Regulatory Review of the Electricity Market in Rwanda:
Towards Crowding-in Private Sector Investment
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Acknowledgements

The regulatory review of the electricity market of Rwanda is a result of a continental initiative to crowd-in private sector participation in Africa’s electricity market in collaboration with member States, in this case the Republic of Rwanda. This review process enjoyed cooperation from the Ministry of Infrastructure, which was very valuable. The initiative is a result of partnership between the UN Economic Commission for Africa (ECA), through its SDG 7 finance initiative spearheaded by Dr. Vera Songwe, United Nations Under-Secretary-General and Executive Secretary of ECA, and the RES4Africa Foundation, through its Missing Link initiative spearheaded by Mr. Roberto Vigotti, Secretary General of RES4Africa Foundation. The Rwanda regulatory review, under the guidance and technical contribution of Mr. Robert Lisinge, Chief of Section for Energy, Infrastructure, and Services Section of ECA (EISS), was led by Mr. Yohannes G. Hailu, energy policy expert at EISS of ECA, and by Mr. Andrea Renzulli, senior policy officer at RES4Africa, with technical and analytical contributions from Mr. Antonio Passero, Mr. Leonhard Braun, and Ms. Iarina Ciceu, and the participation of Ms. Cristiana Lisi from RES4Africa. The contributions of Mr. Anthony Monganeli and Soteri Gatera of EISS are much appreciated. Similarly, Ms. Sissay Tadesse provided all-round support which was valuable in the effective implementation of the initiative.

The national policy and regulatory data necessary for objective regulatory review, as well as the draft country economic, energy sector, and regulatory context, was ably developed by the national consultant, Dr. Albert Butare. The regulatory analysis was based on a large national regulatory and policy database, which was validated by energy experts from the Ministry of Infrastructure, the Rwanda Utilities Regulatory Authority, Rwanda Energy Group, and other institutions. The following sector leaders and experts represented the institutions during validation: Ms. Peace Kalisa; Mr. Steven Bihinda; Ms. Antoinette Habinshuti; Mr. Chris Shyaka; Mr. Elvis Cyubahiro; and Alexis Mutware.

The initiative received support, including publication logistics, from ECA Sub-Regional Office for Eastern Africa. The support of Director Mama Keita, Mr. Bernard Bamin, and Ms. Alphonsine Nyiransabimana is acknowledged. The technical and graphic design work by Epsilon Publishers Ltd, which has improved the quality of this publication, is acknowledged.
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Executive Summary

This report provides an analysis of Rwanda’s electricity sector policies, laws, and regulations in relation to crowding-in private sector participation in developing national electricity infrastructure. The report is part of the United Nations Economic Commission for Africa and RES4Africa Foundation joint program on *Regulatory Review of the Electricity Sector in Africa: Towards Crowding-in Private Sector Investment*.

The electricity market of Rwanda saw rapid improvements in power generation and network expansion, reaching 227 MW capacity in 2020 from more than 40 generating plants. Through the Energy Sector Strategic Plan, major investments are implemented to increase generation capacity and expand electricity services to a growing number of households through on-grid and off-grid systems. Rwanda is seeking accelerated economic and social development. The associated demand for electricity is also expected to increase significantly. Meeting this demand and established energy sector goals require a major expansion of the national electricity capacity and additional investments. In this context, complementing the public sector, the role of the private sector is expected to grow.

Rwanda has made major strides in crowding-in private sector investment in the generation segment of the electricity market, as well as in off-grid investments. To meet the transformation aspiration, enabling the participation of the private sector across the electricity market value chain will be essential.

In line with this general objective, the purpose of this regulatory review is to pinpoint the main strengths and gaps of the policy and regulatory framework currently in force related to private sector participation in the entire electricity market. It further aims to offer concrete recommendations for regulatory improvement and reform towards attaining a competitive, resilient, and sustainable electricity market.

The regulatory analysis is undertaken following a comprehensive UNECA and RES4Africa regulatory review methodology, which was developed with the participation of African and international regulatory experts. The approach enables three broader assessments: the degree of openness of the electricity market to the private sector based on evaluation of the power sector structure and governance; the attractiveness of the market based on an assessment of sector economics, fair competition, and overall economic regulation; and the readiness of the market based on an assessment of technical regulations.

**Main findings related to the Generation segment**

Related to the openness of Rwanda’s electricity market, the generation segment features strength in the areas of clarity of the energy strategy and the direction of the sector, associated system planning practices, a clear and effective procurement system, and a robust power sector governance system spearheaded by the regulator, RURA. The generation market, however, faces constraints emerging from limited generation off-taking options with the predominance of the single-buyer system, limited private sector participation models particularly related to merchant models, and a power sector framework with limited unbundling that constraints power sector wholesale and retail competition. Related to the attractiveness of the generation segment of the market, regulatory strength is observed in areas of contracts regulation,
economic regulation, provision of credit enhancement, and indirect incentives such as through tax relief. However, direct incentive provision to generation investors is uncommon, as a result greater reliance on competitive approaches can help bridge this gap, such as competitive tenders. Furthermore, standardization such as in public PPAs would be beneficial to generation investment. Related to the readiness of the generation segment of the market, regulatory development is witnessed in areas of permitting and authorizations, system planning, instituting security and quality standards, and transparency and data. The grid code is fairly developed, though has gaps in articulation of some aspects of the market operation such as dispatch and curtailment. The generation segment of the market would benefit from clarification of the grid code on dispatch and curtailment, allocation of connection costs, and establishment of a one-stop-shop for non-environmental permits and authorizations.

Main findings related to the Transmission segment

The electricity market of Rwanda exhibits a degree of openness to private investment in transmission assets. The electrification and transmission investment plan are in place. The transmission segment is also supported by a robust system planning, clear security and quality standards, and other provisions under the grid code. Private sector market entry into transmission assets investment, or operation, is open under licensing. Such entry through PPP models is also permissible, along with a concession model for transmission. The transmission segment is similarly supported by effective contracts and economic regulation. However, the public sector preference to go progressively on implementation of full unbundling has limited actual private sector participation beyond the generation market.

Main findings related to the Distribution segment

Similar to the transmission segment, the distribution segment of the market is guided by a clear energy strategy and system planning, and clear power sector governance system. Private sector participation in distribution is permissible by regulation through a concession model, share ownership, as well as EPC+finance models. PPP models are also generally possible. However, the preference on gradual and progressive market reform meant that effective private sector participation in distribution remains constrained. Therefore, the private sector in the distribution market may face a conducive regulation with a practical challenge to implement distribution investment. It will be important to provide further policy clarity from MININFRA to mitigate this uncertainty for network investors. The main regulatory impediment related to the openness of the distribution segment of the market to private sector investment emanates from the power sector framework. Rwanda has not yet implemented transmission service unbundling, as well as unbundling of distribution retail services.

Main findings related to the Off-grid segment

Off-grid market development is often a crucial part of the strategy to achieve universal access to energy. Rwanda performs very well in terms of the openness of the off-grid market to private sector investors related to energy strategy and system planning in operation. The off-grid market is further supported by the procurement policy, particularly permissibility of PPP models in such markets. The good performance related to power sector governance also extends to the
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off-grid market, including through dedicated institutional focus on electrification. EPC model of private sector participation in off-grids is possible. An off-grid electrification concession model is also possible, which is already implemented for grid-connected generation assets. However, a merchant investment model, such as B2B (or business-to-business model) is not permissible under current regulation, since the electricity open market is not yet established in Rwanda. Related to attractiveness of off-grid investment, indirect incentives, such as tax holiday and VAT and import duty relief, as well as preferential income tax treatment are available to scale investors. Furthermore, deregulation of off-rid tariffs, different from grid-based tariffs, makes off-grid energy investment in Rwanda attractive. However, standardization of retail contracts remains a gap. Related to readiness, system quality and security standards for off-grid are in place through minimum technical requirements. Off-grid system integration due to grid arrival are also clarified by current regulation. However, current regulation related to grid arrival does not permit mini-grids to coexist with the main grid. Guarantees or compensation mechanisms are also not in place for potentially stranded assets due to grid arrival. Addressing these remaining regulatory barriers would strongly position the off-grid market of Rwanda to private investors.

Therefore, regulatory and policy measures that address these challenges would constitute positive steps towards further strengthening the sector to support Rwanda’s ambition of economic transformation through private sector investment participation in energy infrastructure development. Towards this end, the following recommendations are provided to the Rwanda Utilities Regulatory Authority, the Ministry of Infrastructure, Rwanda Energy Group, and other relevant energy sector institutions.

To enhance the Openness of the electricity market

1. Review and adopt net metering regulation to broaden generation off-taking options and boost private sector generation investment.
2. Pursue access, in the long-term, to the South African Power Pool, where there is an active regional spot market. Similarly, advocate the operationalization of a similar spot market within the East Africa Power Pool.
3. Review the utility of merchant generation models to upscale generation investment and put in place appropriate regulatory provisions to enable such business models.
4. Pursue transmission and distribution services unbundling.
5. Consider the separation of transmission assets management from system operation.
6. Encourage wholesale and retail market competition to enable greater openness to private sector participation.
7. Pursue a review of the current practice and regulations towards enabling private sector participation through the implementation of workable models.

To enhance the Attractiveness of the electricity market

1. Develop and adopt standardized public PPA and other contracts (Transmission Service Agreement and Distribution Service Agreement) to improve on contracts regulation and administration.
To advance investment in networks and off-grid systems, review the credit enhancement mechanism to private sector investors in these assets.

Review the national tariff system and align with the National Energy Policy by taking steps to transition to cost-reflective tariffs.

Pursue competition-based private sector investment participation to reduce the need to provide incentives in established markets.

**To enhance the Readiness of the electricity market**

- Review the grid code to provide clarity related to dispatch (market settlement rules) and curtailment.
- Provide regulatory clarity and certainty on the allocation of costs related to third-party access to the grid.
- Similar to the facilitation of environmental approval under a one-stop-shop, consider instituting a similar efficient approach for other relevant authorizations and permits to minimize administrative and transaction costs save valuable project time.
- Provide regulatory clarity and predictability in the off-grid market by reviewing and updating regulations related to grid arrival, including the coexistence of grid systems and guarantees, or compensation, for stranded assets.

The electricity market of Rwanda is expected to play a major role in supporting and enabling the country’s socio-economic transformation. As Rwanda seeks to rapidly increase its energy capacity, including through private sector investment, effective regulation and an enabling policy environment play key roles. This regulatory review offers constructive identification of areas of regulatory strength and gaps related to the crowding-in of private sector investment in the electricity market value chain. Implementation of the recommendations would enhance the effectiveness of the regulatory environment towards attracting private investment in the market.

As Rwanda takes further bold steps towards its energy sector regulatory reform, the UN Economic Commission for Africa and the RES4Africa Foundation remain committed to partner with Rwanda in addressing any of the identified regulatory and policy gaps. They also commit to supporting regulatory capacity development, as well as any area of particular reform interest of Rwanda towards greater openness, attractiveness, and readiness of the electricity market.
Introduction
Kigali city centre skyline and surrounding areas lit up at night
Photo credit: Jennifer Sophie/Getty Images
1. Introduction

Recognition that energy plays a key role in facilitating socio-economic development, and that its insufficient provision impedes it, has brought energy to the forefront of national, regional, and global agenda. National sector development strategies in most of Africa reflect the need to expand energy access rapidly, facilitated through the implementation of Sustainable Development Goals (SDGs), particularly SDG7. African states have pursued the energy access agenda, devoted public finance for energy infrastructure and capacity expansion, and instituted measures to strengthen the energy sector.

Despite appreciable progress as a result of these measures, structural challenges remain within the electricity markets of Africa. Over 500 million people on the continent today lack access to electricity. Latest global SDG7 tracking reports warn that progress made so far is not on track to achieving universal access by 2030 and that nearly 90 percent of the population without access at the end of the decade will be residing in Africa, partly due to rapid population growth.

Financing energy development remains a key challenge. The cost of achieving the SDGs at large in the continent is estimated at about USD 1.3 trillion per year. Africa would require USD 32 billion per year through 2030 on universal electricity access-related investments (AfDB, 2019), with additional investment requirements on energy infrastructure. According to the Infrastructure Consortium for Africa, 37 percent of infrastructure investments in the continent was undertaken by African governments in 2018, with the private sector accounting for 11 percent (ICA, 2018). Given the major infrastructure investment gap and the limited investment role of the private sector so far, addressing the crowding-in of private sector investment in the electricity market is crucial.

Towards the goal of crowding-in the private sector, feasibility (bankability) of projects, country risks, profitability (viability), and the legal/regulatory environment are often identified as key barriers. Indeed, the regulatory framework is crucial for attracting private investments. The Regulatory Indicators for Sustainable Energy (ESMAP, 2020) indicate that more than half of the global population lacking access to electricity remained in countries with weak regulatory frameworks by 2019. These regulatory challenges remain to be addressed.

The purpose of this assessment is to pinpoint the main strengths and gaps of the regulatory framework governing the electricity market in African countries, in relation to crowding-in of private sector investment. It seeks to identify areas of improvement and reform to ensure a competitive, resilient, and sustainable electricity market. In the context of this particular regulatory review report, it focuses on the Ethiopian electricity market.

Rwanda has acquired a reputation as a top reformer and investment-friendly destination, thanks to the efforts in diligent planning, implementation, and drawing often on home-grown solutions to achieve results. Through performance-based contracts, or Imihigo, and based on legal frameworks (Ministry of Public Service and Labor, Law No. 18/2017), it holds branches of government accountable for achieving set targets. One notable effect in the energy sector has been the increase in electrification rate from 10 percent in 2010 to 55 percent as of June 2020 (REG, 2020a). However, the momentum should be kept as areas of improvement remain, such as off-taking options, wholesale and retail market competition, competitive tendering, standardization of contracts, and others.
This regulatory review examines these and additional issues in-depth concerning the crowding-in of private sector investment in the electricity market of Rwanda, from generation and networks to off-grid market segments. The goal is, through regulatory improvement and expected increase in private sector participation, to promote the achievement of SDG7 goals and developing a resilient, competitive, diverse, and vibrant electricity market that will sustainably attract private capital to supplement public investment. This is particularly crucial in a post-COVID-19 environment where public resources are even more constrained due to priorities in public health and social protection, as well as economic recovery.
Country Overview
Towards Crowding-in Private Sector Investment

Introduction

Rusumo Falls on the Kagera River, Rwanda.

Photo credit: DeAgostini/Getty Images
2. Country Overview

Rwanda, located in central East Africa, has borders with Uganda to the north, Tanzania to the east, Burundi to the south, and the Democratic Republic of Congo to the west. Following the 1994 genocide which severely impacted Rwanda’s economy and society, it has since taken the path of reconstruction, economic and social recovery, and in the last decade rapid economic development and transformation. Today, Rwanda is one of the exemplary African states on successful economic and social development, putting in place a conducive business environment, and pursuing overall transformation.

Map of Rwanda credit: Peter Hermes Furian
Map of Africa credit: Geo Atlas Graphi Ogre
2.1 Macroeconomic Overview

With a resident population of 12.95 million, Rwanda has one of the highest population densities in Africa. It is among the fastest-growing economies in the continent, having a gross domestic product (GDP) of USD 10.3 billion, up from 9.5 billion USD in 2018 (NISR, 2020). It enjoys strong economic growth, averaging over 7 percent annually over the last two decades. Figure 1 indicates that following strong growth of 8.6 percent and 9.5 percent in 2018 and 2019, respectively, the economy contracted by 3.4 percent in 2020 due to the ongoing effect of the global COVID-19 and Rwanda’s stringent public health measures to contain the pandemic; however, growth is projected to rebound in 2021. Similarly, GDP per capita has been growing rapidly and steadily, from about USD 225 in 2000 to USD 818 in 2019, an increase of 264 percent within a decade. See Annex A for more economic performance data.

The strong growth performance in the last decade led to significant reductions in the national poverty rate. Household living condition surveys by the National Institute of Statistics of Rwanda indicate that poverty declined from 60.4 percent in 2001 to less than 38.2 percent today. Major gains were also registered in social development, in the areas of education, health, and overall wellbeing. Rwanda’s Labor Force Survey indicates that the unemployment rate is 17.9 percent, higher than the 15.2 percent in 2019. This could mainly be related to economic disruptions associated with COVID-19 (NISR, 2021).

Figure 1: GDP growth (%, 2010-2020)

Source: NISR (2020)

Figure 2: GDP per capita (nominal USD, 2000-2019)

Source: MINECOFIN (2020)
Growth in Rwanda required major investment, particularly in infrastructure. As a result, public debt, after remaining stable from 2010-2012, increased notably by 2013. Since then, there has been a gradual increase of public debt as a share of GDP, reaching 58 percent by 2019. It is expected that COVID-19 increased public spending, and public debt, likely increasing the ratio.

Figure 3: Debt-to-GDP ratio (%), 2010-2019

Source: MINECOFIN (2020)

**Inflation and exchange rate stability**

Inflation is largely stable, remaining at 2.4 percent in 2019. Due to rising food prices and disruptions in supply chains, it has increased to 6.6 percent in 2020, remaining above the National Bank of Rwanda’s policy target of 5 percent (AfDB, 2020). On public finance and credit, Rwanda enjoys a B+ rating by Fitch Ratings. However, infrastructure spending and expenditures related to addressing the COVID-19 pandemic have affected the fiscal balance. The debt-to-GDP ratio was 58 percent in 2019 and rose to 66 percent in 2020. Rwanda is pursuing a long-term strategy to reduce external financing of its national budget. Data from MINECOFIN (2020) indicates that Rwanda relied on external resources to finance 70 percent of its budget in 1995. The external financing share declined to 16 percent of the budget in the 2018/19 budget cycle. This trend continued in the 2019/2020 budget cycle with external resources accounting for only 13.4 percent of the national budget. This has led, however, to rising borrowing to self-finance national projects and plans.

The national strategy to accord a growing role to the private sector will be crucial in this regard to mitigate the burden on the public sector in driving major investments. The GDP share of private sector investment in 2017 was 14.4 percent, which grew to 17.6 percent by 2020. It is projected to reach 21.2 percent by 2024 (see Annex B).
Country Overview

Business climate

Rwanda implemented reforms to improve the overall business climate. As a result, it enjoys high rankings in the World Bank’s Ease of Doing Business Index, which ranked Rwanda 29th out of 190 economies in the 2019 report. This places the country in the second-best position in Africa, behind Mauritius. The business environment improved considerably, demonstrated by major gains in global ranking since 2016. The World Bank has recognized Rwanda, in its 2019 assessment, among countries in the top 10 global reformers. Foreign investors enjoy by law equal treatment as Rwandan investors. Similarly, all investors have the right to own property, which is inviolable and protected from unlawful seizure, or confiscation (the Law on Investment Promotion and Facilitation, 2015). Rwanda subscribes to many regional treaties which augment the country’s attractiveness as an investment destination, including the East African Community (EAC), the Common Market for Eastern and Southern Africa (COMESA), and the Africa Continental Free Trade Area (AfCFTA).

As a result of these reforms in the business environment and various government policies, such as macroeconomic management, Rwanda manages to attract major investments from the domestic and international private sector. MINICOFIN (2020) data indicates that investments increased from about USD 400 million in 2010 to USD 2 billion by 2018, and USD 2.46 billion by 2019, whereby energy sector investments account for 45 percent of total investments.

2.2 Electricity Sector Overview

Rwanda is experiencing rapid electricity demand growth throughout most of its regions. As demonstrated in the figure in Annex C, demand is expected to increase from 120 MW in 2011 to 600 MW in 2022 (Rwanda National Electrification Plan Task 2 report, 2019). Similar to many countries in the region, Rwanda heavily relies on hydro sources to fuel the electricity demand, although diversification, particularly through variable renewable sources, is gaining traction.
Country Overview

Electricity consumption

Electricity consumption had rapidly increased in Rwanda from 2010 to 2014. Following a decline from 2014 to 2016, it has been on the rise since 2017. Similarly, even though the overall level of electricity consumption per capita is still low, it showed a similar pattern of increasing from less than 30 kWh in 2010 to nearly 40 kWh by 2014. Per capita consumption has been increasing since 2017, however remains below 30 kWh by 2019. See electricity demand forecast in Annex C.

Figure 5: Electricity consumption, total (GWh, 2010-2019)*

*Electricity consumption data for 2016 is missing, and is therefore inferred to be the average between 2015 and 2017

Source: NISR (2018-2020)

On-grid installed capacity and electricity production

As of August 2020, 226.7 MW generation capacity was installed (REG, 2020b) from more than 40 electricity generation plants. The generation technology mix is constituted by 45.17 percent hydropower, 26.76 percent diesel, 13.89 percent methane gas, 6.94 percent peat, 5.32 percent solar power, and 1.62 percent imported from the Democratic Republic of Congo and Uganda (REG, 2020c).
The generation capacity tripled from 76 MW in 2010 to over 200 MW by June 2018, by which time over 50 percent of the installed capacity represented renewable sources. A total of seventeen independent power producers (IPPs) were licensed in 2017 to supply electricity to REG. As of 2017, 52 percent of generation capacity was under private ownership, demonstrating the prominent role of the private sector in the generation market of Rwanda. The Energy Sector Strategic Plan (2018) foresees a generation mix made up of around 52 percent renewable sources by 2024.

**Access to electricity**

Rwanda has set a national target of achieving 100 percent access to affordable and modern sources of energy by 2024 (Republic of Rwanda, 2016). The national electricity access priority over the last years led to the extension of the national distribution system across the country. As a result, a rapid increase in the household electricity connection rate was achieved. These efforts have been led by the Electricity Access Roll-out Program (EARP) under which access has increased from 364,000 households in June 2012 to 590,000 households (24 percent of the total) by June 2016 (see Annex D for electricity connection rates).

As of June 2020, the cumulative electricity access rate was at 55 percent, which is achieved through 40 percent grid-based connection and a further 15 percent through off-grid systems (mainly decentralized solar energy) (REG, 2020a). The grid covers, as of March 2019, 100 percent of hospitals, 93 percent of health centers, and 80 percent of primary and secondary schools (World Bank, 2019). Off-grid access is targeted to deliver 48 percent of electricity access in Rwanda by 2024, as part of the national universal access plan. The grid covers, as of March 2019, 100 percent of hospitals, 93 percent of health centers, and 80 percent of primary and secondary schools (ibid). See Annex E for ongoing and planned transmission networks.
Electricity service quality and reliability

In 2013, technical and non-technical losses amounted to about 24 percent. As a result, in 2015 Rwanda set a target of loss reduction of 1 percent per year compared to this benchmark (REG, 2020d). By 2016/2017, losses stood at just over 21 percent, and a year later at 19.6 percent (ibid). In 2020, Rwanda registered a total of 170 hours of electricity outages, distributed over eight substations. This corresponds to a SAIDI of 1.478 and a SAIFI of 2.495 (EUCL, 2021).

Off-grid electricity market

Based on EDCL data on the reported sales by companies, the cumulative off-grid connections by the end of June 2017 were 189,069 households. By the end of June 2018, an estimated 276,960 households were connected. The solar home system market levelled off in 2018. Companies are increasingly introducing smaller solar home systems in response to the gradual saturation of current target markets, raising the need to attract lower-income households (Energizing Development, 2019). The government continues to work towards improving the enabling policy and regulatory framework for the off-grid market. In June 2019, the government published a range of guiding documents to alleviate the policy uncertainty felt among private sector actors in 2018. See Annex F for solar lighting sales figures.

The cumulative sales of all solar home systems today are estimated to have enabled electricity access to 14 percent of households, or approximately 1.7 million people.

The mini-grid sector is generally nascent in Rwanda. Delays in developing a conducive business environment supported by simplified planning, regulation and policy hampered the rapid development of this market segment. This has resulted in limited investment during 2018. Through the National Electrification Plan (NEP), mini-grid investment guidance is provided, including prioritized locations. High capital expenditure requirements, limited proven business models, and low end-user consumption currently compel mini-grid developers to seek financial support for improving commercial viability and seek the application of competitive tariffs to accelerate development. The Scaling-up Off-Grid Energy in Rwanda (SOGER) program implemented by Energy for Impact (E4I) and the EnDev RBF program for mini-grids directly supported mini-grid development in the country by providing technical assistance and financial incentives in 2018.
In line with the government’s objective of universal access by 2024, of which at least 48 percent is expected to be delivered through off-grid solutions, off-grid solutions initiatives are pursued. These include the Renewable Energy Fund (REF), established in collaboration with the World Bank, to promote the financial viability of reaching rural households. It is part of a financial agreement signed in July 2017 amounting to USD 50 million to implement the Scaling-Up Renewable Energy Program (SREP). The Renewable Energy Fund Project (REF) is a financial intermediary loan (FIL) to the government as the borrower, funded by the SREP Trust Fund. The government has transferred (grant portion)/on-lend (loan portion) the funds to the Development Bank of Rwanda (BRD), which administers the facility. The project is structured around two components: (1) line of credit and direct financing for off-grid electrification; and (2) technical assistance, capacity building, and project implementation support (Development Bank of Rwanda, 2017).

The REF is tasked through the first component to set up and operationalize a local-currency line of credit and direct financing facility which helps address access to finance and affordability constraints in Rwanda. This is aimed at accelerating the growth of the off-grid electrification market. The REF provides lines of credit to local financial institutions for sub-loans to households and micro, small, and medium enterprises, as well as direct loans to private companies engaged in off-grid electrification (mini-grid developers and potentially off-grid solar companies). Through the second component, the REF provides necessary technical assistance and capacity building to BRD and participating entities (SACCOs, banks, and private companies engaged in off-grid electrification), as well as project implementation support to BRD as the host of the facility. The REF provides access to local currency financing through five windows (see Annex G).

As of August 2019, five privately-owned companies operated mini-grids in Rwanda. Currently, nine companies are in operation. These private companies operated 11 Mini-grids (5 solar and 6 hydro). According to EnDev data, mini-grid connection costs vary from USD 250 to USD 650. According to EDCL data, the cost per kWh varies depending on the technology used. Operational costs do not typically exceed 5 percent of capital expenditure. Mini-grid revenue streams are comprised of connection fees, electricity sales, and grants and subsidies. To date, financial incentives have typically covered up to 70 percent of capital expenditure for mini-grids in Rwanda. The charged connection cost per household for existing and planned projects range from USD 35 to 60, except for MeshPower, which does not charge a connection fee.

Post-subsidy tariffs largely fluctuate between USD 0.35 and 0.70 per kWh, depending on the consumer group, subsidy amount, tariff structure, geographic location, and business model. The cost of electricity generated by mini-grids remains higher than national grid tariffs (USD 0.10 for low-demand customers versus USD 0.22 for higher demand customers).

To further promote off-grid electrification, the government has also pursued setting up SHS minimum standards, publishing mini-grid guidelines, awareness campaigns on off-grid electrification, launching detailed feasibility studies of identified mini-grid sites under SEFA/AfDB funds, tendering out through BRD to enable the participation of private mini-grid developers, and establishing a taxes exemption scheme on solar materials (REG, 2019).
2.3 Electricity Sector Governance and Market Structure

Overview of electricity sector reforms

Since the 1990s, Rwanda’s electricity sector has undergone a number of significant changes. Private sector participation in the electricity market of Rwanda can be traced as far back as 1995 when the government set a direction by putting in place economic reforms aimed at reviving the national economy. The privatization program was established by Law No. 02 of 11/03/96 on Privatization and Public Investment and implemented by the institutional framework established by the Presidential Decree No. 08/14 of 03/05/96. In doing so, the government was pursuing efficient management, financial accountability, and budget discipline to encourage private participation and promote entrepreneurship. In the electricity sector, the next significant milestone was Law No. 18/99, which removed the monopoly in the electricity market, allowing private companies to invest in the generation segment as IPPs.

The first attempt to involve the private sector into the Rwandan utilities dates back to 2003 when the utility of the time, ELECTROGAZ, was placed under a five-year management contract with Lahmayer International to manage and restructure it in collaboration with Hamburg Water Works. However, the contract practically lasted for only two years. By March 2006, the management contract was terminated and the management and operation of ELECTROGAZ were reverted to the Government of Rwanda. Meanwhile, in 2004, the government published a new Energy Policy in response to an emergency condition mainly triggered by drought. The policy reaffirmed that private sector investment and management would play a significant role in developing the sector, within a regulatory environment that protects consumers and enables investors to recover their costs (Castalia Strategic Advisers, 2009).

Subsequently, in 2008, the Rwandan Parliament passed a law transforming the multi-utility Electrogaz into separate utilities for electricity (RECO) and water (RWASCO). The law was classifying RECO as a public institution that performs commercial or industrial activities, which gave RECO a mandate to facilitate private investments. In 2011, the electricity and water entities were once again integrated into the Energy and Water and Sanitation Authority (EWSA), which in turn, was split into two corporations, the Rwanda Energy Group (REG) and the Water and Sanitation Corporation in 2014. At the same time, the Electricity Law of 2011 was enacted, establishing the liberalization and regulation of the electricity sector. The law stipulated conditions enabling investments and ensuring fair competition and defined the rights of users and operators.

As a consequence, the legislation was authorizing the electricity business (EWSA) to invest in all segments of the industry, directing it to focus on bulk transmission and distribution and retailing functions. New large generation projects were to be developed by the private sector that would sell electricity to the utility, as a single buyer under PPAs. The electricity market was expected to remain dominated by EWSA having an important role in the generation, transmission, and distribution, while IPPs were being encouraged to invest in the generation sector. Self-contained, off-grid schemes were open to be owned and operated by EWSA or private developers.

In this market context, tax and financial incentives by the government led to interest from private investors as IPPs. Engaging the support of DPs, setting up EnDev (Energizing Development) in collaboration with the government, the Result-Based Financing (RBF), and Private Sector
Participation program through EnDev and the Private Sector Participation in Micro-hydro Power Supply for Rural Development project (PSP Hydro) were early attempts in engaging the private sector. These programs assisted private project developers through technical, financial, and business advice and supported the Ministry of Infrastructure and other relevant authorities in establishing a suitable regulatory framework and favorable conditions for private sector involvement. A few IPPs generating hydropower benefitted from a grant of about 25 percent of the total investment cost. This approach triggered an influx of more initiatives, including a concession scheme of previously state-owned Micro Hydro Power Plants (MHPPs), village grid enterprises, and solar lighting enterprises. Other recorded private sector involvements include utility-scale solar plants, mini-grids, methane gas-to-power plants, and peat-fired plants.

**Institutions governing the electricity sector**

The following institutions govern the electricity market of Rwanda.

<table>
<thead>
<tr>
<th>Institution</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ministry of Infrastructure (MININFRA)</td>
<td>MININFRA is the Ministry in charge of the energy and infrastructure sector. Its roles include policy and strategy formulation. It has an oversight role, as the lead institution for the entire sector, translating the government’s vision, national strategy, action plans, and targets into implementation.</td>
</tr>
<tr>
<td>Rwanda Utility Regulatory Authority (RURA)</td>
<td>As per the Law No.09/2013 establishing RURA, the institution has the mandate to regulate certain public utilities. It carries this function by setting up the necessary guidelines for the implementation of relevant laws and regulations, ensuring compliance and the continuity of service delivery while preserving public interest, protecting users and operators in a competitive setting, and protecting and promoting consumers’ interests. RURA plays the key roles of setting tariffs, regulating the electricity market, and providing licenses and permits.</td>
</tr>
<tr>
<td>Ministry of Environment (MoE)</td>
<td>The Ministry of Environment was established to ensure the conservation, protection, and development of the environment. It also ensures the safeguard of climate resilience in the context of the green growth development strategy. It develops environment and climate change policies and strategies and monitors implementation. The Ministry influences energy projects through compliance with environmental laws and guidelines.</td>
</tr>
<tr>
<td>Rwanda Environment Management Authority (REMA)</td>
<td>Under the supervision of the Ministry of Environment, as per the Law No. 63/2013 establishing the authority, REMA is entrusted with the legal mandate for national environmental protection, conservation, promotion, and overall management, including advisory to the government on all matters on the environment and climate change.</td>
</tr>
<tr>
<td>Rwanda Development Board (RDB)</td>
<td>Among its prime roles, RDB is charged with investment promotion and facilitation. The Law No 46/2013 establishing RDB gives it the mandate to, among others, fast track development activities and facilitate the government and private sector in doing so; to promote local and foreign direct investments in Rwanda; to provide guidelines, analyze project proposals and follow up the implementation of government decisions in line with public and private investments; to carry out privatization programs; to promote entrepreneurship and support the creation and development of private enterprises.</td>
</tr>
</tbody>
</table>
Furthermore, in terms of coordination, the sector is supported by different stakeholders, the private sector, development partners (DPs), and civil society organizations (CSOs), in a structured consultation scheme called the Sector Working Group (SWG), with its Technical Working Groups (TWGs). An overview of the governance framework of the power sector is provided in Annex H.

**Market players**

The following institutions are among the main market players.

**Table 2: Market players**

| Rwanda Energy Group (REG) | The REG was established following the adoption of Law No. 97/2013, which dissolved the former Energy Water and Sanitation Authority. The law paved the way for the creation of two corporate entities - the REG for electricity services and WASAC for water and sanitation services. These entities were subsequently incorporated in July 2014. The REG has the mandate to develop and provide reliable and affordable energy while creating value for the stakeholders. Currently, it is under 100 percent government shareholding; however, the incorporation creates a mechanism for private sector share ownership. The government has so far preferred to maintain full public ownership while enabling REG to play public utility functions. To fulfil its mandate, the REG has been divided into two subsidiaries - the Energy Utility Corporation Limited (EUCL) and the Energy Development Corporation Limited (EDCL). |
| Energy Utility Corporation Limited (EUCL) | EUCL is the state-owned vertically integrated utility tasked with providing electricity utility services through operations and maintenance of existing public generation plants, transmission and distribution networks, and retail of electricity to end-users. In doing so, it uses four main processes feeding into the core business. These are planning, marketing and development, distribution planning and development within already electrified areas, and operations and maintenance of power plants and networks owned by the utility. The utility also plays a key role in the execution of power purchase/power sales agreements with IPPs and other regional utilities for electricity import and export. |
| Energy Development Corporation Limited (EDCL) | EDCL is mandated to increase investment in the development of new energy generation projects to expand supply in line with NST1 and other national targets. It is also tasked with developing transmission infrastructure and implementing electricity access projects to meet national targets. It also pursues least-cost power development, implements the Electricity Access Roll-Out Program, and undertakes the necessary technical studies. Furthermore, it is responsible for the planning and development of public energy projects. |

**Electricity market model**

The generation segment of the electricity market is constituted by numerous IPP-owned power plants, which are mainly hydro, and state generation assets operated by REG. The public grid connected electricity is developed through investment management and construction of generation and transmission facilities by REG’s development branch, Energy Development Corporation Limited (EDCL); on the other hand, operations and maintenance of plants,
transmission, and distribution network and retail of electricity is run by REG’s Energy Utility Corporation Limited (EUCL). Transmission and distribution infrastructure is in the sole hands of the REG, operated by EUCL. Presently, nearly half of the generation capacity is in the hands of the private sector. See Annex H for governance framework of the power sector.

IPP relations with the utility are governed by PPAs signed with EUCL. Even though regulated by RURA, mini-grids are handled by their respective IPPs from generation to delivery to the customers.

Figure 9: Structure of the electricity supply industry

2.4 Policies and regulations governing the electricity supply industry

The electricity market of Rwanda is governed through numerous strategy papers, policies, and laws, summarized in the section below (see further information in Annex L).

Table 3: Energy sector strategies, policies, and plans

| National Strategy for Transformation (NST1, 2017) | NST1 is the implementation instrument for the remainder of Rwanda’s Vision 2020 and the first four years of the journey under Vision 2050. NST1 integrates far-sighted, long-range global and regional commitments by embracing several developmental agendas. These include the Sustainable Development Goals (SDGs), the African Union Agenda 2063, the East African Community (EAC) Vision 2050, the Paris Agreement, and other agreements. In particular, NST1 focuses on addressing the electricity access challenge in its Economic Transformation Priority Area 4. Electricity is regarded as a means of promoting industrialization and export growth by scaling up electricity generation and improving quality, affordability, and reliability of supply. Under the Social Transformation Pillar, Priority Area 5, the vision is to provide universal access to basic infrastructures such as electricity, water, sanitation, and internet broadband. For effective implementation of this vision, the private sector is called upon to help reach off-grid areas and invest in grid expansion. |
### Country Overview

Another goal of NST1 is to enhance demographic dividend through ensuring access to quality health for all. In this regard, 100 percent of electricity access to health facilities is envisaged.

<table>
<thead>
<tr>
<th><strong>Rwanda Energy Policy (2015)</strong></th>
<th>The 2015 energy policy presents a revision of the previous national policies of 2004 and 2011, which mainly responded to emergency energy security considerations rather than holistically tackling broader sector challenges. The current policy required a shift due to underlying changes in the country. The economy had experienced stable and fast growth for some time, and power supply crises had stabilized. Rwanda’s population was growing relatively rapidly and was projected to reach 16.4 million people by 2030. At the same time, Rwanda had low levels of access to modern energy such as electricity and LPG. This energy poverty was constraining efforts to achieve medium-term macroeconomic objectives, including attaining middle-income status by 2020. See Annex I for specific issues that the current Policy is intended to address.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Energy Sector Strategic Plan (ESSP, 2018)</strong></td>
<td>The ESSP is an implementation strategy for the NST1 and a guide for the implementation of the Rwanda Energy Policy. The current ESSP follows an earlier edition, reviewing the current status of the sector and outlining high-level target objectives. The objectives apply to all subsectors and serve to translate the policy goals laid out in the REP and NST1 into tangible outcome indicators achievable by 2024. It incorporates analysis of medium-term supply and demand balance, assessment of policy gaps in the sector, development of a least-cost power development plan, and an electrification plan. In essence, the plan sets out ten objectives to be achieved over seven years (see Annex J for details of these objectives).</td>
</tr>
</tbody>
</table>
| **Rural Electrification Strategy (2016)** | Based on the targets and guidelines set by the ESSP and the Rwanda Energy Policy, the Rural Electrification Strategy is developed on the key principle of providing the most appropriate form of electricity access to households. A pathway is therefore established in a manner that as households’ energy requirements increase in line with the country’s economic growth, they can graduate to higher-powered forms of electricity.
   
   It is detailed in four distinct programs:
   
   - Government establishing a mechanism to allow low-income households to access modern energy services through a solar system as a basic necessity;
   - Government establishing a risk-mitigation facility targeting the private sector such that solar products will be made available on financial terms that the population can afford;
   - Mini-grids being developed by the private sector with the government playing a key role in identifying sites and establishing a framework through which these can become financially viable investments; and
   - Government continuing to roll out the electricity network via the Electricity Access Roll-out Program, focusing on connecting high consumption users and driving economic growth. |
| **National Electrification Plan (NEP, 2018)** | The NEP is advanced based on the principles and targets set out in the NST1, especially the universal access to electricity by 2024. Defined therein are areas where low-demand residential customers can be supplied with DC Solar Kits (below 50 Wp as defined by EDCL). Furthermore, supplies to larger customers with a full-fledged stand-alone AC solar system should be provided to those who are too isolated from the network and other customers to techno-economically justify an individual connection to the central grid or an off-grid system. The NEP provides a national map based on the technologies to be applied up to the cell level. |
| Least Cost Power Development Plan (LCPDP, 2019) | The LCPDP provides a least-cost generation expansion plan for Rwanda’s electricity system. The purpose of the plan is to have a systematic development of generation resources by prioritizing the least cost options to ensure that the tariff affordability objectives are optimized. The least-cost study has been segmented into two phases: the immediate period (2019 – 2025) and the medium to long-term (2026 – 2040) in line with the long-term nature of energy infrastructure investments. The network development plan is also elaborated on in the NEP. |

### 2.4.1 Key laws and regulations for the electricity supply industry

**Foundational legislation**

Electricity Law No. 21/2011, as amended by Law No. 52/2018, is regarded as the cornerstone of electricity regulation in Rwanda. Its main purpose is governing the activities related to electric power production, transmission, distribution, and trading within or outside Rwanda. Its main objectives relate to i) the liberalization and regulation of the electricity sector; ii) the electric power distribution development; iii) the setting of the enabling conditions for electric power investments; and iv) the rights of users and operators and the respect of fair competition. Furthermore, this Law provides for the licensing of activities in the electricity sector, equal access to the market, the regulation of tariffs, access by the private sector, and the import and export of electricity.

The Electricity Licensing Regulations (2013) include provisions related to license requirements to conduct electricity operations, a license for electricity production and a license for electricity transmission. Additionally, the Regulation Governing the Simplified Licensing Framework for Rural Electrification in Rwanda (2015) provides for an expedited licensing process whereby mini-grid operators can apply for a simplified electricity license. Under these Regulations, mini-grid operators are obliged to integrate with the main network.

The Ministerial Guidelines on Mini-grid Development (2019) were published for interested Mini-Grid Private Developers (MPDs), to clarify and streamline the procedures for investing in mini-grids. They are expected to create a conducive working environment for mini-grid project developers and consequently contribute to the 300,000 off-grid connection target per year in line with the ESSP to reach 100 percent electrification by 2024.

Additionally, the Regulation Governing the Simplified Licensing Framework for Rural Electrification in Rwanda (2015) provides for an expedited licensing process whereby mini-grid operators within the scope of Article 5 can apply for a simplified electricity license. Under these Regulations, mini-grid operators are obliged to integrate with the main network shall it arrive.

**Grid Code and technical regulation**

The Grid Code was adopted by the Regulatory Board of Rwanda Utilities Regulatory Authority (RURA) in August 2013. The Grid Code sets out that the Transmission System Operator and System Operator functions reside inside the National Energy Provider, the state-owned entity responsible for providing electrical power in Rwanda. The Code establishes the rules and procedures that allow all participants in the electricity market to use the Interconnected Power System (IPS) and to permit the IPS to be planned and operated safely, reliably, efficiently,
and economically. The Grid Code covers a range of technical, operational, commercial, and governance issues. It includes the Governance Code, the System Operations Code, the Network Code, the Metering Code, and the Information Exchange Code. Sections 5 and 6 of its System Operations Code deal with the scheduling and dispatch of generation and ancillary services, whereas section 4 regulates transmission operations planning. Further information on the sub-codes is provided in Annex K.

The Reticulation Standards for Electricity Transmission Planning, Construction, and Maintenance (2020) establish guidelines for construction and maintenance standards to be followed in the planning and implementation of construction and maintenance works for transmission lines. It addresses the standardization of the electrification construction technology and provides tools to obtain the best economic value, without compromising standards and safety.

Two main sets of guidelines ensure the safety and reliability of off-grid electrification solutions, the Guidelines on Minimum Technical Requirements for Mini-Grids in Rwanda (2019) and the Ministerial Guidelines on Minimum Standards for Solar Home Systems (2019). The latter define the minimum service level energy requirements for an off-grid solar home system to be considered under rural electrification in Rwanda as established in the Rural Electrification Strategy. The guidelines also cover corresponding minimum requirements for solar home system accessories such as lamps, batteries, solar PV panels, charge controllers, installations requirements, and others to ensure the safety of end-users, quality of the systems, as well as the quality of service.

**Tariff Regulation**

As per Electricity Law No. 21/2011, electricity tariffs are established by RURA and published in a decision in the Official Gazette (see Annex M, N, and O). The Electricity Law sets out general tariff principles, but the more specific tariff setting methodology defined by RURA is not publicly available.

For isolated grids, RURA sets tariffs as per Article 33 of the Regulation Governing the Simplified Electricity Licensing Framework for Rural Electrification in Rwanda (2015). In this case, RURA puts in place a methodology for electricity tariffs for isolated systems. The Rwanda Energy Policy advises the pursuit of a reasonable return on investment through cost-reflective energy pricing.

### 2.4.2 Other regulation for private sector participation

**Private Sector Participation Models**

The PPP Law No. 14/2016 supports four models of public-private partnerships: management contract; build-operate-own (BOO); build-operate-transfer (BOT); and lease-operate-develop (LOD), but any other arrangement may be prescribed by an Order of the Prime Minister. Article 5 of the same law lists potential sectors for PPPs in infrastructure and services, which includes energy.

As for now, the private sector has been mostly called upon to contribute to the generation side of the sector through the IPP model, where the producer enters into a PPA where EUCL is the off-taker.
**Procurement processes**

The government is shifting from negotiated agreements based on unsolicited proposals to competitive procurement of new generation capacity basing on the PPP Law. Indeed, in the twelve months leading to August 2019, no new bilateral Memoranda of Understanding and/or other forms of agreements were undertaken (World Bank, 2019).

Law No. 62/2018 governs the public procurement of goods, works, and services in Rwanda. It sets out the fundamental principles for public procurement, as well as the types and methods for public procurement and the organizational rules for different stages of the procurement process from tender preparation to the awarding and monitoring of projects. It also defines the organization, planning, and communication of procurement programs, identifies the entities responsible for the management of procurement processes, establishes rules for the definition, signature, and enforcement of public contracts, and provides for other related issues such as payments and sanctions.

Ministerial Order No. 002/20/10/TC establishes regulations on public procurement and provides standard procedures of procurement planning up to the conclusion of the contract (TIR, 2018). The Order also provides for the use of e-procurement and its procedures. Additionally, in July 2016, REG published a Procurement Procedures Manual in line with previous legislation and based on international best practices on procurement.

**Incentives**

The Rwanda Development Board (RDB) lists the following incentives, which are available to prospective investors in the energy sector.

- Provision of investment certificate to enable privileges;
- A variety of fiscal and non-fiscal incentives (tax exemption including VAT on importation of equipment, investment allowance up to 50 percent, free repatriation of profits, 100 percent written-off development and research costs, preferential corporate income tax of 15 percent, corporate income tax holiday of up to seven years for energy projects producing 25 MW with 50 MW investment);
- Provision of RDB aftercare support to registered projects with an investment certificate.

There is also a list of energy supply equipment exempted from VAT, established by the Ministry of Finance and Economic Planning (MINECOFIN, 2015). The VAT exemption specifically targets equipment for energy efficiency, clean cooking, and renewable energy. In addition, existing exonerations on infrastructure levies are kept in place. Other incentives include road access facilitation and access to the transmission lines.

The PPP Law No. 14/2016 supports four models of public-private partnerships: management contract; build-operate-own (BOO); build-operate-transfer (BOT); and lease-operate-develop (LOD). As for now, the private sector has been mostly called upon to contribute to the generation side of the sector through the IPP model, where the producer enters into a PPA where EUCL is the off-taker.
Analysis of Electricity Market Policy and Regulatory Framework
Towards Crowding-in Private Sector Investment

Country Overview

Solar field located at the Agahozo Shalom Youth Village east of Kigali, Rwanda

Photo credit: Sameer Halai, Co-Founder of SunFunder

Solar Company: Gigawatt Global
3. Analysis of Electricity Market Policy and Regulatory Framework

UNECA and RES4Africa Foundation have developed a custom methodology to assess countries’ policy, legislative, and regulatory frameworks in their ability to encourage the participation of private sector investors. The approach encompasses a review of the entire electricity supply industry value chain, covering the generation, transmission, distribution, and off-grid segments of the market.

3.1 UNECA and RES4Africa methodological approach

The methodology identifies three areas, referred to as Dimensions under which policy, legislative, and regulatory areas are clustered. These Dimensions are as follows.

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Openness</td>
<td>or power sector structure and governance. This Dimension covers policies, laws, and regulations meant to define energy policy and strategy priorities, market-entry, infrastructure planning, sector governance, market structures, and related considerations. These instruments combined provide an overall view of the openness of the electricity market to investors.</td>
</tr>
<tr>
<td>Attractiveness</td>
<td>or sector economics. This Dimension assesses policies, laws, and regulations that ensure the economic viability of electricity infrastructure investments, as well as fair competition among market operators. A review of these instruments provides an overall synthesis of the attractiveness of the electricity market to private sector investors.</td>
</tr>
<tr>
<td>Readiness</td>
<td>or sector maturity. This Dimension investigates technical regulations designed to ensure the implementation into, and efficient integration and management of electricity infrastructure within the energy system. A review of these elements of the Dimension provides an overall picture of the readiness of the electricity market to investors along the value chain.</td>
</tr>
</tbody>
</table>
Figure 10: Overview of the Topics assessed within each Dimension

<table>
<thead>
<tr>
<th>Openness</th>
<th>Attractiveness</th>
<th>Readiness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy strategy</td>
<td>Contracts regulation</td>
<td>Authorization and permits</td>
</tr>
<tr>
<td>System planning</td>
<td>Economic regulation</td>
<td>System planning</td>
</tr>
<tr>
<td>Power sector governance</td>
<td>Incentives</td>
<td>Grid code</td>
</tr>
<tr>
<td>Power sector framework</td>
<td>Indirect incentives</td>
<td>Grid access</td>
</tr>
<tr>
<td>Power sector competition</td>
<td>Credit enhancement</td>
<td>System quality and security standards</td>
</tr>
<tr>
<td>Private sector participation model</td>
<td></td>
<td>Access to data</td>
</tr>
<tr>
<td>Procurement process</td>
<td></td>
<td>Mini-grid integration</td>
</tr>
<tr>
<td>Generation off-taking options</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Each of these Dimensions in the methodology is disaggregated into three further levels, namely Topics, Indicators, and KPIs (key performance indicators). See further detail in Annex P.

- **Topics (1st Level)** define the main areas of policy and regulatory assessment (such as energy strategy, system planning, and grid code) specific to each of the Dimensions. Topics are composed of Indicators. See Annex K for an overview of the Topics assessed.

- **Indicators (2nd Level)** cover single policy or regulatory elements (such as energy policy, Electricity Act, public PPAs, retail tariff structure, and grid connection). Each Indicator is composed of a series of KPIs.

- **KPIs (3rd Level)** are single elements, or specific questions, that provide a detailed understanding of Indicators, which in turn inform Topics.

Figure 11: Methodological building blocks

The methodology, cascading from the broader to the micro-level, enables proper assessment and understanding of the degree of openness, attractiveness, and readiness of electricity markets to private sector investors. This approach led to the formulation of a set of questionnaires – one for each segment of the electricity market, that is generation, transmission, distribution, and off-grid. – Based on YES/NO questions, the approach enables the assessment of the policy, legal, and regulatory environment related to its fundamental attributes: clarity; predictability; transparency, and accountability.

The quantitative result from this methodological exercise is estimated by summing the positive (YES) answers to the detailed questions (KPIs). To reflect on the relative relevance of a particular KPI under a given Indicator, and to assess the impact that a particular Indicator has on its Topic, Indicators, and KPIs are subjected to relative weights on a scale system. The weights were reviewed and validated by a panel of African and international experts, and reflect the average input of the experts.

To compute the necessary quantitative results based on data input from countries, UNECA and RES4Africa developed the ROAR (Regulatory review of the Openness, Attractiveness, and Readiness) tool. The ROAR tool computes results by country based on country data inputs and a defined weighting methodology.
The quantitative results, therefore, are presented at the Topics level and use a scoring system based on a 0 to 3 point-scale, where 0 is the lowest score – indicating a lack of regulatory preparedness on the assessed Topic related to private sector investment participation – and 3 is the highest – indicating a full regulatory preparedness on the assessed Topic.

3.2 Main findings of the regulatory review

Assessment is undertaken across the electricity market value chain – Generation, Transmission, Distribution, and Off-grid systems – and across three broader Dimensions vis-à-vis private sector participation – openness, attractiveness, and readiness of the market across the value chain.

3.2.1 Generation segment

Figure 12: Overview of the generation segment

Overall, the openness, attractiveness, and readiness of the electricity market of Rwanda to generation investors are shaped by a series of regulatory factors in some of which the market is already well-positioned. Regulatory improvements in the suggested key areas, as summarized in the web diagram above, would further enhance the ability of the market to crowd-in generation investors with scale.
The electricity market of Rwanda, related to generation, demonstrates openness in key areas. One such area is Power Sector Governance in which Rwanda performs well. There is an energy act, Electricity Law No. 21/2011 of June 23, 2011, providing legal clarity on the governance of the electricity market in Rwanda. The Grid Code further clarifies the roles and responsibilities along the electricity value chain. Furthermore, the existence of a regulatory authority, the Rwanda Utilities Regulatory Authority (RURA), with a clear definition of responsibilities, mandate, and public availability of its decisions provides a strong governance mechanism for the electricity market. The regulatory is sufficiently independent as per the law establishing RURA, and is only answerable to the President of the Republic and the Prime Minister’s Office, along with safeguards to guard it against conflict of interest. The regulator is also financially sufficiently independent as clarified in the Property and Finances as per the Law Establishing RURA. Furthermore, RURA can enforce its legally binding decisions. Dispute resolution mechanism is also key to private sector investors. The regulator also serves a role in dispute resolution among suppliers and consumers of energy. There are also other mechanisms including the 7th section of the Governance Code in the Rwanda Grid Code through the Grid Code Secretariat, which is an organ charged with the administration of the Grid Code. These aspects of Rwanda’s power sector governance make it a top performer related to governance and overall openness.
### System planning

Articulating short, medium, and long-term plans in the sector is a crucial aspect of the overall openness of the market to private sector participation through the provision of clarity and direction of the sector. Rwanda ranks superbly in this area. The sector has a master plan, articulated through the Rwanda Least Cost Power Development Plan (LCPDP) (2019-2040), the National Electrification Strategy (NES), and the National Electrification Plan (NEP) of 2019. There is a formal procedure to review aspects of the plan related to generation expansion. The Energy Development Corporation Ltd (EDCL) updates the power system master plan and the LCPDP. The plan is also technology-specific, particularly related to reducing dependence on diesel power generation and exploration of different generation expansion possibilities, including clean energy development. The plan also offers renewable energy sources (RES) assessment and potentials mapping. These capacities related to planning demonstrate strong system planning activities in operation in Rwanda.

### Procurement process

Procurement system management is another area where Rwanda ranks top related to the openness of the generation market to investors. There is a law governing Public-Private Partnerships (PPPs) – Law No. 14/2016 of May 2, 2016. There is also a public entity with a prominent role in PPPs – the Rwanda Development Board (RDB), including PPPs negotiation, entering into PPP agreements and advising the government on PPPs. There is a clear process for selecting PPPs through a Steering Committee and contracting authority. There are also defined PPP models for generation investors, including build, own and operate (BOO), build, own, and transfer (BOT), and lease, operate, and develop (LOD). The engineering, procurement, and construction (EPC)+Finance model is also permissible. Unsolicited proposals are possible by investors, for which there are clear rules and procedures for their treatment, including under Article 25 of the PPP Law. There is an official valuation system for unsolicited proposals, including through Article 27 of the PPP Law. Similarly, related to solicited proposals, competitive tendering is used as the unique procurement model. There are clear rules and procedures for evaluating competitive bids, accompanied by a bid evaluation system. These systems of solicited and unsolicited procurement management guided by the PPP law demonstrate strong performance of Rwanda and broader openness for generation investors.

### Energy strategy

Related to the energy strategy aspect of the openness of the generation market to private sector investors, Rwanda also performs well. The Rwanda Energy Policy revised in 2015 provide guidance to the sector. The policy articulates generation expansion targets (current projections are for peak demand to reach between 282 and 376 MW by 2024, with a 15 percent reserve margin). There is a formal procedure for energy policy review, which is already provided within the policy. There is also a RES target of 60 percent articulated in Rwanda’s Sustainable Energy for All (SE4ALL) Action Agenda. Rwanda has also articulated an Environment and Climate Change Policy, approved by Cabinet on June 7, 2019. It includes a greenhouse gas (GHG) reduction target (38 percent compared with a business-as-usual scenario by 2030) along with a formal policy review process. Therefore, Rwanda’s energy and climate policies, targets, and reviewing and monitoring processes provide strong bases for the strategic guidance of the sector and the generation market.
### Generation off-taking options

The participation of private sector investors is partly affected by generation off-taking options. Rwanda performs moderately in this regard. There is currently a dedicated single buyer model (dedicated off-taker) in operation where the Energy Utility Corporation Limited (EUCL) serves this purpose. However, in the off-grid market, RURA has updated the simplified licensing framework for mini-grids whereby an off-taking agreement with the public sector is not required. Private PPAs (or power purchase agreements between two private parties) are permissible subject to regulatory approval. In this case, private generators are permitted to wheel the energy through the national grid. However, the selling of excess electricity back to the grid is not permitted, since the regulation related to net metering is not yet in place. Captive generation, with no capacity limit, is also permitted for self-consumption. Self-consumers are also permitted to draw electricity from the grid. Regionally, the lack of spot markets, rules governing their harmonization, and rules for accessing spot markets limit off-taking options. Therefore, while Rwanda performs well related to enabling off-taking flexibility in the off-grid market, enabling private PPAs, and captive generation without limits, regulatory gaps related to net metering and regional spot markets are areas for further regulatory attention in expanding off-taking options, increasing market openness, and encouraging further generation investment from the private sector.

### Private sector participation model

The generation market of Rwanda is open to private sector participation through various models. Generation participation through a concession model is possible, where the Ministry of Infrastructure (MININFRA) has the power to issue such concession agreements, as per the 2015 Rwanda Energy Policy. Private sector participation through share ownership or divestiture, and privatization are also permissible. The National Investment Policy of 2017 enables the selling of shares, including for infrastructure managed as public property, and such interest can be filed by interested private operators. The procurement process also opens the generation market for private sector players through EPC+Finance models. However, currently, merchant generation investment models are not permitted by the existing regulatory framework.

### Power sector competition

Two regulatory areas relevant to the generation market remain major constraints towards broader openness of the generation market in Rwanda to private sector investors. The generation market is open to private sector investors, as demonstrated by a significant presence of IPPs generating nearly half of the national capacity. However, the wholesale and retail electricity markets are not open to competition. The latter two relate to the power sector framework. Transmission and distribution services remain bundled. Furthermore, transmission assets management is not separated from system operation. The prevailing system operates mainly under a single-buyer model with vertical integration. While the generation market demonstrates regulatory advancement in terms of openness to private sector investors, this is limited by the lack of competition in transmission and distribution systems that curtail diversity of generation business models, such as merchant generation, and broadened third party access to the grid. Regulatory improvements in these areas will further advance Rwanda’s demonstrated openness to generation investors.
A deep dive into the Attractiveness dimension

Figure 14: A deep dive into the Attractiveness dimension for generation

Related to the attractiveness of the generation market, Rwanda performs very well in contract regulation. Public PPAs include capacity components, and such agreements include clarity on validity of terms (timelines, milestones, and expected end-date), commissioning and availability targets, dispute resolution mechanisms, and changes outside the contract. Furthermore, the agreements typically include economic considerations, such as frequency of payments, indexation to inflation, and that of hard currency (USD or EUR). Termination provisions are also typically addressed, including transfer obligations and early termination of contracts. Therefore, the generation market’s attractiveness related to contract regulation is well established. However, public PPAs are not standardized, potentially leading to transaction costs and limiting simplified approaches to contracts management. Contract regulation performance of Rwanda will be superb with due attention and development of standardization in public PPAs to complement existing regulatory advancement in this area.

One of the most attractive areas of the generation market of Rwanda is the provision of credit enactments, vital for risk mitigation and management. Under Article 21 of the Electricity Licensing regulations, revenue escrow agreements could be available to the private sector. Furthermore, government guarantees could be structured based on the support of the government to the market through sovereign guarantees. Such guarantees for PPAs are typically administered between REG and IPPs. Multilateral guarantees from donors or multilateral institutions could also be available for generation investors.
Domestic financial institutions are encouraged to participate in concessional financing and credit guarantees. Concessional lending is available, such as through the Renewable Energy Fund and the Development Bank of Rwanda, though the financing capacity could be very limited compared with the requirements of a scaled project.

One of the critical challenges to private sector participation in generation investment is economic regulation or the tariff system. Rwanda performs moderately in economic regulation. There is already a clear tariff methodology, and an updated tariff methodology is currently underway. The tariff structure is split with detailed methodology between generation, transmission, and distribution components. There is also a periodic tariff revision mechanism in place, with a provision for quarterly tariff review. These are attractive elements of economic regulation. However, regulatory improvements are needed in key areas to further enhance the attractiveness of the electricity market of Rwanda. There is a need to tackle the cost-reflectiveness of tariffs to encourage economic pricing. Currently, tariffs are not cost-reflective. The subsidies received to compensate for the non-cost-reflective tariffs are allocated towards subsidization of industrial customers tariffs to promote the competitiveness of the national industry. Residential customers pay a cost-reflective tariff, except for cross-subsidization between different levels of consumption (as a means of cross-subsidizing electricity between different levels of income). The Energy Sector Strategic Plan 2018/2019 – 2023/24 of September 2018 already recognizes this challenge. It clearly articulated the need, through diversification of power sources to enable the government to lower long-term costs of service, to “work towards a cost-reflective consumer tariff.” Achieving this goal is crucial to improving economic regulation and better positioning the market to attract investment from the private sector. Furthermore, the public availability of tariff methodology and tariff revisions would improve the market attractiveness.

Investors in the generation market of Rwanda should expect fewer incentives. Rwanda no longer extends feed-in tariff (FiT) incentives. These used to be extended to hydro investors through IPPs; however, they are suspended and replaced by negotiated tariffs. Feed-in premiums (FiP) and a contract for difference (CfD) instruments were not used in the market since the electricity open market is not yet established. Furthermore, renewable energy-specific auctions are not available so far, and there is no public scheduling of auctions. A green certificate mechanism, renewable portfolio standards (RPS), or renewable purchase obligation (RPO) are not implemented. Capacity payments are implemented in most PPAs through “take-or-pay” clauses, however, there is no capacity market. The lack of these incentives per se is not a challenge if the market can move into greater competitiveness that reduces the need to offer a list of incentives. In the absence of such a regulatory transition, incentives continue to define market attractiveness.

Even though there are limited direct incentives provided, and unavailability of certain indirect incentives such as a carbon market with a carbon tax, there are other indirect incentives to investors. Subsidies are provided in some cases through results-based financing, often supported by available funding from development partners (DPs). There is also a possibility for direct financing from DPs and institutions such as the Rwanda Green Fund (FONERWA) and
EnDev Rwanda. In micro-hydro energy development for rural electrification, for example, EnDev Rwanda contributes an average of 25 percent of the investment cost. Furthermore, a value-added tax (VAT) relief is provided to generation investors on importation of equipment, along with an investment allowance of up to 50 percent, and a corporate income tax holiday of seven years for projects generating 25 MW within USD 50 million investment. An investment certificate is also provided for investor special treatment, including free repatriation of profits, and if applicable 100 percent write-off of research and development costs.

A deep dive into the Readiness dimension

Figure 15: A deep dive into the Readiness dimension for generation

The generation market of Rwanda exhibits readiness in several key areas. There is a strong practice of network development planning at the national level, which is publicly available. Examples are the National Electrification Plan of 2018 (NEP), Design of the Electrification Plan in Rwanda of 2019, and on-grid and off-grid expansion plans under the Energy Sector Strategic Plan (ESSP) 2018/19 – 2023/24. Such plans are reviewed through formal procedures, including generation expansions. Rwanda also carries out regular network expansion assessments, along with flexible grid requirements and renewable energy integration studies.
The regulatory environment is ready related to system quality and security standards. Under the Rwanda Grid Code, System Operation Code is articulated for reliable operation of the system. There is also transparency related to sharing system quality and security standards, including data sharing through the RURA website.

The grid code is moderately ready, though there are fundamental areas that require further regulatory development. In three areas, the grid code is sufficiently developed. First, the system operation rules are defined through the System Operation Code, along with the responsibilities and roles of grid participants in the integrated power system (IPS). They also define ancillary services. Second, grid connection rules for generators are clarified (in the Grid Code under Generator Connection Conditions of the Network Code), with clear and publicly available procedures on connection authorization with national jurisdiction. Third, related to ancillary services in the areas of reactive power, black start capacity and spinning reserves, rules and regulations are in place and are publicly available (REG website). However, the grid code requires further regulatory consideration to improve the readiness of the electricity market for private sector participation. One such area is regulatory clarification related to dispatch. Even though dispatch is run under an economic merit order, there are no clear market settlement rules, though markets often expect periodic publication of market settlements. The second is related to curtailment. Conventional projects do not receive compensation for curtailed power, and there are no limitations on curtailment. Renewable energy projects similarly don’t receive such compensation. Such regulatory concerns are, however, addressed indirectly through generalized take-or-pay and capacity payment clauses in PPAs.

Third-party grid access is an aspect of market readiness requiring regulatory development. Third-party grid access is ensured under current transmission system operation. In this regard, the Rwanda Grid Code Governance Code 2 assures that with the attainment of a license and following technical connection conditions by the participant, “open access shall not be denied by any transmission or distribution company.” Open access is accompanied by a contractual framework for connection, including a Connection Agreement, Use of System Agreement, Operating Agreement, Power Purchase Agreement, and Ancillary Services Agreement. The connection rules do not provide priority to renewable energy, as such is technology-neutral. However, the regulation should provide clarity on the allocation of connection costs.

Authorizations and permits issuance are well developed in Rwanda. Environmental approval rules are carried out based on the Organic Law No. 04/2005 on Determining the Modalities of Protection, Conservation, and Promotion of Environment in Rwanda. Such rules are applicable nationally. The Rwanda Environment Management Authority (REMA) follows clear and publicly available procedures for such authorization and licensing. Furthermore, Environmental Impact Assessments (EIAs) are facilitated under a One-Stop Center at the Rwanda Development Board (RDB), along with other facilitation services. Construction permits are administered through clear rules, including through the Rwanda Building Control Regulation of May 2012. These rules are clear and transparent, as specified in Article 85 of Law No. 10/2012 governing buildings in Rwanda and procedures for granting building permits.
There is also a clear rule for water rights, guided including by the Rwanda National Water Resources Master Plan of 2015. Similarly, land rights or access, enjoy clear rules following the implementation of land registration in Rwanda. The Office of the Registrar of Land Titles (ORLT) manages the land registration process. Land acquisition by private investors is permissible. The government is securing and demarcating land for strategic investments in different sectors per the master plan. Under the Land Administration Procedure Manual, the Procedures for Land Transaction and Registration are clarified. Therefore, authorization and permitting processes are straightforward and the regulation around them are fairly advanced in Rwanda. However, establishing, similar to environmental approvals, one-stop centers for water, land, and construction permits would further enhance the readiness of the electricity market.

Transparency and data sharing are crucial for investors. In this regard, Rwanda performs superbly. Socioeconomic data is available through multiple sources, including through the National Institute of Statistics of Rwanda and the Rwanda Data Portal. Balance sheets of public utilities are also publicly available, including financial statements and annual reports. Electricity generation and demand, as well as other sector data, are also publicly available.

3.2.2 Transmission segment

Figure 16: Overview of the transmission segment
Overall, crowding-in Transmission asset investors require addressing the openness, attractiveness, and readiness related regulatory challenges summarized below.

A deep dive into the Openness dimension

Figure 17: A deep dive into the Openness dimension for transmission

Private sector investment in the transmission market in Africa is often limited, even though this segment of the market is witnessing increasing openness and new business models. The electricity market of Rwanda exhibits a degree of openness to private investment in transmission assets. Key aspects of the electricity market related to energy strategy, system planning, and network expansion plan are already discussed under the generation market segment. It is worth noting that the national Electrification Plan and grid expansion plans are in place, along with a transmission investment plan. The latter is articulated under the REG Strategic Plan 2019-2024 for transmission development under Financing Strategy Investment Outlook, where an investment requirement of RWF 59 billion is estimated.

The power sector governance and framework are also evaluated under Generation - Openness. The power sector framework remains bundled for wholesale and retail electricity services. However, private sector market entry into transmission assets investment, or operation, is open under licensing. Under Article 27 of the Electricity Law, the electricity market of Rwanda is deemed to be “market-based on free and equal access to the activities of electricity production, transmission, and distribution.” It also permits PPP models for private sector participation, such as BOO, BOT, and LOD. The requirements for license application and acquisition are clear under the Electricity Licensing Regulations.
Towards Crowding-in Private Sector Investment

Analysis of Electricity Market Policy and Regulatory Framework

The transmission segment of the market demonstrates openness to different forms of private sector participation models. A grid concession model for transmission by a private sector operator is permitted. Participation through share ownership in the transmission company is also permitted. The Independent Power Transmission (IPT) model is also possible as per the Electricity Law and the PPP Law. However, the government seems to have chosen to go progressively on implementation of full unbundling, limiting actual private sector participation beyond the generation market.

The procurement system offers another opportunity for private sector participation. In this regard, there are defined PPP models for transmission systems – BOO, BOOT, and BTO. Furthermore, EPC+Finance models are also available. However, these options are not yet implemented in transmission assets engaging private sector players. The tendering process for transmission assets is competitive, supported by the policy goal to reach 52 percent grid connections by 2023/24 from the level of 28.7 percent today. However, such bids do not exclude public companies from participating, though governed by the competitive neutrality in public procurements. Tenders are also publicly scheduled for transmission investment, organized both under early and late-stage models.

A deep dive into the Attractiveness dimension

Figure 18: A deep dive into the Attractiveness dimension for transmission

Contracts regulation for transmission services is guided by a degree of standardization for transmission services, akin to a Transmission Service Agreement. Such standardization includes performance evaluation based on network availability, validity and terms, commissioning and availability, dispute resolution, and termination provisions. These are guided by the Rwanda Grid Code, PPAs, transmission service application form, Quality of Supply (QoS), and other instruments.
### Economic regulations

There is a clear economic regulation for networks, under a defined tariff methodology structure which is regulation cost-based (RAB). The tariff is periodically revised. As such, network economic regulation in Rwanda is well developed.

### Credit enhancement

The transmission segment of the market does not enjoy the same level of credit enhancement as in the generation market, limiting the degree of openness of the transmission market. Even though revenue escrow agreement for transmission investors could be available, along with concessional lending, government and multilateral guarantees are not available to investors.

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#### A deep dive into the Readiness dimension

**Figure 19: A deep dive into the Readiness dimension for transmission**

Overall, the Transmission segment of the market is ready for private sector investors. Readiness related to the *grid code*, *grid access*, *system quality and security standards*, and *access to data* have been already discussed under *Generation - Openness*.

### Authorizations and permits

Regarding the *authorizations and permits* topic, it is worthy to acknowledge that the guidelines on Right-of-Way for Power Lines (2015) provide provisions for a safety corridor requiring the licensee to keep the power lines clear of tall trees, building and other structural obstructions that could interfere with the operation of the line, and to provide access for power lines maintenance.
3.2.3 Distribution segment

Figure 20: Overview of the distribution segment

Overall, the overall openness, attractiveness, and readiness regulatory assessment of the Rwandan power market is shown in the above web diagram.
There is an overall openness of the distribution segment of the power market to private sector investment in Rwanda. Key regulatory issues related to the energy policy and strategy and systems planning are already discussed. It is worth paying attention to household connections and electricity access targets embedded in national strategies. As articulated in the ESSP, in the 2018/19 – 2023/24 planning period 1.04 million households will be connected to the grid, equivalent to 170,000 new customers per year, with a goal of universal access for 3.72 million households by 2024, with the plan envisages 48 percent of connections via off-grid solutions.

The superb performance on power sector governance is also analyzed under generation and transmission segments. Similarly, Rwanda demonstrates high performance in procurement system management. Particularly in the distribution segment of the market, defined solicited PPP models are permitted, including BOO, BOOT, and BTO models of partnership with the private sector. EPC+Finance models are also available for the private sector. For example, the National Strategy for Transformation (NTS1) encourage the facilitation of access to commercial borrowing for REG for all transmission projects including in the area of EPC+Finance. This model is expected to extend to distribution networks as well. Furthermore, there is public scheduling of tenders for distribution investment, improving openness. However, there are limitations in the procurement system that offer scope for regulatory improvement. Competitive tenders for distribution investment is currently unavailable, both under early and late-stage models.
Private sector participation in the distribution segment of the market is permitted through a concession model, as well as share ownership and EC+Finance models. However, concession and share ownership models are not yet implemented in practice. There is a preference to move in this direction progressively. Therefore, the private sector in the distribution market may face a conducive regulation with a practical challenge to implement distribution investment. It will be important to provide further policy clarity from MININFRA to mitigate this uncertainty for network investors.

The main regulatory impediment related to the openness of the distribution segment of the market to private sector investment emanates from the power sector framework. Rwanda has not yet implemented transmission service unbundling, as well as unbundling of distribution retail services.

**A deep dive into the Attractiveness dimension**

*Figure 22: A deep dive into the Attractiveness dimension for distribution*

For investors seeking effective contracts regulation as part of the attractiveness of the distribution segment of the market, Rwanda performs well in this respect. Even though the typical distribution service agreement is not in place, there is an attempt at standardization through the Rwanda Grid Code under the Governance Code, including on PPAs and Supply Agreements, and the Distribution service application form. The Network Code also covers distribution network requirements applicable to prospective connection applications, technical and protection requirements, and other aspects.
It defines performance based on network availability, or Interruption Performance, identifies network performance indices, dispute resolution mechanism, and termination provisions. Following these regulatory provisions, efforts in instituting a standardized distribution service agreement (DSA) would further improve the attractiveness of the distribution market.

Economic regulations

Rwanda also demonstrates high performance in economic regulation applicable to the distribution market segment. A clear network tariff methodology is in place. Network tariff is regulated on a cost basis, along with periodic review and revision mechanism in place. To improve performance in this area, a further attempt is needed in increasing transparency by making such methodology and reviews publicly available.

Credit enhancement

The distribution segment of Rwanda’s electricity market attracts minimal credit enhancement to private sector investors. Escrow agreements are not available so far. Government and multilateral guarantees are also not in place. However, concessional lending could be available through DFIs.

A deep dive into the Readiness dimension

Figure 23: A deep dive into the Readiness dimension for distribution

The distribution market segment of Rwanda is fundamentally ready in several regulatory areas. Rwanda has superb performance in authorization and permits management for the right of way, land, construction, and environmental approval. Establishing a single service window for these services, which is now limited to environmental approval, would put the performance in this area at the top.
System quality and standards

System quality and security standards are in place, along with a Grid Code with well-defined system operation rules. They also clarify metering services under the Rwanda Grid Code on Metering Code.

Access to data

There is transparency with good access to economic and energy sector data, including financials.

Grid access

Grid access in the distribution segment of the market requires regulatory improvement to enhance market readiness. Rules providing mandatory connection to ensure third party access do exist. However, allocation of connection costs is not defined and clarified, including at the national level. Such rules are also not publicly available. Grid connection and operations agreement related to final customers enjoy rules for open access to the grid, accompanied by a contractual framework for connections. However, clarity on the allocation of connection costs is currently missing. Addressing these regulatory gaps will enhance the readiness of the market.

3.2.4 Off-grid segment

Figure 24: Overview of the off-grid segment
Off-grid market development is often a crucial part of the strategy to achieve universal access to energy. Identifying and addressing regulatory barriers in this segment of the electricity market, and encouraging private sector investors to effectively participate are needed in closing access gaps. The off-grid market is nascent in Africa, often with regulatory uncertainty. The national electrification strategy of Rwanda places importance on the development of the off-grid market, including the potential role of the private sector. Therefore, identifying regulatory barriers for effective private sector participation in this market in Rwanda, as well as acknowledging current regulatory advancements, could be helpful. The overall regulatory performance of the off-grid market in Rwanda is provided below.

**A deep dive into the Openness dimension**

*Figure 25: A deep dive into the Openness dimension for off-grid*

Rwanda performs very well in terms of the openness of the off-grid market to private sector investors related to energy strategy and system planning in operation. Related to energy strategy applicable to the off-grid market, the Rwanda Energy Policy (2015) seeks to ensure the “provision of cost-effective, appropriate solutions to the poor … particularly in rural areas where energy services are scarce or expensive, [and] poverty reduction can occur.” The policy is backed by a National Electrification Plan, outlining how 52 percent of grid-based connections can be achieved by 2024. Furthermore, the Rural Electrification Strategy (2016) seeks to achieve 48 percent of households’ access to electricity services (1.5 million households, or nearly 250,000 connections per year) through off-grid solutions by 2024. The 48 percent is composed of grid standard micro grids representing 10 percent, and 38 percent from solar kits and stand-alone systems.
| **Procurement process** | The strength of the *procurement process* and management in Rwanda is already discussed under the generation, transmission, and distributions segments. It is worth noting that various PPP models, such as BOO, BOOT, and BTO are permissible in the off-grid market of Rwanda. Furthermore, a PPP split assets investment approach for off-grids is possible. Competitive tenders for off-grid investments are practiced, even though the public scheduling of such tenders is currently lacking. Overall, Rwanda demonstrates openness to private sector participation due to improvements in procurement policy and management. |
| **Power sector governance** | The good performance related to the overall *power sector governance* is already discussed. It is worth noting, in relation to the off-grid market, that there is a dedicated institutional focus on off-grid and rural electrification that plays a role in place of a rural electrification agency. |
| **Private sector participation model** | Acknowledging the regulatory strengths in Rwanda’s off-grid electricity market affecting market openness, there are key regulatory barriers that hamper effective private sector participation in this market segment. Key challenges related to the power sector framework overall is already assessed under the generation, transmission, and distribution segments, and applies to the off-grid market as well. Similarly, challenges related to power sector competition at the wholesale and retail levels are also discussed. For the off-grid market, it is important to further consider regulatory constraints related to the *private sector participation models*. EPC model of private sector participation in off-grids is possible. An off-grid electrification concession model is also possible, which is already implemented for grid-connected generation assets. However, a merchant investment model, such as B2B (or business-to-business model) is not permissible under current regulation, since the electricity open market is not yet established in Rwanda. |
A deep dive into the Attractiveness dimension

Figure 26: A deep dive into the Attractiveness dimension for off-grid

The attractiveness of the off-grid market of Rwanda is enhanced by the provision of indirect incentives to investors. VAT and import duty relief are extended. A corporate preferential income tax of 15 percent is also extended. Though most off-grid investments are for low-capacity energy, projects producing 25 MW with USD 50 million investment also attract corporate income tax holiday for 7 years. With the application for exemption at the Rwanda Revenue Authority (RRA), import duty relief is extended for plants and machinery as per the RRA guide based on Taxes and Customs Duties in the Development of Our Nation.

Rwanda also offers an attractive off-grid market to investors based on advancements in economic regulation for the off-grid market. There is a periodic review of the national tariff system. Off-grid tariffs are deregulated (as of January 2021), where off-grid operators are permitted to set tariffs different from the grid-based tariffs. Furthermore, the off-grid tariff method is in place at RURA, though not made publicly available.

There is a regulatory gap, however, related to the standardization of retail contracts for off-grid operators. In the absence of standardization, rules governing metering and billing are in place as per the Ministerial Guidelines on Mini-grid Development (Ministry of Infrastructure) for payment of electricity services, and as per RURA Minimum Technical Requirements for Mini-grids in Rwanda (2019), Metering (Chapter 8).

Off-grid market investors may expect a possibility of concessional lending support, for example through DFIs. However, government and multilateral guarantees are not extended to investors in this market segment.
Overall, the off-grid market of Rwanda demonstrates a good degree of readiness. The performance related to authorizations and permits process and access to data is already discussed under generation, transmission, and distribution market segments.

System quality and security standards are in place, including through RURA (2019) Minimum Technical Requirements for Mini-grids in Rwanda. Quality of service regulation is in place. Rwanda regulates both main and off-grid systems by the same system quality standards.

There are regulatory provisions for off-grid system integration. Current regulation permits mini-grid operators to operate as small power producers (SPP) and distributors (SPD) as per the RURA (2019) Regulation Governing the Simplified Electricity Licensing Framework for Rural Electrification in Rwanda. Mini-grid operators are permitted to sell eligible assets to the utility. Operators are also permitted to decommission and remove assets. Clarification of these regulatory issues has advanced the readiness of the off-grid market to private investment. However, in cases of grid arrival, current regulation does not permit mini-grids to coexist with the main grid. Guarantees or compensation mechanisms are also not in place for potentially stranded assets due to grid arrival. Addressing these regulatory gaps would improve off-grid system integration and grid arrival regulation, and provide for greater clarity and predictability relevant to crowding-in private sector scaled participation in this market segment.
Conclusions and Recommendations
Towards Crowding-in Private Sector Investment

Conclusions and Recommendations

Shore-based KivuWatt power production facility in Lake Kivu, Karongi District.

Photo credit: Photo by CYRIL NDEGEYA/AFP via Getty Images
4. Conclusions and Recommendations

The Rwanda electricity market regulatory review provides analyses of the sector policy, laws, and regulatory frameworks towards crowding-in private investments to bridge the gap in providing energy infrastructure towards meeting SDG7. The analyses are conducted using a regulatory review methodology developed by UNECA and RES4Africa Foundation. It is based on three broader regulatory Dimensions that review fundamental attributes to attracting private sector participation. These are the degree of openness of the electricity market in Rwanda (or power sector structure and governance), the attractiveness of the market to investment (or sector economics), and the degree of readiness of the market (or sector maturity). Assessment is undertaken across these three Dimensions.

In general, the electricity market of Rwanda saw rapid improvements in power generation and network expansion. Under the National Strategy for Transformation, Rwanda has set a target of universal access to electricity by 2024, six years ahead of the 2030 global target under SDG7. The national generation capacity has grown considerably in recent years, reaching 227 MW in 2020 from more than 40 generating plants. Through the Energy Sector Strategic Plan implementation, major investments are pursued to increase generation capacity and delivery of electricity services on-grid and off-grid. As Rwanda seeks to accelerate economic and social development, the electricity demand is expected to further increase. Meeting this demand and energy sector goals require a major expansion of the national electricity capacity and significant investments. In this effort, the role of the private sector will continue to be crucial in securing success.

Currently, even though Rwanda made a major stride in crowding-in private sector investment in the generation segment of the market, as well as in off-grid systems, network investment so far attracts minimal private sector role. Regulation and its implementation largely play a role in this regard. As Rwanda pursues an ambitious transformation of the energy sector, examining and enabling the participation of the private sector across the electricity market value chain will be of at most importance to meeting such goal.

In all three regulatory review Dimensions of openness, attractiveness and readiness, Rwanda enjoys good performance. On electricity market openness, clarity of the national energy policy and sector strategies, system planning, and the effective governance of the market through an enabled and independent regulator are advanced features of the Rwandan electricity market. Implementation of projects is also supported by a national competitive procurement management system. Related to market attractiveness, availability of incentives, economic regulation system (tariff administration), contracts regulation, and availability of credit enhancement mechanisms are areas of good regulatory performance. On the readiness of the electricity market to crowd-in private investment, Rwanda demonstrates excellent performance in the areas of transparency, authorizations and permitting efficiency, system planning, and putting in place the necessary system quality and security standards. These regulatory provisions and advancements have raised the overall openness, attractiveness, and readiness of the electricity market.

However, there are remaining regulatory barriers and uncertainties that will impede effective participation of the private sector and, therefore, require regulatory assessment, improvement, and in some areas reform.
4.1 Takeaways from the regulatory review

**Related to the Openness of the electricity market**

The generation segment of the market faces challenges emanating from limited electricity off-taking options (particularly lack of net metering and access to a regional spot market); regulatory barrier on merchant generation in open electricity market; and absence of wholesale and retail markets competition. The transmission and distribution segments of the market also face regulatory challenges on openness related to: lack of competition on wholesale and retail power; the slower pace at implementation of market unbundling; the lack of PPP and other models’ application in network investment; and experience in managing competitive tenders for distribution. The off-grid segment faces regulatory barriers related to the openness of the market to investors in public scheduling of tenders; merchant investment models; and the overall power sector framework related to competition.

**Related to the Attractiveness of the electricity market**

The generation segment of the market faces challenges emanating from the following shortcomings: standardization of public PPAs; cost-reflectiveness of tariffs; and almost no direct incentives in the absence of competitive markets. The transmission and distribution segments of the market also face regulatory challenges on attractiveness related to credit enhancement, particularly government and multilateral guarantees; and standardization of transmission and distribution service agreements. Most of these challenges emanate from the overall closure of networks investment to private investors. The off-grid segment faces the following regulatory barriers related to the attractiveness of the market to investors: standardization of retail contracts; credit enhancement and particularly government and multilateral guarantees.

**Related to the Readiness of the electricity market**

The generation segment of the market faces challenges related to clarification of the grid code on dispatch and curtailment; allocation of connection costs; and facilitation through a one-stop-shop for non-environmental permits and authorizations. The readiness of the market to network investors is also affected by similar challenges. In the off-grid market, there are also additional regulatory barriers related to the coexistence of grids and off-grids; and guarantees and compensation during grid arrival for stranded assets.

There is notable progress and advancement of the regulatory environment of the electricity market in Rwanda. Further assessment, improvement, and where needed reform will contribute towards further advancement of the regulatory and electricity market business climate. Therefore, regulatory and policy measures that address the challenges would constitute positive steps towards further strengthening the sector to support Rwanda’s ambition of national economic transformation through effective private sector investment participation.
4.2 Recommendations

Rwanda enjoys a track record of commitment to improving regulatory environments to attract private capital and investment throughout the economy. Its superb performance on reform and business climate is exemplary, as witnessed in its Doing Business rankings. This is equally matched by the ability to attract FDI in various sectors. Rwanda has similarly advanced progressive regulations to govern the electricity market, as witnessed in numerous parts of the regulatory review in this country assessment. However, there are remaining regulatory barriers that could impede effective crowding-in of private sector investment in the electricity market, as discussed above. Address these remaining regulatory challenges will enhance the openness, attractiveness, and readiness of the electricity market of Rwanda across the value chain from generation to off-grid systems. Towards this goal, the following measures are recommended mainly to the Ministry of Infrastructure (MININFRA) and the Rwanda Utilities Regulatory Authority (RURA), and also to the Rwanda Energy Group (REG), as well as other relevant energy institutions.

To enhance the Openness of the electricity market

The energy policy, sector strategies, and accompanying regulations demonstrate effective openness of Rwanda’s electricity market to private sector participation. The market is backed by an effective procurement system. Generation investors are keen on securing diverse off-taking options. Rwanda also performs well related to enabling off-taking flexibility in the off-grid market, enabling private PPAs, and captive generation without limits. However, regulatory gaps related to net metering and regional spot markets are areas for further regulatory attention in expanding off-taking options. Therefore:

- Review and adopt net metering regulation to broaden off-taking options and boost private sector generation investment.
- Pursue access in the long-term to the South African Power Pool, where there is an active regional spot market, and advocate the operationalization of a similar spot market within the East Africa Power Pool.

The generation market of Rwanda is open to private sector participation through various models, including share ownership, divestiture, concessions, and EPC. The current regulation does not support merchant generation investment. In this regard,

- Review the utility of merchant generation models to upscale generation investment and put in place appropriate regulatory measures to enable such business models.

Transmission and distribution networks are in general open to private sector investment by regulation. However, the preference to go gradually to opening these segments of the market has limited the presence of a private investment in networks, including through PPPs. As the network expansion requirements and financing needs are expected to grow in the short to medium-term,
Review the current practice and advance regulations towards better **openness** to private network investors through the implementation of workable models.

The power sector framework of Rwanda is overall open to the participation of private investors in the electricity market. Private parties are permitted to own and operate generation assets, by acquiring licenses. Off-grid investors are offered exclusivity over an area. Though currently wholesale and retail competition is not curtailed by regulation, they are nonetheless not implemented. To further improve this framework:

- Pursue transmission and distribution services unbundling.
- Pursue the separation of transmission assets management from system operation.
- Encourage wholesale and retail market competition to enable greater **openness** to effective private sector participation.

---

**To enhance the Attractiveness of the electricity market**

Contract regulation partly defines the attractiveness of electricity markets. Rwanda features conducive contracts regulation, through public PPAs, that includes capacity components, clarity on validity of terms, commissioning and availability targets, dispute resolution mechanisms, and changes outside the contract. The agreements also include economic considerations, such as frequency of payments, indexation to inflation and that of hard currency (USD or EUR). Termination provisions are also addressed, including transfer obligations and early termination of contracts. However, such contracts are not standardized. Therefore:

- Develop and adopt standardized public PPA and other contracts (TSA, DSA and others) to improve on contracts regulation and administration.

Financing is a major constraint to energy investments. Rwanda offers electricity market investors credit enhancement possibilities, including through escrow agreements, government and multilateral guarantees, and concessional loans. However, such support is not extended to network and off-grid investors to the same extent as for generation investors.

- To advance investment in networks and off-grid systems, review the credit enhancement mechanism to private sector investors in these assets.

Electricity market investment is dependent on economic regulation, or the tariff system. A clear tariff methodology, allocation by market segment (generation to distribution), and its periodic review are good practices in economic regulation. However, prevailing tariffs are not cost-reflective. Therefore,
Conclusions and Recommendations

Review the national tariff system and align with the National Energy Policy by taking steps to transition to cost-reflective tariffs.

Investors in the electricity market of Rwanda should expect less direct incentives, such as FiT, FiP, CfD, RPO, RPS, and others, though few others are offered (through Rwanda Green Fund and EnDev Rwanda). However, Rwanda offers several indirect incentives to investors, including VAT and import duty reliefs. Considering these,

Pursue competition-based private sector investment participation to reduce the need to provide incentives.

To enhance the Readiness of the electricity market

Rwanda’s grid code is moderately ready. The grid code is sufficiently developed in the areas of system operation rules, grid connection rules, and ancillary services. However, regulatory clarity is lacking related to dispatch and curtailment. There is no market settlement rule to support dispatch. Curtailment concerns are today addressed indirectly by take-or-pay and capacity payment clauses in public PPAs. Therefore,

Review the grid code to provide clarity related to dispatch (market settlement rules) and curtailment.

Third-party grid access is ensured under the Grid Code. Open access is accompanied by a contractual framework for connections, including a Connection Agreement, Use of System Agreement, Operating Agreement, Power Purchase Agreement, and Ancillary Services Agreement. However, regulation clarity on the allocation of connection costs is lacking. Therefore,

Provide regulatory clarity and certainty on the allocation of costs related to third-party access to the grid.

Authorizations and permits issuance are well developed in Rwanda. Environmental approval is undertaken under a one-stop-shop. Such processes are also clear and publicly known for land, water, and construction permits. These processes do not benefit from a one-stop-shop business facilitation and could increase the time and transaction cost associated with energy projects. Therefore,

Similar to the facilitation of environmental approval under a one-stop-shop, institute a similar efficient approach for other relevant authorizations and permits to minimize administrative and transaction costs and reduce project time.
Particularly in the off-grid market, in cases of grid arrival, current regulation does not permit mini-grids to coexist with the main grid. Guarantees or compensation mechanisms are also not in place for potentially stranded assets due to grid arrival. Therefore,

Provide regulatory clarity and predictability in the off-grid market by reviewing and updating regulation related to grid arrival, including on coexistence of grid systems and guarantees or compensation for stranded assets.

4.3 Way Forward

The electricity market of Rwanda is expected to play a major role in supporting and enabling the country’s socio-economic transformation. The concurrence of development agendas on Rwanda’s development and transformation, domestic universal electricity access goals, as well as regional and continental market integration has made the development of the energy sector a priority. This appropriate policy attention on the sector and long-term sector development strategy necessitate major investments in generation, transmission, distribution and off-grid systems. In the post-COVID economic environment, coupled with prevailing investment requirements of the sector, engaging the private sector in the market is essential to meeting different sector-related goals. It continues to be important that private sector actors supplement public resources in sustaining investment in energy infrastructure.

Towards this end, this regulatory review evaluated the openness, attractiveness, and readiness of the electricity market of Rwanda, relative to private sector crowding-in, and identified key areas of strength, as well as areas of further improvement. Key recommendations are offered to close the main regulatory gaps. As Rwanda seeks to rapidly increase its energy capacity, including through private sector investment, regulatory and policy reforms play key roles. This report offers constructive identification of areas of reform and system enhancement for a competitive and resilient electricity market that sees growing participation of private capital.

The UN Economic Commission for Africa and the RES4Africa Foundation remain committed to supporting Rwanda in addressing any of the identified regulatory and policy gaps, investing in the necessary regulatory capacity development, as well as any area of particular reform interest of Rwanda towards greater openness, attractiveness, and readiness of the market. They also call on the development community, NGOs, ISOs, national organizations, and the private sector to play their constructive role in supporting Rwanda in this reform process, aimed at economic transformation and achievement of SDG7 goals.
References


Towards Crowding-in Private Sector Investment

References


### Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>AfCFTA</td>
<td>Africa Continental Free Trade Area</td>
</tr>
<tr>
<td>AfDB</td>
<td>African Development Bank</td>
</tr>
<tr>
<td>BOO</td>
<td>Build, Operate, and Own</td>
</tr>
<tr>
<td>BOT</td>
<td>Build, Operate, and Transfer</td>
</tr>
<tr>
<td>BRD</td>
<td>Development Bank of Rwanda</td>
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<td>CfD</td>
<td>Contract for Difference</td>
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<td>Civil Society Organizations</td>
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<td>DPs</td>
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<td>Distribution Service Agreement</td>
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<td>Energy for Impact</td>
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<td>EAC</td>
<td>East African Community</td>
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<td>Electricity Access Rollout Program</td>
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<td>EDPRS</td>
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<td>EIA</td>
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<td>EICV</td>
<td>Integrated Household Living Survey</td>
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<td>ELECTROGAZ</td>
<td>Defunct utility for electricity and water</td>
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<td>EnDev</td>
<td>Energizing Development</td>
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<td>EPC</td>
<td>Engineering, Procurement, and Construction</td>
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<td>EPD</td>
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<td>FDI</td>
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<td>Feed-in Premium</td>
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<td>Government of Rwanda</td>
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<td>GDP</td>
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<td>HLTO</td>
<td>High-Level Target Objectives</td>
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<td>IMF</td>
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<td>IPP</td>
<td>Independent Power Producer</td>
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<td>Interconnected Power System</td>
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<td>Acronym</td>
<td>Full Form</td>
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<td>KPIs</td>
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<td>LCPDP</td>
<td>Least Cost Power Development Plan</td>
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<td>LOD</td>
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<td>LPG</td>
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<td>MINECOFIN</td>
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<td>MININFRA</td>
<td>Ministry of Infrastructure</td>
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<td>MPDs</td>
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<td>MW</td>
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<td>NDC</td>
<td>Nationally Determined Contributions</td>
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<td>National Electrification Plan</td>
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<td>National Strategy for Transformation 1</td>
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<td>PPA</td>
<td>Power Purchase Agreement</td>
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<td>Public-Private Partnership</td>
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<td>PRSP</td>
<td>Poverty Reduction Strategy Paper</td>
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<td>QoS</td>
<td>Quality of Supply</td>
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<td>RBF</td>
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<td>RDB</td>
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<td>REF</td>
<td>Renewable Energy Fund</td>
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<td>REG</td>
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<td>RES</td>
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<td>REGIDESO</td>
<td>Defunct utility for electricity and water</td>
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<tr>
<td>REMA</td>
<td>Rwanda Environment Management Authority</td>
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<td>Rwanda Energy Policy</td>
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<td>RES</td>
<td>Renewable Energy Sources</td>
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<td>RES4Africa</td>
<td>Renewable Energy Solutions for the Mediterranean and Africa</td>
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<td>RPO</td>
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<td>SACCO</td>
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<td>SREP</td>
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<td>SWG</td>
<td>Sector Working Group</td>
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<tr>
<td>Abbreviation</td>
<td>Full Form</td>
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<td>TSA</td>
<td>Transmission Service Agreement</td>
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<td>TWG</td>
<td>Technical Working Group</td>
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<td>UNECA</td>
<td>United Nations Economic Commission for Africa</td>
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<td>USD</td>
<td>United States Dollars</td>
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<td>VAT</td>
<td>Value-Added Tax</td>
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<td>WASAC</td>
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Annexes

Annex A
Summary of Basic Economic Statistics (2016/2017 figures)

<table>
<thead>
<tr>
<th>Economic Indicator</th>
<th>Value</th>
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<tbody>
<tr>
<td>Total population</td>
<td>12,208,407 (2017 World Bank)</td>
</tr>
<tr>
<td>Real GDP growth</td>
<td>8.6 percent (2018)</td>
</tr>
<tr>
<td>GDP at current prices</td>
<td>USD 9.135 billion (2017 World Bank)</td>
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<tr>
<td></td>
<td>RWF 8,190 billion (NISR, 2018)</td>
</tr>
<tr>
<td>GDP per capita</td>
<td>USD 830 (2018 IMF)</td>
</tr>
<tr>
<td>Consumer price index (inflation)</td>
<td>CPI increased by 1.1 percent on average between December 2017 and December 2018</td>
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<tr>
<td>Total exports</td>
<td>USD 995.7 million (2018 BNR)</td>
</tr>
<tr>
<td>Total imports</td>
<td>USD 2,425 billion (2018 BNR)</td>
</tr>
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<td>Exchange rate</td>
<td>942 Rwf (24/07/2020); 901 Rwf (24/07/2019); 861 Rwf (24/07/2019)(^1) representing an increase of 5 percent per year of the value of the USD to the Rwf</td>
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</table>

Annex B
Investment (share of GDP, 2017–2024)

![Graph showing investment](image)

Source: Based on data from MINECOFIN (2020), Key Statistics of Rwanda.

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\(^1\) [https://www.bnr.rw/currency/exchange-rate/](https://www.bnr.rw/currency/exchange-rate/)
Annex C
Electricity demand forecast (MW, 2011-2022)


Annex D
Electricity connections (% 2000-2016)


Annex E
Ongoing and planned transmission network, 2019

Annex F
Sales of solar lighting products (units, 2016-2018)

<table>
<thead>
<tr>
<th></th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
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<tbody>
<tr>
<td>Lamp Sales</td>
<td>13,897</td>
<td>28,894</td>
<td>20,419</td>
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<tr>
<td>Lamp Tenders</td>
<td>-</td>
<td>1,511</td>
<td>2,859</td>
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<tr>
<td>SHS Sales</td>
<td>41,019</td>
<td>94,741</td>
<td>98,046</td>
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<tr>
<td>SHS tenders</td>
<td>-</td>
<td>18,996</td>
<td>17,379</td>
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Annex G
REF access to local currency financing through five windows

Window 1
On-lending through SACCOs to households and micro-enterprises: the window provides a wholesale line of credit to BRD for on-lending to SACCOs that comply with established eligibility criteria. SACCOs will on-lend the funds to eligible households and micro-enterprises for the purchase of qualifying solar systems.

Window 2
On-lending through banks (commercial and microfinance) to households and small and medium enterprises (SMEs): the window provides a wholesale line of credit to BRD for on-lending to eligible commercial and microfinance banks, which will then extend sub-loans to households and SMEs for the purchase (and possibly, in the case of SMEs, distribution) of qualifying solar systems.

Window 3
Direct financing of mini-grid developers: this window will provide direct financing to eligible mini-grid developers to finance the construction of renewable-energy-based mini-grid systems.

Window 4
Direct financing of locally-registered off-grid solar companies support to qualifying solar systems.
Window 5
Is a USD 15 million subsidy scheme under the Result-Based Financing (RBF) model. The RBF scheme allows Off-grid Solar Companies (OSCs) to offer off-grid services at a lower price to low-income households. This helps to minimize their default risk, allowing more OSCs to participate in the REF program, and contribute to the government’s NST1 (2017–2024) targets. The expected result is also based on the expectation that Window 5 subsidy increases the number of OSCs leveraging REF credit line from other Windows.

Annex H
Governance framework of the power sector

Annex I
Specific issues that the Rwanda Energy Policy, 2015 was intended to address

The policy has been devised to address the following issues:

i. insufficient investment to develop electricity generation, transmission and distribution projects including the interconnection projects that can facilitate and enhance the energy trade;

ii. Large technical and non-technical electricity losses;

iii. Inadequate maintenance;

iv. High costs of supply due to the past insufficient investment in power generation, transmission and distribution and sometimes coupled with a very low operational efficiency and lack of financial planning;

v. Lack of cost-reflective tariffs;

vi. Lower electricity access;

vii. Low quality of electricity supply and customer service;

viii. Inefficient commercial operations in terms of lack of an accurate customer database, inadequate systems and controls for meter reading and high accounts receivable.
Annex J

High-level target objectives (HLTOs) established by ESSP 2018-2024

1. Generation capacity increased to ensure that demand is met and a 15 percent reserve margin is maintained.
2. Reliability of electricity supply to be improved. The average number of power interruptions per year reduced to 91.7 and the average number of hours without power to 14.2, and network reinforcement was undertaken to reduce network losses.
3. Household access to electricity increased to 100 percent.
4. Productive user access to electricity increased to 100 percent.
5. Street lighting expanded to all main national roads and urban roads.
6. Losses in the transmission and distribution networks reduced to 15 percent. This was combined with (2) above.
7. Halve the number of households using traditional cooking technologies to achieve a sustainable balance between supply and demand of biomass.
8. Petroleum strategic reserves increased to cover three months’ supply.
9. Gas strategic reserves increased to cover three months.

It then assigns a budget to each HLTO and arrives at the cost of implementation of the ESSP at USD 3,123.38.

Annex K

Brief description of the sub-codes composing the Grid Code

a. The Preamble provides the context for the Grid Code and its various subsections. It is also the single document in the Grid Code that contains detailed definitions and acronyms of all relevant terms and abbreviations used in the Grid Code documents.

b. The Governance Code sets out how the Grid Code will be maintained. It describes the process that will be followed to update the Grid Code to improve safety, reliability, and operational standards. In addition, the document also explains oversight and compliance requirements that need to be observed by all Grid Code Participants.

c. The System Operations Code sets out the responsibilities and roles of the Grid Code Participants as far as the operation of the IPS is concerned. It also sets out the responsibilities and roles of the Grid Code Participants as far as the scheduling and dispatch of the IPS is concerned.

d. The Network Code focuses on the technical requirements and standards of the interconnected power system (IPS).

---

e. **The Metering Code** ensures a metering standard for all current and future Grid Code Participants. It specifies metering requirements to be adhered to and addresses levels of responsibility.

f. **The Information Exchange Code** defines the obligations of parties with regard to the provision of information for the implementation of the Grid Code. The information requirements, as defined for the Grid Code Participants, are necessary to ensure non-discriminatory access to the IPS and the safe and reliable provision of transmission and distribution services.

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**Annex L**

**Policies, Plans and Regulations (Accessed 7/06/2021)**

<table>
<thead>
<tr>
<th>Policy Description</th>
<th>Link</th>
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### References

- **Reticulation Standards for Electricity Transmission Planning, Construction and Maintenance, 2020**
- **Regulation No. 01/2015 Governing the Simplified Licensing Framework for Rural Electrification in Rwanda**
- **Guidelines No. 02/2019 on Minimum Technical Requirements for Mini-Grids in Rwanda**

### Annex M

#### Tariffs for all Customers Categories

<table>
<thead>
<tr>
<th>Customer category</th>
<th>Consumption Block</th>
<th>Tariff (VAT and regulatory fee Exclusive) – FRW/kWh (US Cents)</th>
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<tbody>
<tr>
<td>Residential Customers</td>
<td>≤ 15 kWh per month</td>
<td>89 / 9.24</td>
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<tr>
<td></td>
<td>15 – 50 kWh per month</td>
<td>212 / 22.01</td>
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<tr>
<td></td>
<td>&gt; 50 kWh per month</td>
<td>249 / 25.85</td>
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<tr>
<td>Non-Residential Customers</td>
<td>≤ 100 kWh per month</td>
<td>227 / 23.57</td>
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<tr>
<td></td>
<td>&gt; 100 kWh per month</td>
<td>255 / 26.48</td>
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<tr>
<td>WTP and WPS</td>
<td>All consumed kWh</td>
<td>126 / 13.08</td>
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<tr>
<td>Telecom towers</td>
<td>All consumed kWh</td>
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<td>Hotels</td>
<td>All consumed kWh</td>
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<td>Health Facilities</td>
<td>All consumed kWh</td>
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<tr>
<td>Broadcasters</td>
<td>All consumed kWh</td>
<td>192 / 19.94</td>
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<tr>
<td>Small Industries ≤ 22,000 kWh/Year</td>
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<td>134 / 13.91</td>
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<tr>
<td>Medium Industries 22,000 – 660,000 kWh/Year</td>
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<tr>
<td>Large Industries &gt; 660,000 kWh/Year</td>
<td>All consumed kWh</td>
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<tr>
<td>Commercial Data Centers</td>
<td>All consumed kWh</td>
<td>179 / 18.59</td>
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Annex N
Industrial Tariffs per category

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<tr>
<th>Industry Category</th>
<th>Charges (VAT and regulatory fee exclusive)</th>
<th>Maximum Demand Charge (FRW/kVA/month) / USD</th>
<th>Customer Service Charge (FRW/month) / US Cents</th>
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<td>Energy Charge (FRW/kWh) / US Cents</td>
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<td>Peak hours (8:00AM – 5:59PM)</td>
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<tr>
<td></td>
<td>Off-peak hours (11:00PM – 07:59AM)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small</td>
<td>134 / 13.91</td>
<td>4,008 / 4.16</td>
<td>11,017 / 11.44</td>
</tr>
<tr>
<td>Medium</td>
<td>103 / 10.70</td>
<td>3,588 / 3.69</td>
<td>10,514 / 10.92</td>
</tr>
<tr>
<td>Large</td>
<td>94 / 9.76</td>
<td>2,004 / 2.08</td>
<td>7,184 / 7.46</td>
</tr>
</tbody>
</table>

Annex O
Flat rates for industrial customers without smart meters

<table>
<thead>
<tr>
<th>Industry Category</th>
<th>Flat rate (FRW/kWh, VAT &amp; Regulatory Fee exclusive) / US Cents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>151 / 15.68</td>
</tr>
<tr>
<td>Medium</td>
<td>123 / 12.77</td>
</tr>
<tr>
<td>Large</td>
<td>106 / 11.01</td>
</tr>
</tbody>
</table>

Note: As of October 2020, the exchange rate of the USD to the RWF: 963 RWF/USD

Annex P
An overview of the Topics assessed
<table>
<thead>
<tr>
<th>Attractiveness</th>
<th>Economic Regulation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The structure and characteristics of public PPAs, TSAs, DSAs, and standard retail contracts for off-grid operators.</td>
</tr>
<tr>
<td>Incentives</td>
<td>The existence of instruments incentivizing private investors to operate in the power sector (e.g., FiT, capacity payments, green certificates, RES quotas)</td>
</tr>
<tr>
<td>Indirect Incentives</td>
<td>The existence of policies or instruments indirectly incentivizing private investors to operate in the power sector (e.g., carbon pricing, result-based financing, tax relief)</td>
</tr>
<tr>
<td>Credit Enhancement</td>
<td>The existence of lending agreements or guarantees that reduce risk or costs for private investors entering the power sector.</td>
</tr>
<tr>
<td>Authorizations and Permits</td>
<td>The existence and characteristics of permits needed for the construction of assets in the power sector (e.g., land &amp; water rights, construction, and environmental permits)</td>
</tr>
<tr>
<td>System Planning</td>
<td>The existence and characteristics of the network development plan.</td>
</tr>
<tr>
<td>Grid Code</td>
<td>The characteristics of the grid code (e.g., the existence of rules for system operation and connection).</td>
</tr>
<tr>
<td>Grid Access</td>
<td>The existence of third-party access and the characteristics of grid connection and operation agreements.</td>
</tr>
<tr>
<td>System Quality and Security Standards</td>
<td>The existence of quality and security standards for transmission network planning and operation.</td>
</tr>
<tr>
<td>Access to Data</td>
<td>The public availability of data related to electricity sector performance.</td>
</tr>
<tr>
<td>System Integration (for Off-Grid)</td>
<td>The existence and characteristics of regulation for grid arrival.</td>
</tr>
</tbody>
</table>