Perspectives in Regulating a Regional Electricity Market: The ECOWAS Experience

Ifey Ikeonu, Energy Policy & Regulation Consultant

Introduction

The Economic Community of West African States (ECOWAS) is made up of 15 countries of West Africa, including Benin, Burkina Faso, Cabo Verde, Cote D'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo.

West Africa as a region is blessed with enormous natural energy resources for electricity generation including vast oil and gas reserves to be found primarily in Nigeria, Cote D'Ivoire, and Ghana; huge hydro resources in countries like Ghana, Nigeria, Mali, Niger, and Guinea; coal reserves in Nigeria and uranium in Niger. In addition, other renewable energy sources like solar and wind abound in the region. Generally, Africa as a continent has the cumulative highest sunshine hours annually with more than 85 percent of the continent's landscape receiving a global solar horizontal irradiation at or over 2,000 kWh/(m2 year).

In spite of these resources, ECOWAS has continued to suffer huge deficit in electricity supply and has not being able to convert these huge potentials into actual electricity for the teeming populace as average electricity consumption per capita is about 118kWh.[1] ECOWAS has an average access to electricity rate of about 38 percent,[2] one of the lowest in the world.

It was therefore in a bid to harness the huge energy resources within the region and translate the potential into actual energy to fast track the socioeconomic development of the region that the ECOWAS Authority of Heads and State and Government, in 2003, approved the ECOWAS Energy Protocol.

WAPP at a Glance

Total Population of West Africa	348,631,936	million
Average Urban Electricity Access Rate	51.39%	
Average Rural Electricity Access Rate	13.48%	
Average Regional Electrification Rate	29.16%	
Average Cost of Electricity in WAPP ($)		
Electricity Generation		
Total Installed Capacity Hydro/Thermal (GW)	5	16
Ratio of Hydro/Thermal Asset	22%	78%
Total Available Capacity Hydro/Thermal (GW)	3	9
Total Hydro Energy Generation (TWh)	17	
Total Thermal Energy Generation (TWh)	43	
Ration of Hydro/Thermal Energy Generation	27%	72%
Total Renewable Energy Available (GWh)	6	
Transmission Infrastructure		
HV Transmission System 330 kV - 60 kV of 800 Transmission Lines	15,000 km	
Number of Substations	600	
Number of Power Plants (Hydro & Thermal)	200	

Source: B. Adeyomo WAPP Presentation 2017

The ECOWAS Energy Protocol

The ECOWAS Energy Protocol of 31 January 2003 articulated a vision of establishing a framework for investment in energy and long-term energy trade within the region to support the following regional goals:

- Increased access to energy
- Stable, affordable, reliable & sustainable electricity supply
- Achieving the Millennium Development Goals
- Peace and security

The achievement of these goals is to be driven by balanced development of the diverse primary energy resources of the ECOWAS member states for the mutual benefit of the region leveraging on economy of scales.

Member states were also mandated to ensure long-term cooperation in the energy sector and unfettered access to energy transmission networks to facilitate and sustain increased cross-border electricity trading among member states. The Protocol also provided for the creation of regional institutions and agencies required to achieve the set objectives, including the creation of a regional electricity regulatory body.

Establishment of Regional Bodies for the Impementation of the Energy Protocol

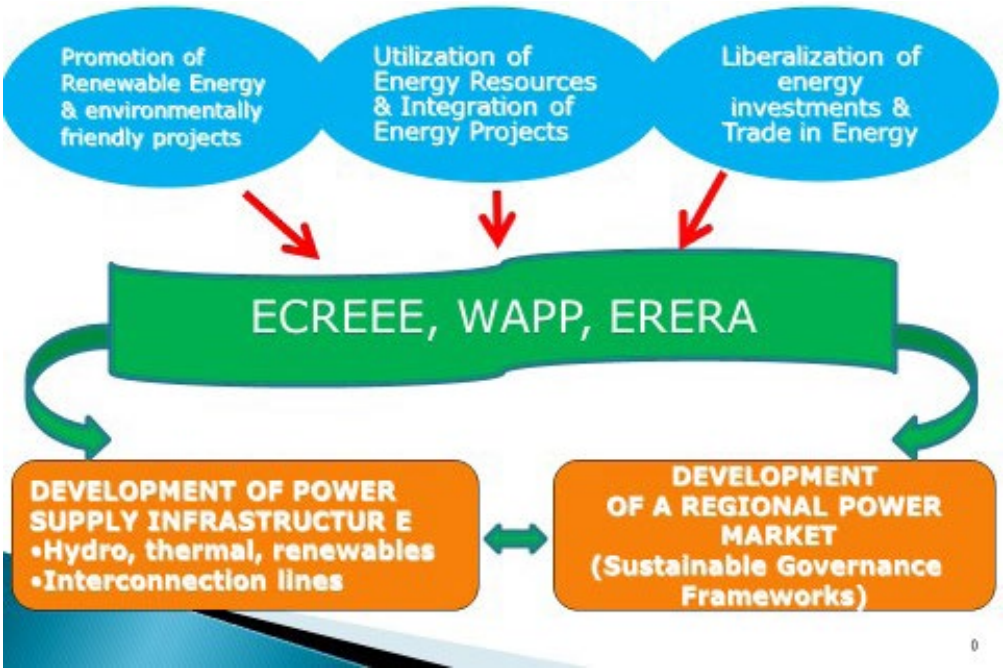
In furtherance of the implementation of the Energy Protocol, four regional bodies were established to drive the regional integrated energy programme. These are the West African Gas Pipeline Authority (WAGPA), the West African Power Pool (WAPP), the ECOWAS Regional Electricity Regulatory Authority (ERERA), and the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE). The roles of WAPP and ERERA are discussed below.

3.1 The West African Power Pool (WAPP)

The West African Power Pool is a specialized institution of ECOWAS established in 2006. WAPP's primary mandate is to facilitate the integration of regional power systems towards the realization of a regional electricity market. It is therefore responsible for developing the regional electricity master plan and implementing the regional electricity interconnection projects. WAPP is made up of public and private generation, transmission and distribution companies involved in the operation of electricity in West Africa.

WAPP plays a very active part in promoting new investment in transmission and generation in the

ECOWAS Vision: Energy Protocol

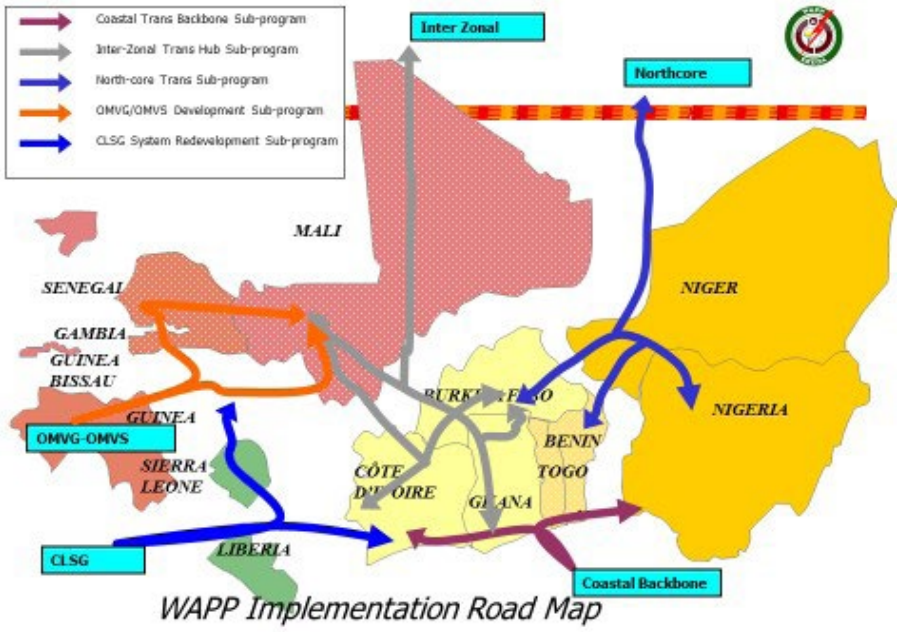


regional market and has been instrumental to the development of a number of regional transmission projects to improve interconnectivity among member states. A number of interconnection projects are already in existence, while there are plans in place to construct new interconnections to ensure that the entire sub-region is completely looped.

The existing and proposed interconnections are shown below.

3.2 The ECOWAS Regional Electricity Regulatory Authority (ERERA)

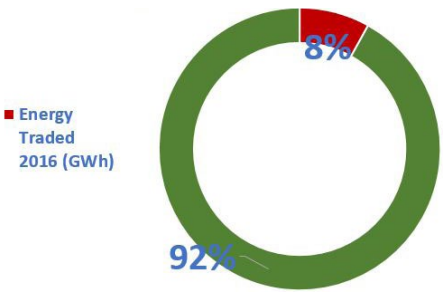
ERERA was established in 2008 as a specialized Institution of ECOWAS with the mandate of regulating cross-border electricity trading among member States and creating a conducive and enabling environment to attract private sector investment into the regional electricity market.



WAPP is currently working on a number of regional transmission network projects, including the Ghana–Burkina Faso interconnection, the Cote d'Ivoire-Sierra Leone-Liberia-Guinea (CSLG) Interconnection project, as well as the OMVG (Gambia-Guinea-Guinea Bissau-Senegal) project.

Currently, electricity trading among member states is quite low accounting for less than 10 percent of total energy generated.

Percentage Trade of Total Energy Generated



Source: B. Adeyomo WAPP presentation 2017

ERERA's Role as Regional Regulator

ERERA has the novelty of being one a couple of regional electricity regulators in the world. Indeed, the only other regional regulator similar to ERERA is Comisión Regional de Interconexión Eléctrica (CRIE), the Regional Electric Interconnection Commission of Central America, which was created under the Framework Treaty of the Central America Electricity Market. The treaty was entered into by the governments of Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama for an electrical interconnection system for Central American Countries (the SIEPAC Project).

Similar to the vision behind the creation of the West African Power Pool, SIEPAC was conceived to stimulate the creation and consolidation of a regional electricity market through the promotion and

establishment of legal, regulatory, and technical mechanisms to facilitate the participation of the private sector in the build-up of generation and transmission infrastructure for improved cross-border electricity trading between the various countries.

CRIE, like ERERA, is guided by the principles of gradualism, competitiveness, and reciprocity in the development of the regional electricity market.

However, whereas the mandate of CRIE as regional regulator appears to be limited to providing the regulatory framework required for the implementation of the SIPEC project, the mandate of ERERA as regional regulator is wider as it is has powers to intervene in every aspect of the regional electricity market to ensure conformity with the regional rules and upon invitation, to also offer national regulators assistance on technical issues. The overall mission of ERERA as provided by the Regulation on its operations[3] includes:

- The regulation of cross border power trading among ECOWAS member states
- Overseeing the implementation of the necessary conditions to ensure availability and reliability of electricity
- Ensuring a conducive regulatory and economic environment suitable for the development of the regional market

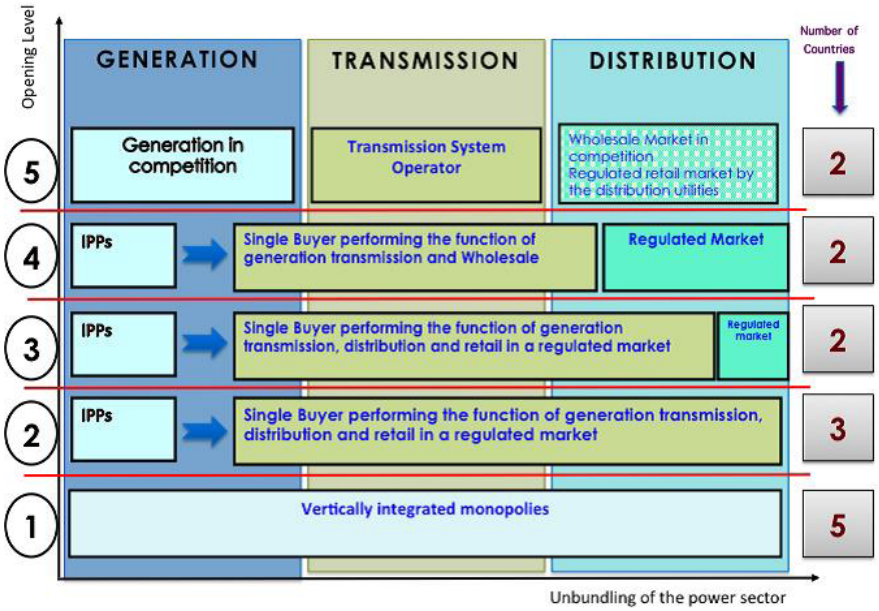
Accordingly, ERERA's mandate allows it to set rules for both the technical and economic regulation of all cross-border electricity trading within the ECOWAS region. In addition, it is also responsible for ensuring the development and monitoring of the regional electricity market and is equally vested with quasi-judicial powers to resolve disputes among market participants. In addition to its role on the regional market, ERERA also has powers to, upon request, assist member states as well as national regulators on technical issues with respect to domestic regulation. All of these attributes contribute to the uniqueness of ERERA as a regional regulator and it is doubtful if there is currently any other regional regulator vested with as much powers with regards to a regional electricity market.

Status of the Domestic Electricity Sectors Within ECOWAS

The creation of a regional market consisting of countries with varying and wide differences in the status of their national markets has been a major challenge in the setting up of the ECOWAS regional electricity market. The 14 countries involved in the West African Power Pool (Cabo Verde, an Island, is not part of the interconnected system) range from very small countries with vertically integrated state owned utilities to partially unbundled systems and on to countries such as Nigeria that have fully unbundled and privatised the erstwhile state-owned power companies.

ERERA, in 2012, had to perform initial studies to assess the status of the power sector in all member states to establish a strategy for a way forward. The result of the study showed that the member states could be categorized into four different groups in terms of the level of reform and private sector participation in the electricity sector. The categories are summarized graphically in Table 2.

Table 2: Status of ECOWAS Domestic Power Sectors in 2012



This disparity in the levels of development of the various national markets on the face of it constituted a major impediment to the development of the regional electricity market as it was obvious that without a basic degree of harmonization by all member states, an integrated electricity market will be difficult to establish and operationalize. Consequently following a number of stakeholder consultation, a number of minimum criteria were identified that would form the initial basic framework for harmonization of policies and legal framework by the 14 member states to allow for the effective takeoff of the regional electricity market. These minimum criteria were captured in the legal document known as the Directive on the Organisation of the Regional Electricity Market enacted by the ECOWAS Council of Ministers on 21st June 2013.[4]

Directive on the Organisation of the Regional Electricity Market

Article 19 of the ERERA Regulations stipulates clearly the Principles that will govern the regional electricity market and further empowers the ECOWAS Council of Ministers to enact the necessary Directive that will inculcate these Principles and make them binding on all member states. The objective of the Directive is to define the general principles that will govern the Regional Electricity Market within the framework of the ECOWAS Energy Protocol.

Accordingly, the Directive addressed the following issues:

a) Market design:

In line with the principles of the ECOWAS Energy Protocol, the Directive provided that the development and establishment of the regional electricity market shall evolve in three (3) phases according to the Regional Market Rules[5] approved by ERERA. The Market Design, which has since been approved by ERERA, provides for three distinctive phases. The first phase consists of trading by way of bilateral contracts (using approved model contracts), which can be short, medium, or long term.

The second phase of the market will consist of a mixture of bilateral contracts and short-term, day-ahead market. Eligible customers will be able to enter into cross border power purchase contracts with generators and transmission tariffs will be guided by the approved methodology.

The third and final stage envisages that the market will be fully liquid with sufficient regional transmission capability and excess generation capacity in some countries. This will ensure a completely deregulated wholesale electricity market.

Each of these stages will be preceded by the completion of agreed conditions precedent to signal the preparedness of the member states and market participants to fulfill the requirements for the effectiveness of each stage.

With the completion of most of the conditions precedents for the commencement of Phase 1 of the regional market, it is anticipated that the official commencement of the market will be declared early 2018.

b) Structure of National Electricity Markets:

A previous study performed by ERERA revealed that not only were the electricity utilities in most of the member states vertically integrated, it was also clear that in the short term, theses utilities will not be vertically unbundled due primarily to their very small sizes and need for economies of scales. It was also apparent from the studies that there was no separation of costs in accounting for the various segments of the business (generation, transmission, and distribution). It was, therefore necessary to ensure that at the very least, all member states will ensure clear cost unbundling along functional lines to allow for transparency and effective allocation of costs, needed for tariff determination in the electricity market. To this end, therefore, the Directive provided that all member states shall ensure that their existing Electricity Acts and relevant regulations be amended to provide for functional separation of accounts in terms of generation, transmission, and distribution segments.

Some of the countries have commenced action in this area but it does appear that there are real challenges with the required technical capacity coupled with the fact that there is a reluctance to change from the historical accounting model that these utilities have been used to over the years.

c) Regional Transmission Network Open Access:

An obvious prerequisite to the off-take of a regional electricity market is open access to the

regional grid. Again, a result of the study by ERERA prior to the enactment of the Directive revealed that of the 14 WAPP member states, only Nigeria and Ghana had laws that allowed for open third-party access to the transmission network. The market principles have also envisaged the participation of major eligible customers in the regional market during Phase 2 and thus the need to provide for third-party unfettered access for this class of customers. Again, most of the existing national legislation in the member states had no provision for determination of eligible customers and consequently, no provision for open access to such customers.

The Directive, therefore, provided for member states to amend their laws to allow for open access to the transmission network on the one hand, while also providing for third-party access to eligible customers on the other hand.

Although a number of member states have amended their laws to allow for third-party access especially with regards to the participation of IPPS, the issue of eligible customers still remain a challenge, as only Nigeria and Ghana have rules allowing for the participation of eligible or bulk customers in the national electricity markets. ERERA also is working on a guideline to assist member states in this area.

d) Harmonization of Contracts:

The market design for the Phase 1 of the Regional Electricity Market provides for trading amongst market participants to be basically by way of bilateral contracts. Currently, the level of cross-border electricity trading among member states is quite low (8 percent) of total power generated in the region.

Whereas West Africa as a region has a long history of cross border electricity trading, the contractual frameworks for most of these transactions were borne more out of political expediency than the need to have in place a commercially viable contract. With the ongoing reform in most of the counties, it has become imperative to review these contacts to make them more sustainable and to also ensure that all new contract are legally structured in line with the emerging regional electricity market.

A number of member states have previously approached ERERA as regional regulator to provide assistance to them in the negotiation of Power Purchase Agreements. This dearth in capacity, therefore, made it necessary to entrust ERERA with the mandate of developing model bilateral contracts for power sales/purchase, as well as developing standard connection and use of network agreements. After consultations with stakeholders, ERERA, working with WAPP, developed the model bilateral contracts. A standard Connection and Use of Network Agreement for access to the Regional Grid and WAPP Operational Manual[6] have also been developed by WAPP for approval by ERERA.

e) Strengthening of National Regulatory Authorities:

ERERA's role as regional regulator is complemented by the role of the national regulators as the regional market itself can only be sustainably established based on the viability of the domestic markets. In 2012 when ERERA carried out its regulatory studies on the current state of the power sector in the ECOWAS region, 11 of the 15 member states had in place regulators for the electricity sector, whereas four of the countries had no regulators.

For the 11 countries that had regulators in place, most of the regulators did not have the requisite powers to perform core regulatory activities such as tariff setting and market monitoring. Furthermore, most of the regulatory bodies were under-funded and lacked the requisite human and technical capacity to function effectively.

In view of the key role regulation and governance has to play in the successful development and functioning of the regional electricity market, the Directive provided that not only are all member states required to establish independent electricity regulatory agencies, all such bodies (including the existing ones) are to be given the required financial support and powers to undertake key regulatory activities including tariff setting and market monitoring.

Currently, all but one of the 15 ECOWAS Member States have now established regulatory authorities for the electricity sector (a number of them are multisectorial regulators). There have also been steps by some of the countries such as Senegal, Cote d'Ivoire, and Burkina Faso to amend their existing laws to strengthen the capacity of the regulators.

f) Tariff Methodology:

In line with the regulation on the organization and operation of ERERA, the Directive empowers ERERA

(following consultations with stakeholders) to approve the cross border transmission electricity tariff methodology.

It also stated that cross-border transmission tariff for new contracts will be determined by the approved regional transmission pricing methodology. ERERA has approved the transmission methodology[7] based on the Mw-KM load flow.

g) Support for Implementation of Directives

The successful development of a regional market requires the collaboration of all key stakeholders, especially the state actors. To this end, therefore, the Directives enjoin all national regulators to support ERERA in the implementation of the Directives at the various national levels.

Member states were also given a time frame of 24 months within which to comply with the provisions of the Directives. States that are unable to comply within the stated timeframe or face peculiar challenges in the implementation of the Directives were also required to inform ERERA of any challenges being faced in implementing the Directives.

ERERA has enjoyed a lot of support on the implementation of the Directives from the various State Actors as can be seen in the collaboration process that saw ERERA working with the Governments of Guinea, Sierra–Leone, Benin, and Liberia to assist in establishing their regulatory commissions. The ERERA Consultative Committees of Regulators and Operators, respectively, consisting of representatives from all member states, have also been instrumental in assisting ERERA to develop all the rules, regulations, and orders necessary for the commencement of the regional market.

Challenges

The development of the ECOWAS Regional Electricity Market has not been without its peculiar challenges. One of the major challenges is the wide disparity in the status of the various national markets with regards to the reform and operations of the domestic markets. Whereas some of the sectors are fully unbundled and privatized in some cases, there are other countries that do not have even any form of private sector participation.

The issue of adequate generation, transmission and distribution infrastructure still remains a major handicap as no single country in the ECOWAS inter-connected system is energy sufficient and neither is the current transmission grid sufficient and robust enough to support the market.

While there has been significant reform in the electricity sector in a number of member states, there still remains the need to quicken the pace of reforms to at least support a minimum level of harmonization that will support the development of the regional electricity market.

Conclusion

The ECOWAS regional electricity market, which was conceived to facilitate the harnessing of the huge energy resources in the region to improve access to electricity and act as a catalyst for the economic and social development of the region, has so far recorded a number of successes even though it will take a long time to achieve all the key objectives.

One of the key factors that have facilitated this regional integration initiative is a shared regional vision that has manifested in the political will among all member states to take the necessary actions.

The need for a clear and transparent institutional and legal framework for the implementation of the regional market has been critical in driving this initiative. ERERA as regional regulator was given full legal capacity to establish and promote the regional market. This has made it possible to put in place a clear and definitive roadmap for the realization of this regional vision.

Collaboration with national stakeholders in the electricity market is a key factor for the efficient operation of the regional market. In the case of ECOWAS, ERERA has through the establishment of the Consultative Committee of Regulators and Operators, created an effective dialogue platform to discuss pertinent issues relating to the regional electricity market.

Although some successes have been accomplished, it is still important that pressure is brought to bear on national governments that have been slow in carrying out the reform programme in some of the countries to fast track these initiatives. Without the acceptable level of harmonization envisaged by the Directive on the Organization of the Regional Electricity Market, it will be difficult to move to other stages of the regional market development. If the

reforms triggered by the establishment of the market are pursued assiduously, then the ECOWAS region may well be on the right path to increasing access to electricity, which will in turn jump-start the much-needed economic and infrastructural development within the region.

References

[1] Photicus. (August 2015). 'Electricity Consumption per capita' [Online]. Available: http://www.photius.com/rankings/2015/energy/electricity_consumption_per_capita_2015_1.html

[2] International Energy Agency. (2016). 'World Energy Outlook 2016 Electricity Access database' [Online]. Available: http://www.worldenergyoutlook.org/media/weowebsite/2015/WEO2016Electricity.xlsx

[3] ECOWAS Regional Electricity Regulatory Authority. (December 27, 2007).'Regulation C/REG. 27/12/07- ERERA's Operations Act' [Online]. Available: http://erera.arrec.org/en/2007/12/27/regulation-creg-271207-on-the-composition-functions-and-operation-of-the-ecowas-regional-electricity-regulatory-authority-erera/

[4] ECOWAS Regional Electricity Regulatory Authority. (June 21, 2013).'Directive on the Organisation of the Regional Electricity Market' [Online]. Available: http://erera.arrec.org/en/2013/06/21/seventieth-ordinary-session-of-the-council-of-ministers-of-ecowas/

[5] ECOWAS Regional Electricity Regulatory Authority. (August 18, 2015). 'Resolution No 005/ERERA/15 - Approval of the Regional Market Rules of the WAPP' [Online]. Available: http://erera.arrec.org/en/2015/08/18/approval-of-the-regional-market-rules-of-the-wapp/

[6] ECOWAS Regional Electricity Regulatory Authority. (September 29, 2015). 'Resolution No 007/ERERA/15 – Adoption of Operations Manual of the West African Power Pool' [Online]. Available: http://erera.arrec.org/en/2015/09/29/adoption-of-operation-manual-of-the-west-african-power-pool/

[7] ECOWAS Regional Electricity Regulatory Authority. (August 18, 2015). 'Resolution No 006/ERERA/15- Adoption of the Tariff Methodology for Regional Transmission Cost and Tariff' [Online]. Available: http://erera.arrec.org/en/2015/08/18/adoption-of-the-tariff-methodology-for-regional-transmission-cost-and-tariff/

Ifey Ikeonu

Ifey Ikeonu is an Energy Policy & Regulation Consultant. She holds a Master's degree in law, as well as an MBA in Sustainable Development. She is an energy lawyer with over 25 years of experience in the Nigerian and West African Energy Sector. She also has considerable experience in corporate strategy and project management.

She is a former Chairperson of the ECOWAS Regional Electricity Regulatory Authority (ERERA). Prior to joining ERERA in January 2011 as a Commissioner, she held various senior management positions at the Nigerian Electricity Regulatory Commission, including Head of the Licensing & Enforcement Department as well as Head of the Strategic and Project Management Office. She also worked for several years as in-house Counsel at the Power Holding Company of Nigeria.

Mrs. Ikeonu played an active role in the power sector reform programme in Nigeria where she worked with various committees on the Legal and Regulatory aspects of the reform and was also pivotal in developing the regulatory framework for the regional electricity market of the Economic Community of West African States (ECOWAS). She is also very involved in the Sustainable Energy for All Initiative and is an active advocate of gender mainstreaming in the energy sector.

She is a certified Regulation Specialist.