0	0	15	15
	Geothermal					
	Conduct geothermal resource assessment to manage the geothermal exploration risk and attract investors	Number of geo study assessments conducted	Rwanda resource assessment 2022	1	1	3
	Conduct geothermal exploration studies	Number of exploration studies conducted	Ongoing exploration studies in Bugarama, Karongi ,Rubavu	30	30	60
	Methane Gas					

Pillar	Policy action	Unit	Baseline	Targets		Estimated Budget (2035) (Bn Rwf)
			2023/24	2029/30	2034/35	
	Develop methane Gas resources to increase electricity generation capacity	MW	82.4	28	10	218
	Waste to Energy					
	Conduct feasibility studies for the generation of electricity from waste	Level of study development	Rwanda resource assessment 2022	Feasibility study conducted	Monitor implementation of the study	0.5
	Develop waste to power plants to increase electricity generation capacity	MW added	0	0	15MW	80
	Peat					
	Develop Peat to power plants to increase electricity generation capacity	MW added	85	Maximise production capacity of existing peat to power plants		IPP
	Conduct a sustainability study on existing peat power plants and use of alternative sources of energy to power peat plants.	Level of progress of the study	Peat resource assessment conducted	Sustainability study conducted	Sustainability study reviewed	0.3
	Nuclear					
	Feasibility study on power plant development	Level of progress of the study	Pre-feasibility for Nuclear Power Plant	Feasibility Study for Nuclear Power Plant		5.3
	Develop Nuclear powered plants to increase generation capacity	MW	0		110 MW	1,000
	Hydrogen					

Pillar	Policy action	Unit	Baseline	Targets		Estimated Budget (2035) (Bn Rwf)
			2023/24	2029/30	2034/35	
	Conduct feasibility study on the development of hydrogen technology	Level of progress of the study	Terms of Reference	Feasibility Study for Hydrogen Power Plant Conducted		0.5
	Pilot Hydrogen to power technology utility scale project	MW	0		10 MW	30
Cross cutting issues	**Consumer Tariffs**					
	Policy Objective: The policy aims to achieve a sustainable transition to a cost-reflective, yet affordable electricity tariff					
	Conduct regular tariff review to consider market dynamics	Number of tariff reviews conducted	2020	2	2	
	Develop and establish electricity tariff methodology	Level of development	2021 Draft	Electricity tariff methodology available	Electricity tariff methodology available	0.8
	Security and relocation of Energy Infrastructure					
	Policy Direction/ Objective: To reduce /prevent the rise in electricity theft, illegal electricity connections, vandalism and destructions during relocation					
	Establish mechanism to fight against theft of electricity, illegal connections. relocation of utilities and any kind of vandalism of power infrastructure;	Progress	Ministerial Instructions on protection and relocation of utilities developed	Revised energy law integrates stringent measures on theft and vandalism of electricity infrastructure	Review of the Ministerial Instructions on protection and relocation of utilities	NA

Pillar	Policy action	Unit	Baseline	Targets		Estimated Budget (2035) (Bn Rwf)
			2023/24	2029/30	2034/35	
	Establish regulations and standards assuring the security of power infrastructure	Progress	Existing Grid Code	Review of the existing Grid Code	Review of the existing Grid Code	0.5
	Increase training/ capacity building for electricians and consumer awareness campaigns to increase safety of the energy infrastructure.	Number of capacity building trainings and awareness campaigns conducted	Energy sector Capacity Building Plan	5	5	1
	Autonomous Power Generation					
	Policy Objective: To rationalize and clarify the role of private or self-generation power plants in the electricity system.					
	Establish regulatory framework for autonomous generation	Progress on establishing regulatory framework	2022 Revised energy policy and law	Regulation on autonomous generation established	Review of regulation governing autonomous generation	NA
Electricity Access	**Policy objective:** Enhance access to sustainable, modern energy services for all Rwandans and ensure sustainable interconnectivity with neighboring countries.					
	Develop and periodically update a national electrification plan	Progress	2024 update	2	2	2
	On-grid access: Power Transmission and Distribution Network					
	Policy Objective: The main policy objective is to ensure universal access to affordable, reliable and sustainable power supply.					
	Extend electricity network to provide access to household through grid connection	% of HHs connected to grid	55.9 %	80%	99%	1,500

Pillar	Policy action	Unit	Baseline	Targets		Estimated Budget (2035) (Bn Rwf)
			2023/24	2029/30	2034/35	
	Implement a Least Cost Transmission and Distribution network expansion.	Km of HV added	1,158km	1,631Km	1,835.11Km	276
	Revise and upgrade the existing connection policy frameworks to support the rapid development of the grid electrification	Number of reviews	2017 connection policy	Review connection policy		0.3
	Provide electricity access to productive uses and social sites	% connection of PUAs	96%	100%	100%	
	Off-grid					
	Policy Objective: The main policy objective is to ensure access to affordable, reliable, sustainable power supply through either Standalone Systems or Mini grid systems to unserved/remoted area.					
	In collaboration with private sector, provide electricity access to households through off grid connection (stand-alone solar and mini-grid systems	% HHs connected through off-grid	23%	20%	1%	10
	Establish legal and regulatory framework to regulate the off-grid sector and attract more private sector investment	Progress	Simplified Licensing Framework 2019; Ministerial guidelines on mini-grids and stand-alone solar home systems	Review of licensing framework and ministerial guidelines	Review of licensing framework and ministerial guidelines	0.3
	Develop financial support mechanisms for the of off-grid sub-sector	Progress	REF established under BRD 2017	Monitor implementation		

Pillar	Policy action	Unit	Baseline	Targets		Estimated Budget (2035) (Bn Rwf)
			2023/24	2029/30	2034/35	
Street lighting	**Policy objective:** To establish principles upon which street and public place lighting will be managed and maintained for safety of all road users, pedestrians and cyclists.					
	Install streetlights on National and District main roads with street lights	No. of Kms of street lights installed	2,227.62 Km	3,237Km	3,738km	11
	Develop and implement a comprehensive strategy on the deployment of nation-wide street lighting	Progress on strategy development	Terms of reference available	Streetlight strategy available Review the street lighting strategy	Review the street lighting strategy	0.6
	Develop and implement guidelines for coordination and management of streetlight.	Progress on development of guidelines	Terms of reference available	Guidelines available	Review and monitor implementation	
Electric Mobility	**Policy objective:** To support the deployment of electric mobility in order to reduce carbon emissions by promoting use different modes of electric mobility, reduce petroleum import bill, increasing domestic electricity demand and addressing urban air pollution.					
	Develop and implement the electric charging infrastructure masterplan	Progress of study	Strategic paper on electric mobility adaptation in Rwanda	Electric mobility charging masterplan available	Review and scale up masterplan implementation	1.2

Pillar	Policy action	Unit	Baseline	Targets		Estimated Budget (2035) (Bn Rwf)
			2023/24	2029/30	2034/35	
	Establish standards, guidelines and regulations governing electric mobility.	Progress	Strategic paper on electric mobility adaptation in Rwanda	National guidelines and regulations governing electric mobility developed Standards for electric charging infrastructure adopted	Review guidelines and standards	0.5
Energy Efficiency and Demand-Side Management	**Policy Objective:** The policy objective of the energy efficiency and demand-side management is to constrain uncontrolled future energy consumption growth and to support realizing Rwanda's Green Economy vision					
	Adopt new laws, regulations and codes that mandate energy efficiency measures	Level of development	Draft law on energy efficiency and renewable energy	Energy law adopted to include energy efficiency	Monitor implementation of the law	
	Develop a regional standards and labeling scheme for common appliances	Level of progress	Regional standard and labelling scheme for lighting adopted	Regional standard for industrial motors and other common appliances adopted	Regional standard for common appliances adopted	0.8
	Develop guidelines on energy audit	Implementation progress	EE strategy	Energy Audit guidelines developed	Monitor implementation of energy audit guidelines	0.3
	Encourage and incentivize energy audits	Progress on establishment of	Study on the establishment of super energy service company	Super ESCO established	Review performance of super ESCO and EE investments	1
	Conduct capacity building and awareness on energy efficiency audit	Implementation progress	EE strategy	Develop and adopt curriculum for EE audit and train certified auditors	Review and monitor implementation	1.5

Pillar	Policy action	Unit	Baseline	Targets		Estimated Budget (2035) (Bn Rwf)
			2023/24	2029/30	2034/35	
	Loss reduction in the National Grid (Commercial and Technical)	Percentage loss reduction	18.9%	14.70%	12%	
Clean Cooking and Heating	**Policy Objective:** Facilitate households' transition from cooking and heating using traditional biomass towards modern efficient cooking technologies to achieve a more sustainable wood fuel demand and supply balance, and to deliver related social, health, and environmental benefits.					
	Dissemination of clean cook stoves to increase number of households and institutions accessing clean cooking systems	% household using clean cooking technologies and fuels	32%	80%	100%	611.5
		No. of institutions using clean cooking technologies	TBD	100%	100%	
	Improve coordination of clean cooking subsector	Level of progress	Assessment report on establishment of clean cooking delivery unit	Establish dedicated unit for clean cooking	Evaluate performance of clean cooking unit	10
	Review and develop strategies and action plans to increase access to cleaner cooking technologies,	Level of progress	Biomass strategy available LPG Penetration masterplan available	Review Clean Cooking strategy	Review Clean Cooking strategy	0.8
				Develop clean cooking masterplan	Review Implementation of clean cooking master plan	0.8
	Develop guidelines and standards to regulate the cooking subsector.	Implementation progress	Ministerial guidelines on clean cooking adopted Standards for clean cooking stoves available	Review standards and guidelines	Review standards and guidelines	NA

Pillar	Policy action	Unit	Baseline	Targets		Estimated Budget (2035) (Bn Rwf)
			2023/24	2029/30	2034/35	
	Conduct awareness campaigns and capacity building	Number of awareness campaign	1 countrywide campaign	5	5	5
		No. of capacity building trainings conducted	0	5	5	10
Petroleum and Gas	**Policy Objective:** To ensure safe, sufficient, reliable, sustainable and affordable supply of petroleum and LPG. This entails expanding domestic exploration and production, boosting investments in supply and storage infrastructure, and promoting sound management of downstream resources and markets.					
	Petroleum strategic reserves increased to cover three months' supply	Storage capacity in millions of liters	117.5	230	299	112
	LPG strategic reserves increased to cover three months' supply	storage capacities in metric tones	1.5	24	48	117
	Conduct assessment on demand growth for petroleum product strategic stocks	Level of progress	Energy policy and downstream petroleum policy	Demand assessment report for petroleum infrastructure strategic storage infrastructure	Review of Demand assessment report for petroleum infrastructure strategic storage infrastructure	0.8
Total Estimated Cost						**5,281.7**

Annex II: Institutional Responsibility Matrix

Symbols:

⊙: Lead Institution

◆: Stakeholders

	MININFRA & Agencies	REG Ltd	MINICOM	MINECOFIN	RURA	RDB	MoE	REMA	RSB	RICA	MINEDUC	MINAFFET	MIGEPROF/ GMO	NCST	MINALOC	MINIJUST	MINISANTE	MINEMA	MINICT	RPPA	RMB
General/Cross Cutting																					
Build sustainable national capacity throughout the entire energy sector in both the private sector and across the government agencies	⊙	◆			◆	◆			◆		◆			◆							
Optimize benefits accruing from participation in regional and international integration of energy resources	⊙	◆		◆		◆						◆									
Establish and maintain an efficient energy sector data and information system	⊙	◆												◆					◆		
Develop energy standards to underpin NEP goals	◆		◆						⊙												
Enforcement of energy standards and regulations		◆			◆					◆											
Promote research, development, technological transfer and innovation in the energy sector	◆	◆			◆	◆	◆				◆			⊙					◆		
Ensure energy security and reduce disaster related effects on energy supply infrastructure and resources	◆	◆		◆			◆											⊙			

	MININFRA & Agencies	REG Ltd	MINICOM	MINECOFIN	RURA	RDB	MoE	REMA	RSB	RICA	MINEDUC	MINAFFET	MIGEPROF/ GMO	NCST	MINALOC	MINIJUST	MINISANTE	MINEMA	MINICT	RPPA	RMB
Promote inter-sectoral and cross-sectoral consultative energy planning and power utility reforms	◆	⊙		◆																	
Establish clear direction and efficient management of Rights of Way and Buffer Zones for energy infrastructure	⊙	◆			◆											◆					
Enhance environment, health and safety management in energy sector related activities	◆	◆					◆	⊙									◆	◆			
Mainstream gender issues in the Energy Sector	◆	◆											⊙								
Electricity Supply																					
To improve security of supply to meet demand	◆	⊙																			
Achieve a sustainable transition to a cost-reflective, yet affordable electricity tariff	◆	⊙		◆	◆																
To reduce /prevent the rise in electricity theft and illegal electricity connections	◆	⊙														◆					
Allow autonomous private self-generation if need be to ensure access to electricity in areas not served by the national grid	◆	◆			⊙																
Electricity Access																					
Ensure all households have access to affordable, reliable and sustainable power supply through a combination of grid, mini-grid and standalone	◆	⊙			◆										◆						

	MININFRA & Agencies	REG Ltd	MINICOM	MINECOFIN	RURA	RDB	MoE	REMA	RSB	RICA	MINEDUC	MINAFFET	MIGEPROF/ GMO	NCST	MINALOC	MINIJUST	MINISANTE	MINEMA	MINICT	RPPA	RMB
systems																					
Establish principles for deployment and management of street lighting	⊙	◆		◆	◆										◆						
Promote use of different modes of electric mobility	⊙	◆					◆												◆		
Clean Cooking and Heating																					
Facilitate households transition from cooking and heating using traditional biomass energy technologies towards modern biomass energy technologies and cleaner fuel heating alternatives	⊙	◆					◆	◆	◆					◆			◆		◆		
Energy Efficiency and Demand-side Management																					
Constrain uncontrolled future energy consumption growth to support Rwanda's Green Economy vision	◆	⊙		◆	◆		◆														
Petroleum and Gas																					
Ensure safe, sufficient, reliable, sustainable and affordable supply of petroleum and LPG	◆	◆	⊙		◆			◆							◆						◆

Annex III: Prevailing Legal and Regulatory Framework

Energy sector activities and investments are governed by a set of stand-alone laws and regulations specific to individual subsectors covering the exploitation, utilization, and sales of energy resource. The general legal framework or hierarchy includes several national laws that are indirectly applicable to activities in the energy sector, laws specific to a particular energy sub-sector, regulations in force for a particular sub-sector, as well as technical guidelines, codes, and standards in place that may or may not be legally binding. A high-level overview of the key laws and regulations applicable to each of these sub-sectors is provided below. It is not intended to be an exhaustive inventory, but rather a tool to inform decision-makers, investors, and researchers on the key legal and regulatory frameworks that shape governmental policy, program implementation, and investment incentives.

The principle laws and related regulations connected to the exploitation and use of Rwanda's energy resources comprise the Law on Investment Promotion and Facilitation (2008, revised in 2015 and 2021), PPP Law (2014), Electricity law(2011) and modified in 2018, the Law Establishing EWSA (2010) and the Law Repealing EWSA (2013), the Law Establishing and Determining the Mandate of the Rwanda Utilities Regulatory Authority (2001) and (2013) respectively, Organic Law on Environment (2005) and the Petroleum Law (2013). It should be noted that other laws may be developed in the future to regulate the sector in this regard.

Regulation of business operations across all energy subsectors falls under the mandate of the Rwanda Utilities Regulatory Authority (RURA). As an independent agency RURA is obliged to regulate in an accountable, transparent and fair manner for the benefit of all stakeholders.

A. Main Cross-cutting laws and regulations applicable to sector

Law on Investment Promotion and Facilitation (2008, modified in 2015 and 2021), applies to all strategic and foreign investments in Rwanda. Energy is treated as a strategic sector and a number of specific fiscal and other incentives are outlined in the code to promote greater investment and private sector engagement in the energy sector.

Public Private Partnership Law (2016 and modified in 2018). Providing the legal framework for the engagement, approvals, implementation procurement and management of PPPs. Ministries will need to undertake feasibility studies to show the viability and advantages of using a PPP procurement approach versus public procurement methods. The law provides for sector-specific rules for the procurement of PPP projects to be developed.

Organic Law on Environment (2005). Rwanda's National Environment Policy is legally codified in the Organic law n° 04/2005, determining the modalities of protection, conservation and promotion of environment originating in the Ministry of Natural Resources and implemented by the Rwanda Environment Management Authority (REMA). The Environmental Law sets out conditions for the reduction of customs duties and taxes on environmental equipment and activities. Ministerial

Order N° 003/2008 lays out the procedures and requirements for undertaking EIA while Ministerial Order N° 004/2008 outlines the list of works, activities, and project types that are subject to completing an EIA.

Law Establishing RURA (2013): The Rwanda Utilities Regulatory Authority (RURA) is an autonomous public entity that was initially created by the Law N° 39/2001 to regulate specified public Utilities including electricity and the extraction and distribution of gas from Lake Kivu. This law was replaced by Law Nº 09/2013 giving RURA the mandate to regulate, among others, electronic technologies, renewable and non-renewable energy, industrial gases, pipelines, and storage facilities. In reviewing electricity tariffs and ensuring compliance to the adopted standards, RURA works to enforce fair competition between operators. Under Ministerial Order 4/DC/04 OF 07/06/2004, RURA is allowed to collect 1% of the previous year's annual turnover of the electric power utility for its operations.

Electric power laws and regulations:

Electricity Law (2011 modified in 2018): The main legal instrument for the power sector is Law N°52/2018 modifying Law Nº 21/2011. The law aims to create an enabling environment for the development and distribution of electric power. It covers the general market set-up, as well as the licensing regime for the generation, transmission, distribution and trading of power within and outside of the national territory. The law will be amended to include renewable energy and energy efficiency.

- **Market structure.** The electricity market shall be based on free and equal access to the activities of electricity generation, and distribution except transmission. Electricity distribution activities shall be non-discriminatory, and based on tariffs approved and published by RURA; however, distribution through the grid may be denied where such grid is of a low capacity or where granting it would cause prejudice to existing grid users
- **Tariff setting.** Principles relating to determining electricity tariffs shall be prepared by the RURA and approved by the Minister in charge of electricity. After consultation with the Minister concerning the amount of the State subsidy, RURA sets tariffs. These must ensure that the investor has a normal return on his/her capital investment.
- **Power concession agreements**. MININFRA, as the Ministry in charge of electricity amongst other sectors, has the power to issue concession agreements related to electric power generation.
- **Licensing**. A license is required by all market participants undertaking generation, transmission, distribution, purchasing, or trading operations both within and outside the national territory. This shall be issued by RURA and payable against a fee as determined by the Authority.
- **Autonomous generation and wheeling.** Projects with an installed capacity of less than one hundred kilowatts (100kW) are exempted from a license altogether and not subject to any prior notification to the regulator. Under the Law Establishing RURA, activities of production, transmission and distribution of electricity through transmission and distribution power plants and grids established by a company or a household for their own consumption, or for consumption by other companies thereto, shall be authorized (article 36). Where such power

plants are established within private properties, there must be no violation of public and State private domain.

Law repealing EWSA: The Law Repealing the Energy Water and Sanitation Authority EWSA (Law N°97/2013), repealed the 2010 law that set up the authority, and mandates a separation between the electric power utility and the water and sanitation utility as per the Prime Minister's determining modalities of transfer of responsibilities and property of Energy, Water and Sanitation Authority (EWSA) (2014). All legal and financial responsibilities and obligations from EWSA have been fully transferred to the newly registered companies (REG Ltd and WASAC Ltd).

Rural Electrification licenses: RURA has the mandate to draft regulations for simplified licensing procedures in order to expedite off-grid and mini-grid based rural electrification.

Electricity licensing regulations (Nº 002/ energy/el/rura/2013): cover RURA's responsibility for issuing permits and certificates to all electrical operators that satisfy the licensing requirements outlined in the Electricity Law (2011). Different categories of licenses include production, transmission, domestic and international trade. These regulations do *not* govern concession licenses or agreements.

- **Production (generation) license**: gives the right to generate electrical power and sell it to other licensees or large scale customers inside the country and to access transmission or distribution networks with prior approval by RURA of the contractual agreement.
- **Transmission license:** -holders have the right to buy/transmit/sell electrical energy on their network to other Licensees or consumers connected to the transmission network inside the country, and sets out terms for international trade (Regulation **No. 002/energy/el/rura/2013)**. The license-holder shall also have the right to access the transmission network in accordance with any contractual agreement subject to prior approval by RURA. The transmission network can also be used for communication purposes as long as it does not negatively affect the transmission network performance.
- **Distribution license:** holders shall have the right to purchase electrical power from the transmission company or any other Licensee and to sell it to other Licensees or consumers inside Rwanda, consistent with license conditions set by RURA.

Regulations for electric power quality: The Rwandan Grid Code (RURA 2013) establishes the rules and procedures that allow all participants to use the interconnected power system in a safe, reliable, efficient and economical manner. RURA is responsible for the compilation, approval, implementation, of the Grid Code and monitors and evaluates the quality of service, and generation plants which threaten the power quality standards under the Grid Code would therefore be subject to rejection, revocation, or suspension of their licenses.

Electrical installations regulations: (Nº 002/el/energy/rura/2012) adopted by RURA aims to protect people, properties, and the environment from hazards that can arise under both normal and faulty conditions from electrical installations in residential, commercial, public or industrial

premises and outlines the corresponding required permits.

Technical guidelines on utilization of energy solutions

Energy Efficiency Promotion: (RURA 2013), outlines measures to enhance efficient use of electricity for business/industry, large public institutions, and residential consumers. The guidelines stipulate that all energy consuming appliances and equipment bear labels and meet Minimum Energy Performance Standards for efficient energy use and conservation.

Electrical power standards: RSB has enacted over a dozen power quality standards concerning electric and optical fibre cables, wiring, plugs and outlets, lamps and luminaries, etc. Failure to comply with the above regulations leads to revocation or suspension of permits and operating licenses.

Ministerial guidelines on Mini Grid Development: (MININFRA 2019) streamline mini grid development and facilitate investors by establishing clear procedures to be followed.

Ministerial Guidelines on Minimum Standards Requirements for Solar Home Systems (MININFRA) describes the minimum requirements to be fulfilled by a stand-alone solar power system to ensure quality and reliability services to the beneficiaries.

Laws and regulations for petroleum sub-sector activities

The petroleum industry is typically divided into three major components i.e. upstream, midstream and downstream ends. In Rwanda, upstream regulations are not yet developed since petroleum exploration and exploitation activities are yet to be commercially developed.

Law Regulating Petroleum and Petroleum Products Trade (Nº85/2013) applies to the import, export, transportation, processing, storage, distribution, wholesale and retail sale of petroleum and petroleum products in Rwanda, including LPG. The law provides clarity on licensing categories requirements and procedures, as well as quality standards and strategic reserves to be met.

Petroleum (Exploration and Production) Law: makes provisions for exploration licensing and production licensing to allocate petroleum exploration rights to those best able to conduct exploration activities. Upon discovery of a resource, the holder of an exploration license may apply for a production license. The law obliges companies to prioritize the employment of Rwandan citizens for managerial positions and provides other conditions for capacity development.

Prime Minister's order determining another regulatory authority for trade of petroleum and petroleum products and its additional responsibilities (N°131/03) assign RURA the mission to regulate all operations, activities, installations, equipment and other facilities in relation to trade of petroleum and petroleum products.

Law Establishing the Rwanda Standards Inspectorate, Competition, and Consumer Protection Authority (RICA) (LAW Nº 31/2017), established a competent authority to ensure adherence to

quality standards and pro-competition measures.

A number of **regulations** have been passed to manage the importation and storage of petroleum liquid fuels, petroleum depots, use of LPG, as well as oil pipelines. RURA, in collaboration with Kigali City Council (KCC), RSB, MININFRA and MINICOM developed guidelines for the construction of petrol stations and these are currently being enforced by KCC. The following are some guidelines regulating petroleum business in Rwanda:

Regulation No 04/R/GP-EWS/RURA/2019 governing Aboveground Petroleum Storage Facilities and |Importation of fuel in Rwanda determines RURA's requirements and licence conditions for construction and operation of fuel depots, fuel importation and upgrade of fuel depot.

Regulation governing Liquefied Petroleum Gas in Rwanda (2012 amended 2018) enables RURA to regulate the whole supply chain of LPG in Rwanda including the technical requirements for LPG imports, installation and operation of LPG reticulation plant, road tankers, vehicle for transportation of LPG and retail outlets.

Regulations governing road transportation of petroleum products (RURA 2019) provides all technical requirements for road tankers used in transportation of fuel. Every operator shall seek an authorization from RURA for every road tanker to be used**.**

Regulation governing installation, upgrade and operation of Petrol Service Stations in Rwanda (2014 amended 2017) provides technical requirements and licencing arrangements, based on a national standard established by RSB, for the construction and operation of filling stations, underground storage tanks.

Fuel quality Control regulation: This regulation is under development and it will provide the specifications of petroleum products allowed in Rwanda. It will also help for handling the complaint from Consumers and improves the quality of fuel on Rwanda market.

Laws and Regulations under the Biomass subsector

There are no general guidelines on the exploitation of biomass energy resources in Rwanda save for a few regulations on charcoal harvesting and technical guidelines on construction of biogas digesters issued by RURA. Details are discussed below.

Technical Guidelines on construction of fixed domestic biogas digesters: (RURA 2012) aim to ensure for the quality and required productivity of digesters as well as the safety of end-users. They cover responsibilities of a biogas plant constructor, plant design and gas production optimization, plant siting, feedstock requirements, and construction methods including appropriate materials to be used.

Regulations on Charcoal Harvesting. A permit is needed to cut mature trees; however, such a permit is not needed for own use. At national level, cutting young trees is prohibited. While

carbonization is most efficient during the dry season, as dry wood gives a higher output per unit input, some districts prohibit charcoal production in this period to prevent fire outbreaks. A wood transport permit is needed from district authorities to bring products to market. For charcoal, the permit is limited to a particular Sector.

Technical Guidelines under the Biomass subsector

Technology standards for ICS. RSB has developed a technology standard for ICS.

Ministerial Guidelines on Clean Cooking Technologies. aim to provide guidance for shifting from low-performance cooking stoves burning woody biomass to modern, alternative clean cooking technologies that use alternative fuels like LPG, Electricity, Biogas and Compressed biomass (Pellets and briquettes) and high-performance efficient wood stoves.

B. Planned Laws and Regulations to be developed under this policy

1. **Energy Law:** There is need to have a legal framework on energy and energy efficiency to ensure efficient use of energy resources and thereby reduce losses in transmission and distribution line, ease the burden of energy cost to the end user and reduce the demand of firewood for cooking to ensure that the social, environmental and economic aims are met for sustainable development. This law will combine all the sub sectors; electricity, energy efficiency and clean cooking.
2. **Regulations and Guidelines:**
   i. Guidelines on Right-of-Way for Power Lines
   ii. Ministerial Instructions Determining the Protection and Relocation of Public Utilities
   iii. Regulations On Net Metering and Autonomous Generation
   iv. Guidelines and Regulations Governing Electric Mobility and the Related Masterplan for Charging Stations
   v. Ministerial Guidelines on the Street and Public Lighting Establishing the Roles and Responsibilities of Key Stakeholders
   vi. Regulations on Autonomous Generation