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Summary Regulatory Review of the Electricity Market in Rwanda:

Towards Crowding-in Private Sector Investment

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This analysis is based on policies, laws and regulations adopted until June 2021. Therefore, the results will not consider and/or reflect the impact of policy and regulatory changes adopted thereafter.

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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.

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Analysis of Electricity Market Policy and Regulatory Framework

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.

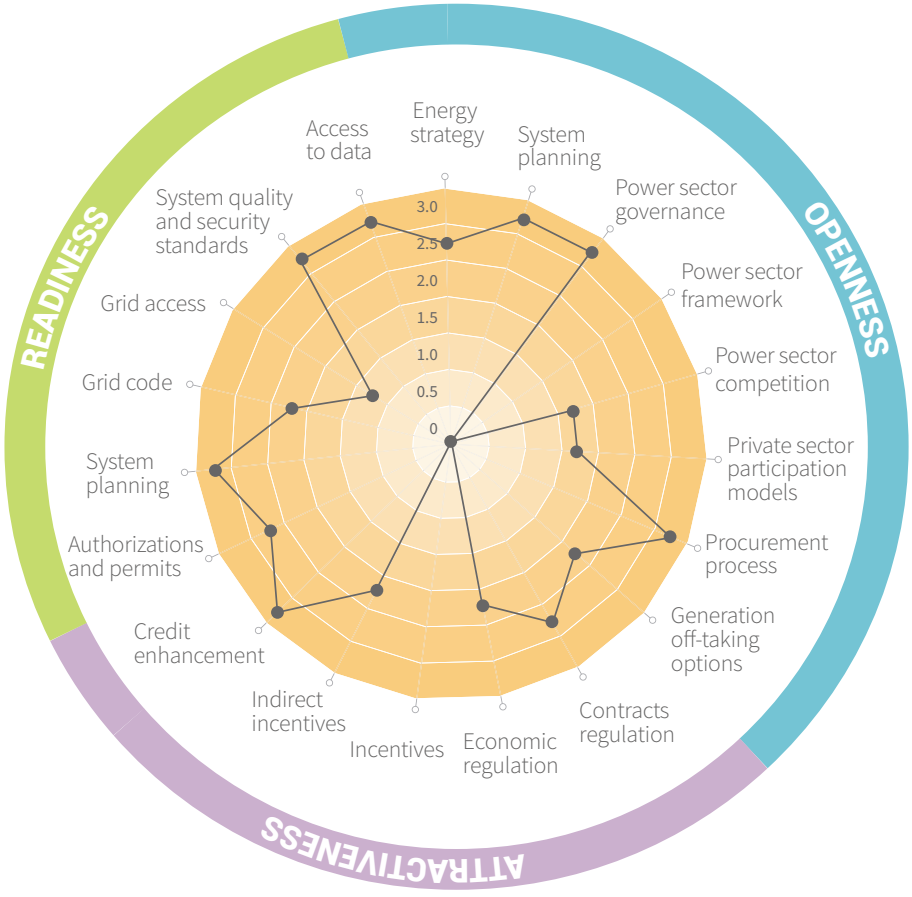
The regulatory analysis is undertaken following a comprehensive UNECA and RES4Africa regulatory review methodology, which was developed with the participation of African and international regulatory experts. The approach enables three broader assessments: the degree of *openness* of the electricity market 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.

Figure 1: Overview of the generation segment

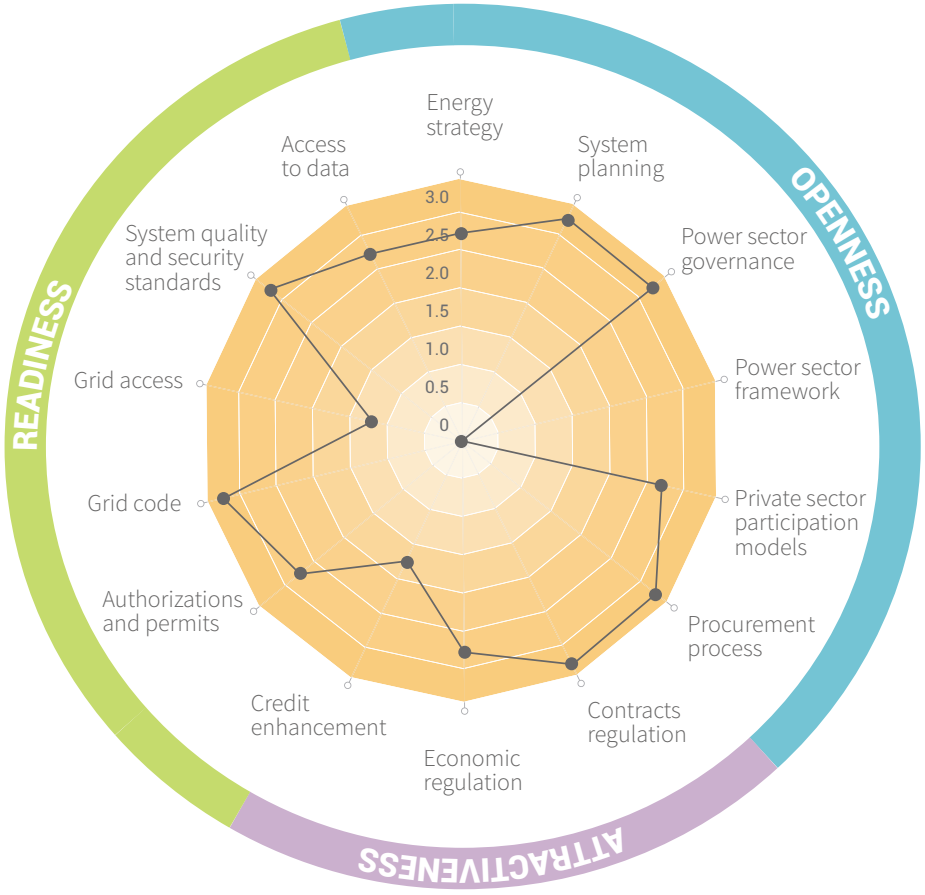


Main findings related to the Transmission segment

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.

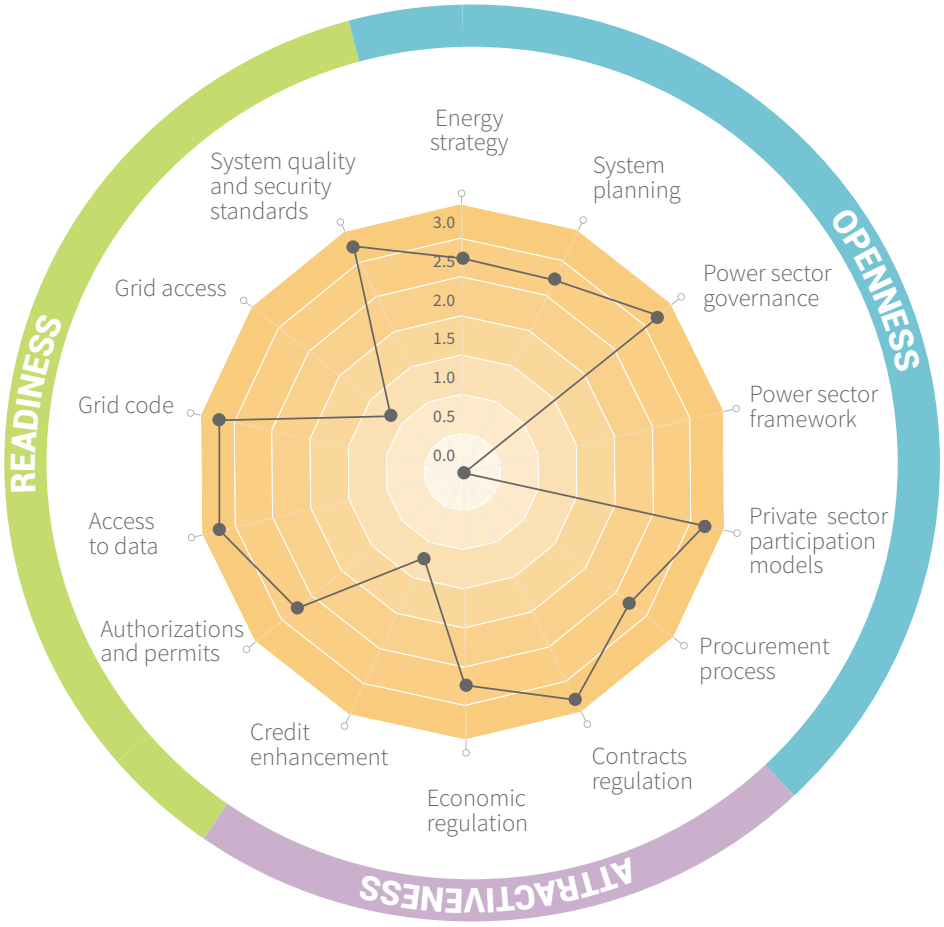
Figure 2: Overview of the transmission segment



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.

Figure 3: Overview of the distribution segment



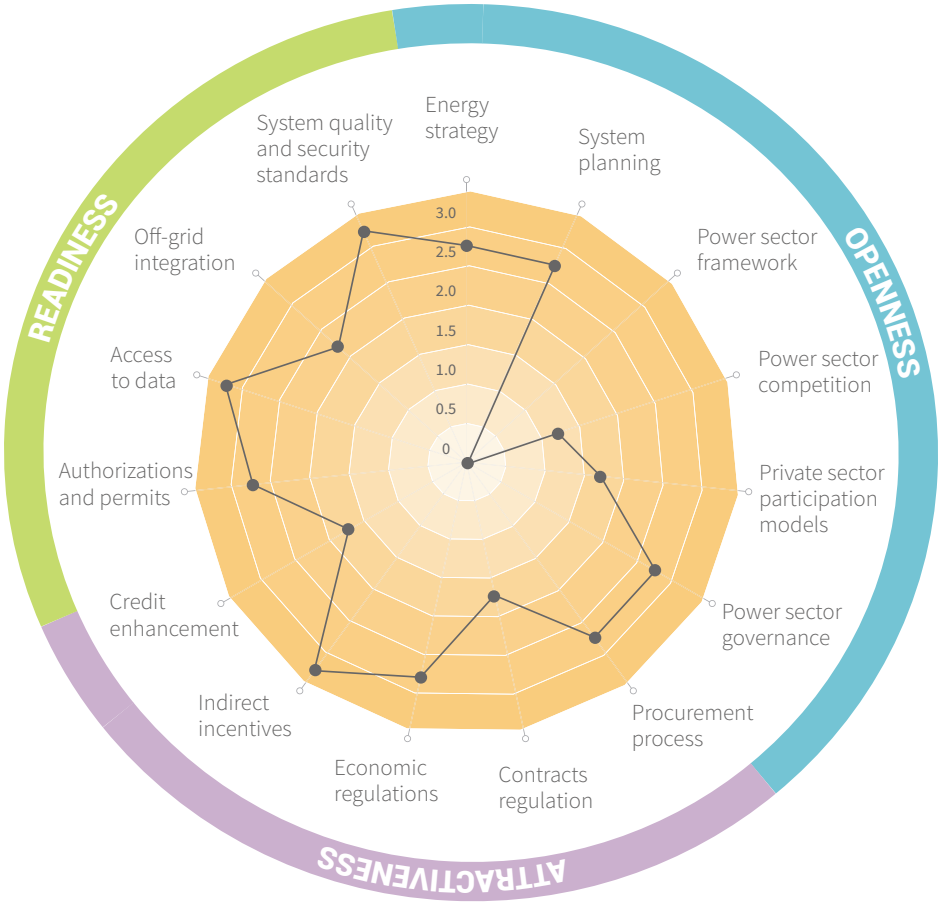
Main findings related to the Off-grid segment

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 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.

Figure 4: Overview of the off-grid segment



Recommendations

To enhance the *Openness* of the electricity market



Power sector framework

- Pursue transmission and distribution services unbundling.
- Consider the separation of transmission assets management from system operation.



Power sector competition

- Encourage wholesale and retail market competition to enable greater *openness* to private sector participation.



Private sector participation model

- Pursue a review of the current practice and regulations towards enabling private sector participation through the implementation of workable models.
- Review the utility of merchant generation models to upscale generation investment and put in place appropriate regulatory provisions to enable such business models.



Generation off-taking options

- Review and adopt net metering regulation to broaden generation 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. Similarly, advocate the operationalization of a similar spot market within the East Africa Power Pool.

To enhance the *Attractiveness* of the electricity market



Contracts regulation

- Develop and adopt standardized public PPA and other contracts (Transmission Service Agreement and Distribution Service Agreement) to improve on contracts regulation and administration.



Economic regulation

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



Incentives

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



Credit enhancement

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

To enhance the *Readiness* of the electricity market



Authorizations and permits

- 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.



Grid code

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



Grid access

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



Off-grid system integration

- 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.

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.



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