



Guest Research Insight – April 2020

“West African Electricity”

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Introduction: Energy for all?

The rate of electrification is approximately 43% across sub-Saharan Africa.¹ It is estimated that by 2030, 600 million of the 674 million persons around the world without electricity will live in sub-Saharan Africa. Seemingly paradoxically, domestically produced energy in Africa remains geared towards export.² Expensive energy infrastructure and small domestic electricity markets may not be attractive to private investors. Connection fees remain high, reducing energy affordability and access.³

The three most important factors in determining a country's energy consumption are population, affluence and efficiency of their energy use.⁴ The 12 West African EITI implementing countries⁵ range from low-income to lower-middle income economies⁶ and have a cumulative population of approximately 367 million.⁷ West Africa's population and purchasing power is expected to increase significantly in coming years.

Climate change hotspots

All elements of the energy trilemma, namely environmental sustainability, energy equity and energy security, are concerns in these EITI countries.⁸

Climate change will impact West Africa's economy, health, food, security and water supply.⁹ Cote d'Ivoire and Sierra Leone have been described as 'climate hotspots', given deadly trends in rain flooding and landslides respectively.¹⁰ West African countries, through the Economic Community for West African States (ECOWAS), have committed to reduce their contribution to greenhouse gas (GHG) emissions. Electricity management is a key component in achieving this goal.

Renewable energy (RE) can be an effective response to issues of environmental sustainability, through GHG reduction, and to energy access through off-grid solutions. Solar and wind, have seen falling technology costs due to increases in efficiencies.¹¹ However, without an appropriate legal and regulatory framework, competing off-grid renewable solutions can trigger a 'death spiral' for national utilities.

¹ IEA, *WEO-2017 Special Report: Energy Access Outlook* (2017) p11-12

² IEA, *Africa Energy Outlook* (2014) p13

³ World Energy Council *Supra Note 6* p57

⁴ Michael Gerrard, *The Law of Clean Energy* (American Bar Association 2011) p3

⁵ EITI implementing countries in West Africa include Burkina Faso, Côte d'Ivoire, Ghana, Guinea, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo.

⁶ World Bank 'Country and Lending Groups Country Classification'

⁷ World Bank 'Data Population Total'

⁸ World Energy Council, *World Energy Trilemma Index* (2018) p7

⁹ IPCC, *Summary for Policymakers* (2018)

¹⁰ World Energy Council *Supra Note 6* p58

¹¹ *Ibid* p58

Renewable energy

Renewable resources include solar energy, wind, hydro, geothermal, biomass and bioenergy, waves, ocean currents, temperature differences in the oceans and the energy of the tides.¹²

The 2015 ECOWAS Renewable Energy Policy (EREP) has set clear targets to increase the share of renewable energy in the region's overall electricity mix. Renewables should account for 10%, (or 35% including large hydro), of the electricity produced by 2020 and 19% (or 48% including large hydro), of the electricity energy mix in 2030. Around 25% of non-urban communities will receive electricity from mini-grids and independent systems by 2030.

Cape Verde, Ghana, The Gambia and Senegal have passed RE laws.¹³ Ghana, Guinea, Liberia, Mali and Senegal have RE policies, with installed renewable capacity targets ranging from 10-30% by 2020 or 2021.¹⁴ Ghana and Senegal are preparing feed-in-tariff (FIT) systems to support renewable energy generation.

Electricity markets

ECOWAS' existing electricity market consists of both electricity exporters and importers. Main electricity exporters within ECOWAS are Nigeria and Cote d'Ivoire.¹⁵ Ghana exports and imports electricity but was an overall electricity importer in 2017. Energy importers include Benin, Burkina Faso, Niger, Mali and Togo.

ECOWAS updated its Revised Master Plan for the Development of Power Generation and Transmission of Electrical Energy in December 2018.¹⁶ The Master Plan considers support to renewables as a priority action. 18% of the energy produced will be from renewable sources, excluding hydro, with a target production of 3.3 gigawatts (GW) by 2022.

The integration of renewables, however, may affect frequency and voltage since there may be limited capability to manage intermittent, and hence unpredictable sources.¹⁷ Voltage control technologies are needed to meet operational limits, but this is not limited to RE. The Togo-Benin network is separated between electricity from Nigeria and Ghana, since Nigeria has difficulties controlling frequency given the large size of its network compared to its neighbours.

Creating a space for renewable electricity generation

RE producers must have access to the market and transmission mechanisms. This is facilitated by separating electricity generation, transmission and distribution services. A

¹² ECOWAS Renewable Energy Policy (2015) p24-29, p5

¹³ USAID *Principles of Regulating Clean Energy in the ECOWAS Region* (2014) p13-14

¹⁴ ECOWAS Supra note 28 p29, p25-26, p19-20, p59

¹⁵ WAPP, 'Key Indicators'

¹⁶ WAPP, *Update of the ECOWAS Revised Master Plan* (2018) p50-56, p26-27

¹⁷ WAPP Supra note 37 (2018) p28

vertically integrated market is one in which the national utility controls all three aspects. A vertically-integrated market is very difficult for a renewable energy producer to penetrate.

The 2013 ECOWAS Directive on the Organization of the Regional Electricity Market provides for unbundling and creates an avenue for 'prosumers', companies that are both electricity producers and consumers, to enter the market.¹⁸ Standardized contracts can reduce specific cost drivers, which in turn can help secure low prices. The 2013 Directive allows provides for the creation of standard Connection and Use of Network Agreements and Model Bilateral Contracts.

The regional electricity market was launched in June 2018. Currently bilateral agreements govern the exchange of electricity between states.¹⁹ This would need to be updated to include other long-term agreements and other options for more immediate electricity transactions. WAPP Information and Coordination Centre will act as the market operator and will ensure parties have equal access to data.

Silver bullet?

It is clear that integration of RE into the energy mix is advantageous for West African countries. However, in many instances, RE must be complemented by traditional sources of energy. Carbon-capture and storage become important considerations in the West African context.

Article 2 of the 2015 Paris Agreement speaks to common but differentiated responsibilities. Although West Africa has not been the major source of GHG emissions in the last century, given the impact of climate change on their economies, they must be a part of the solution. Financing of projects and research into areas such as carbon-capture and storage can help West Africa transition to a greener future.

¹⁸ ECOWAS, *Directive C/DIR.1/06/13* (2013), Art7, Art8

¹⁹ WAPP Supra note 37 p27