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West African Regulator Advances Toward Goal of Developing Regional Power Market

June 2023 – Comprised of 15 West African countries,ⁱ the Economic Community of West African States' (ECOWAS) region has an abundance of both conventional and renewable energy sources. However, the power sector has been unable to meet rising electricity demand,ⁱⁱ which is estimated to reach two times its present level by 2030 with an average annual growth rate of 6%.ⁱⁱⁱ With this in mind, ECOWAS is looking to develop a single regional power market that will expand access to modern and sustainable energy services and increase the share of renewable energy in lieu of environmentally polluting resources and technologies, such as coal and diesel oil.^{iv} The creation of a regulated regional power market would also foster power exchange across borders, thereby facilitating the development of a favorable investment climate and enhanced energy security, energy reliability, and economic growth.

With support from the United States Agency for International Development (USAID) and Power Africa, the National Association of Regulatory Utility Commissioners (NARUC) worked with the ECOWAS Regional Electricity Regulatory Authority (ERERA) to develop a *Functional Model on System Reliability and Electricity Market Design* and accompanying *Gap Analysis Report*, which complement each other to provide a framework to develop reliability and market operations standards applicable to the power systems and electricity markets within the ECOWAS region. This partnership contributes to the enhancement of the regulatory framework for the regional power market and aims to ensure that energy regulators in West Africa are better positioned to achieve harmonized energy markets.

The Benefits of a Regional Energy Market in West Africa

In 2000, ECOWAS member states established the West African Power Pool (WAPP) to facilitate cross-border electricity trade in the region. ERERA regulates the WAPP and, as directed by ECOWAS, oversees the WAPP's market evolution, sets transmission tariff methodologies, sets conditions for access to the regional transmission network, and harmonizes market contracts. In doing so, ERERA supports ECOWAS member states' capacity to engage in power transactions, share reserves, and develop an enabling environment for private investment.

The WAPP also supports domestic infrastructure development as well as connections between countries, allowing for cross-border trade in electricity within the region. By facilitating the development of an integrated regional electricity market, the WAPP is set to play an important role in expanding access to affordable energy services.^v Currently, only 50% of the regional population has access to electricity, and the supply of power is both unstable and expensive – there is an average of 44 hours of outages per month, and prices are high due to a combination of factors such as importing expensive fuels and reliance on inefficient small-scale generation.^{vi}

The Need for an Energy Regulatory Framework

In this context, the interconnection of neighboring power systems could lower the operating and capital costs of individual systems; improve power system reliability with reserve sharing; enhance security of supply through mutual assistance; and allow for electricity service extension to areas that were previously out of reach.^{vii} However, facilitating such a large-scale initiative will require a comprehensive energy regulatory framework, as the entities involved must work together to maintain power system reliability

and ensure smooth market operations. The need for such a framework is especially true in West Africa, where not all the national systems have independent regulators or a regulatory regime. This reality, in a sense, amplifies the importance of EREERA's role in setting a regional regime that governs rules for interstate electricity systems and markets and provides standardization of functions for markets and system operations.

ERERA does not have direct control over the physical grid, including cross-border interconnectors. While it does have authority over cross-border trade, only relevant country authorities have jurisdiction over wheeling (or transporting electric power over transmission lines) domestically and overseeing energy regulatory activity inside their respective countries. Further, there are sub-regional organizations for economic cooperation that include power trade in their programs, such as the Gambia River Basin Development Organization or the Senegal River Basin Development Organization. In this situation, EREERA needs support in defining roles and responsibilities to eliminate any confusion about who must do what to enable the regional power market to function.

The Functional Model and Gap Analysis Report

To help ECOWAS achieve its goals for the region, NARUC provided technical assistance entailing the development of a *Functional Model on System Reliability and Electricity Market Design* (or *Functional Model*) and accompanying *Gap Analysis Report*. NARUC developed the *Functional Model* using the North American Electric Reliability Corporation (NERC) *Reliability Functional Model* development approach, tailored to the context of the ECOWAS power sector. It serves to define the roles and responsibilities of functional entities participating in the regional electricity market and identify any existing gaps in system reliability and market operation functions.

The *Functional Model* consists of two parts: 1) functions that have direct impacts on the reliability of the WAPP interconnected power system (i.e., power system reliability functions), and 2) functions that have direct impacts on the development and efficient operation of the regional electricity market (i.e., electricity market operations functions), with their associated functional entities. The power system reliability functions are embedded in generation, transmission, system operations, and distribution functions, and are mainly responsible for the reliability and technical stability of the regional power system. Meanwhile, the electricity market operational functions are embedded in wholesale market operations and retail market operations. Together, these functions are responsible for the development, stability, and efficient functioning of the regional electricity market.

The accompanying *Gap Analysis Report* provides recommendations on addressing the gaps identified by the *Functional Model*. It builds on the *Functional Model* by identifying gaps in the current roles and responsibilities of ECOWAS member states and regional entities within their respective electricity sectors and provides recommendations to effectively address them. The key aspects that it evaluates include whether a function is undertaken and if there is an overlap by two or more entities in terms of providing tasks within a function.

Looking Ahead

By removing any confusion about the roles and responsibilities of different entities for each task within the regional energy market, EREERA can use the *Functional Model* and accompanying *Gap Analysis Report* to set market operation standards that are conducive to reducing trade barriers and promoting reliable markets. The two documents are mostly generalizable throughout the region. Because the majority of the fundamental functions in the *Functional Model* exist without a requirement for sophisticated institutional

or regulatory reforms, the expectation is that they can be applied by all ECOWAS member states regardless of their regulatory structure or status.

Further, as the regional market develops, the number of functions and related tasks will increase. In the long-term, the *Functional Model* will provide a consistent set of functions and related tasks for all ECOWAS member states, allowing for significant interstate electricity trading at competitive prices.^{viii} It is designed to be a living document, maintained by ERERA, which can be updated and modified to reflect the evolving nature of the West African regional market.

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ⁱ Benin, Burkina Faso, Cabo Verde, Côte d'Ivoire, The Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo

ⁱⁱ "Towards a Viable and Robust Energy Market in the West African/ECOWAS Region." International Institute for Sustainable Development. December 2016. <https://sdg.iisd.org/commentary/guest-articles/towards-a-viable-and-robust-energy-market-in-the-west-africanecowas-region/>

ⁱⁱⁱ Adeoyea, Omotola and Catalina Spataru. "Sustainable development of West African Power Pool: Increasing solar energy integration and regional electricity trade." UCL Energy Institute, University College London, United Kingdom. [https://discovery.ucl.ac.uk/id/eprint/10061426/1/Adeoye_Sustainable%20development%20of%20the%20West%20African%20Power%20Pool\(accepted\).pdf](https://discovery.ucl.ac.uk/id/eprint/10061426/1/Adeoye_Sustainable%20development%20of%20the%20West%20African%20Power%20Pool(accepted).pdf)

^{iv} "Towards a Viable and Robust Energy Market in the West African/ECOWAS Region." International Institute for Sustainable Development.

^v "Functional Model on System Reliability and the Electricity Market." USAID and NARUC. 2022.

^{vi} Cormier, Charles. "Regional electricity trade, key to unleashing West Africa's power." World Bank Blogs. <https://blogs.worldbank.org/energy/regional-electricity-trade-key-unleashing-west-africas-power>

^{vii} "Energy Sector Capacity Building Diagnostic & Needs Assessment Study." African Development Bank. 2013. https://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/Energy_Sector_Capacity_Building_Diagnostic_and_Needs_Assessment_Study.pdf

^{viii} "Technical Document." USAID and NARUC. 2022.