

PW0031 M1:

Annex 1: Background Paper¹ for Roundtable on Regional Electricity Markets

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¹ This Background Paper is based on respective analytical pieces which were written by different experts on the UKNIAF Task team for PW0031..

1 Acronyms

CBN	Central Bank of Nigeria
DisCo DisComs	Distribution Companies
EPSRA	Electric Power Sector Reforms Act
IOC	International Oil Companies
IPP	Independent Power Producer
MO	Market Operations
NERC	Nigerian Electricity Regulatory Commission
NGC	Nigeria Gas Company Limited
SO	System Operator
NERC	Nigerian Electricity Regulatory Commission
WAPP	West Africa Power Pool

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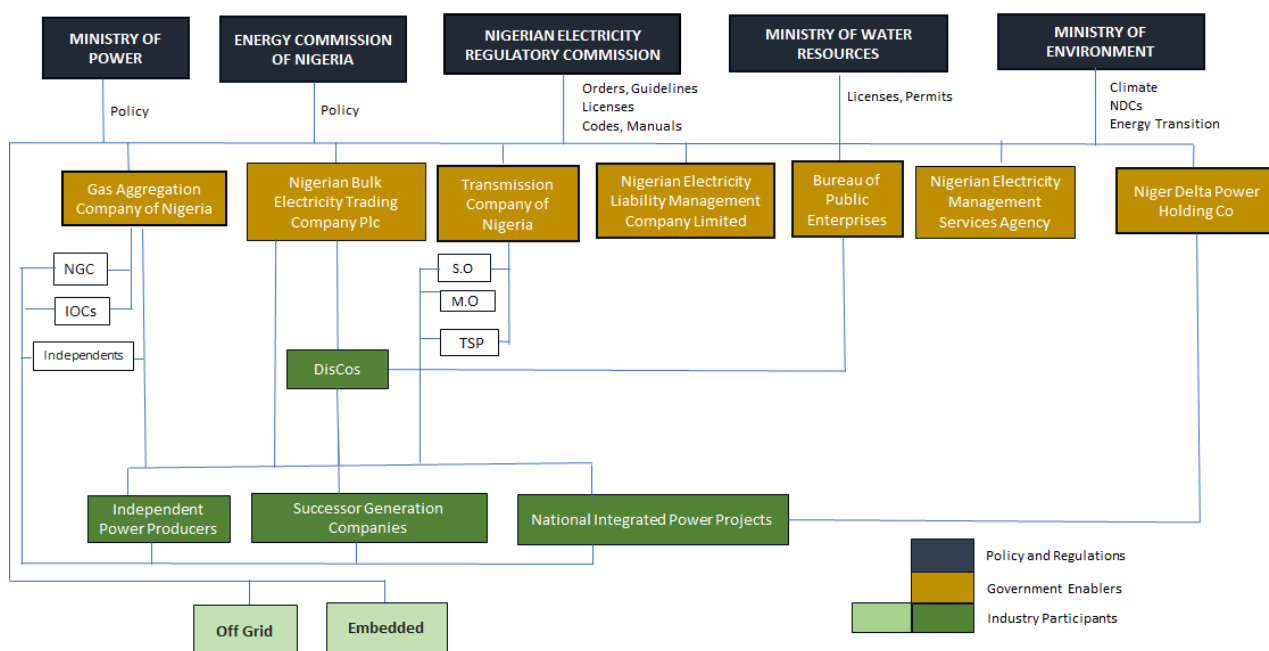
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2. Introduction

The 2022 Constitutional Amendment expands the power of Nigeria’s 36 States in terms of on-grid electricity delivery across generation, transmission, and distribution (Paragraph The 1999 Constitution, paragraph 14(b), part II, Second Schedule). Before this amendment, the powers of state governments were mostly limited to off-grid electricity supply and to the very few areas, which are not covered by the national grid. The constitutional amendment was followed in 2023 by the repeal of the passage of the Electricity Act, which replaces the 18-year-old Electric Power Sector Reforms Act (EPSRA) of 2005.

By the combined effect of the provisions of sections 2(2), 63(1), 230 (2 – 9) of the Electricity Act, the respective States of the Federal Republic of Nigeria are now empowered to create their own electricity markets, establish their state regulatory boards to oversee electricity activities within their jurisdiction. This new reality has a range of implications and introduces some opportunities even as it also comes with challenges, all of which affect various stakeholders in the sector, in different ways.

Figure 1: Map of Stakeholders in Nigeria’s Electricity Industry



For instance, the legal amendments have expanded the powers of State governments to incentivise investments in the power sector. At the same time, institutional capacity deficits at State level will pose varying degrees of risk to different States in terms of their understanding of the relevant issues and what that means in practical real-life terms. Also, while the new sector legal context presents opportunities to fast-track Nigeria’s low carbon transition through increased focus on renewable sources, the potential risks posed by issues such as dual licensing and probable tariff hikes, need to be addressed.

In this background note, some of the critical issues arising from these changes to electricity sector laws have been collated and discussed. Specifically, the implication of these changes on other laws and policies, the factors that need to be considered along the pathway to valuable state electricity markets as well as some international best practice is also presented here.

3. Key Issues

2.1. Impact on Current Laws and Regulations

The Electricity Act addresses some of the issues that have been topical within the sector over the past decade. These include: the transfer of market and system operations from the Transmission Company of Nigeria (TCN) to the Independent System Operator (ISO); and the introduction of tax incentives for investors by the Federal Ministry of Finance. It also changes the institutional landscape in the sector by establishing some new mechanisms, while reestablishing or merging some existing structures. These include:

- The reestablishment of both the Rural Electrification Agency and the Nigerian Electricity Regulatory Commission.
- The establishment of the Nigerian Electricity Management Services Agency (NEMSA) to replace the Electricity Management Services Plc.
- Setting up a National Power Training Institute of Nigeria to *'serve as a focal point for human resources development and workforce capacity building, as well as a research centre for matters relating to electric power in Nigeria and Africa²'*.
- The establishment of the National Hydroelectric Power Producing Areas Development Commission (N-HYPPADEC) to formulate policies and guidelines for the development of hydroelectric power producing areas.
- The setting up of a National Power Policy Coordinating Council whose role is to deliberate on challenges experienced by stakeholders within the industry and to serve as a forum for collaboration between federal and state agencies.

Not only does the Act consolidate all existing legislation that relates to the electricity industry, but it also repeals some existing Acts. The latter include the following:

- **Electric Power Sector Reform Act (EPSRA) 2005:** This Act provided the legal framework for the reform and restructuring of the Nigerian electricity industry. It also established the Nigerian Electricity Regulatory Commission (NERC). The EPSRA was expected to, among other issues, develop and guarantee an efficient, reliable, affordable, safe, and cost-effective system of electricity generation, transmission, distribution, and marketing in the Nigerian Electricity Supply Industry (NESI), unfortunately this did not end up being the case.

² Section 185 Electricity Act 2023

- **Hydroelectric Power Producing Development Commission (Establishment, Etc.) Act 2018:** The Act was enacted to reduce the percentage on revenue generated by any company or authority from the operation of hydroelectric dams, and for related matters.
- **The Nigerian Electricity Management Services Agency (Establishment, Etc.) Act, No.6, 2015:** The Agency works towards ensuring electricity networks that are stable, safe, and reliable. Through close collaboration with other industry participants, NEMSA strives to ensure minimal incidences of electrical accidents, energy accountability, eliminate substandard electrical equipment and materials and rid the system of quack electrical installation personnel contractors.
- **Hydroelectric Power Producing Development Commission (Establishment, Etc.) Act, 2010:** This Act establishes the Hydroelectric Power Producing Areas Development Commission, which was charged with the responsibility for, among other things, managing the ecological menace due to operation of dams and other hydroelectric power activities in the power producing areas.

2.2. Impact and Potential Pathways to Commercial Viability

Some state governments will be keen to make an immediate start on a state electricity market, and their keenness is commendable. Other states may wish to take a cautious approach. In either case, it is essential that there is sufficient advance planning, in full awareness of the issues that need to be handled if the market is to succeed. Many of these are mentioned below.

Three points should be recognised at the outset.

- First, any state market will operate in the context of the existing comprehensive national regulatory framework. While states may choose to implement different rules in some areas, the risks of incompatibilities must be studied. An ongoing forum in which states can review proposed developments will be needed.
- Second, collaboration with neighbouring states should be considered. Commitment and capabilities (needing resources) will be required, and resources may be in short supply; there may be benefit in sharing. Moreover, although individual state governments will be paramount, some element of cooperation between state markets (perhaps ultimately leading to regional markets) may be feasible and worthwhile.
- Third, there will be a lengthy transaction process to a dual market structure. Achieving this successfully will need close collaboration and mutual understanding between state government / regulator and NERC and will impose requirements on both sides.

The following are all necessary for successful implementation:

- (1) **A vision, a sound policy, and a law** that enables the policy to be implemented effectively. There is the prospect of real achievement and the danger that things will go wrong. A coherent and workable plan, set of rules, and the determination to enforce them properly, is essential.
- (2) **A market structure that is transparent and efficient and is compatible with the market nationally and in other states.** Few states have set out their intentions on market design, and how they will align with the national system. For new generation, contracts with local parties will be needed though the means of dealing with balancing requirements must be specified (i.e., what happens in the likely event of a shortfall or excess of available power). The design should take account of realistic expectations of how the market may develop, allowing for the difficulty of predicting this. It should also consider market plans in neighbouring states.
- (3) **Independent regulation, and clear delineation of responsibilities and powers.** Good regulation is critical to the successful and efficient operation of the market. The objectives, obligations and constraints that apply to the Regulator must be well thought-through and clear. Whilst the performance of the Regulator should be scrutinised, its independence should not be jeopardised, if the financial health of the sector is to be maintained at the same time as its efficiency is improved and investments are made. This may be difficult in the face of public pressures on prices. The delineation of responsibilities and powers between the Regulator and the state government must be clear and respected. A further vital aspect is the need for a clear distinction of responsibilities and powers between the state Regulator and NERC – permanently and allowing for the potentially lengthy transition process. In contrast, the state market is implemented and developed. The possibilities for sharing resources with neighbouring states should be carefully examined.
- (4) **Development planning.** A plan showing how the power sector in the state may develop over the medium to long term is important if the state government is to understand how much new generation and network capacity will be required, what fuel and other constraints may arise, and how these will impact on the state market. This will be important both for the state Regulator and potential investors.
- (5) **Financially healthy companies.** Payments must be made in full and on time across the system. Where this does not happen, as Nigerian experience has shown, companies will fail, and the sector will stagnate. Financial strength in the companies is desirable even when payments are normally made as they should be, because only if balance sheets are strong can companies cope with sudden financial shocks – as has been demonstrated in Europe recently following the energy price shocks resulting from the war in Ukraine.
- (6) **A reliable and adequate tariff.** One of the main requirements if payments are to be made in full is that tariffs are adequate to cover companies' costs. The tariffs should, of course, provide for an incentive on the companies to reduce ATC&C losses, increase efficiency, and perhaps ensure reliability of supply; but a reasonably efficient company should be able to cover its costs based on those tariffs. A potential investor will want an assurance that tariffs will remain adequate into the future, and not be subject to reductions or delays for reasons

of political expedience (however understandable such reductions may be in a broader context).

- (7) **An understanding of how renewables obligations will be handled.** It is unclear how NERC will implement the renewable generation duties that have been placed in its court. These could have a significant impact on a state market. Whilst NERC may not wish to commit itself at this stage, state governments can engage with NERC on the matter, so that the implications are understood on both sides.
- (8) **State government commitment and capabilities, and support from Federal agencies.** Making a success of state markets will require full commitment and engagement on the part of the state governments and the development of the necessary institutions and capabilities. Human resources may well be a constraint.

Commercial viability

Setting out a path to commercial viability should be part of the initial planning for the state market but requires a view on how the market is intended to operate. It is unlikely that the financial problems of the national market will be resolved soon; it is necessary that new investments are commercially protected. States will need to set out a series of stages, which can be implemented when the conditions necessary for viability can be ensured.

The state law on its electricity market should provide for the intended stages, and for varying them in the light of experience, and establish the regulatory framework and its interface with the national framework. It is important that that the regulatory framework gives sufficient confidence to potential investors. The law may also need to require internal restructuring of discos to provide state-level businesses.

Potential activities under state markets include:

- Isolated new networks, with associated generation.

The financial viability of such schemes can be assessed individually. Tariffs may need to vary from elsewhere in the state. The regulatory framework governing tariffs, performance standards and other requirements must be clear.

- Captive power schemes.

Schemes supplying captive (often industrial) demand from a dedicated generating source can be assessed on an individual basis. Unless dedicated lines are constructed, there must be provisions governing the use of public networks for this purpose. The power purchase agreements can be negotiated between the generator and the off taker, but there will need to be provisions governing shortfalls or surpluses of generation.

- New generation connected to distribution or transmission networks.

Such generation will need to contract with off takers within the state. Although there are options of contracting with eligible customers, and in future perhaps with competitive retail suppliers, the most obvious purchaser will be the local state-level business of the relevant disco, which would need to be restructured for the purpose. While the discos are in serious

financial difficulties, such contracting may only be feasible if new investments can be protected so that they are paid regardless of the state of disco finances.

- New distribution (or transmission) lines, connecting to the existing systems.

New lines will normally be the responsibility of the disco (or TCN). However, it is possible that an extension could be needed to enable a generator to supply a large new consumer. Such a case would be like (b) above, with additional arrangements relating to the connection.

- Retail supply.

States could take on the power to comprehensively regulate the retail market, controlling prices and standards. This would require a high level of regulatory expertise and regarding tariffs potentially put the state Regulator under a great deal of pressure, increasing the dangers for investors and the need for safeguards. The implications for the current arrangements on sector financial flows, including the CBN's role, would need to be assessed.

- A competitive state wholesale market.

Competitive mechanisms, e.g., for procurement of new generation, can be implemented fairly easily, and before generation contracts are in place mechanisms can be implemented for handling contractual imbalances. A fully competitive market would require several participants on both the generation and supply sides. However, a pathway can be set out to the goal of a competitive wholesale market, together with retail competition, interfacing with the national market and compatible with markets in neighbouring states – even if achieving the goal takes a long time.

It must be clear how these activities will interface with the overall Nigerian market, not just operationally but also in terms of industry finances.

4. Some Examples of International Best Practice

Figure 2: Some country specific examples³

<u>India</u>	<u>Great Britain</u>	<u>Texas</u>
<p>Independent appellate tribunal for speedy resolution of electricity market conflicts.</p> <p>Interstate generation stations (ISGS) established.</p> <p>Security Constrained Economic Dispatch (SCED) began in April 2019, with aim of minimizing wholesale power generation costs by optimizing the dispatch of ISGS generators.</p>	<p>Periodic reforms over the years as contextual realities emerge.</p> <p>One of such reforms was the Electricity Market Reform or ERM (2011-13),</p> <p>One of the features of the ERM is the adoption of capacity remuneration mechanisms and contracts to underpin the deployment of low carbon generation assets.</p>	<p>Abundance of wind, solar and natural gas</p> <p>State electricity market almost totally isolated from national market.</p> <p>Features full retail competition with no default caps for residential customers.</p> <p>Locational marginal prices which automatically incorporate transmission constraints and</p>

Internationally, countries that have embarked on or implemented a reform process started with a monopolistic system based primarily on vertically integration of generation, transmission, and distribution (though not necessarily within a single organisation). With reform, there has been a move towards separating the natural monopolies of transmission and distribution networks and the actually or potentially competitive generation and retail supply activities. Countries have moved at different paces and the detailed nature of reforms has reflected individual country choices and characteristics. Markets have had to adapt to major externally driven developments, such as the need to reflect environmental imperatives and hugely increase renewable capacity, and disruption driven by global energy crises.

The benefits of reform are evident if the industry has a solid legal, regulatory, and financial basis. Disaggregated markets provide for cost transparency and the opportunity to promote efficiency and reliability. The benefits are passed on to consumers via competition, where feasible, or regulation of prices and standards.

As shown in the accompanying paper on Electricity Markets and Trading, a variety of approaches has been taken to wholesale market design, i.e., the sale (by generators or intermediaries) and purchase (by suppliers or intermediaries) of bulk electricity and the mechanisms adopted to ensure supply and demand are always balanced, so that consumer needs can be met, and system stability maintained.

³ A Variety of Market Designs for Electricity Across the Globe. Available at <https://fsr.eui.eu/a-variety-of-market-designs-for-electricity-across-the-globe/>; https://imgs.mongabay.com/wp-content/uploads/sites/30/2023/03/16124931/transforming_indias_electricity_markets-RMI-report.pdf

At its simplest, there is a distinction between contract markets and trading via pools or exchanges which operate over varying timescales. However, both are likely to be needed in practice: if most electricity is traded via contracts, mechanisms (such as a balancing market) will be needed to ensure demand and supply are balanced in real time; if primacy is given to a pool or exchange, investors in new plant will require a degree of certainty over revenues, most readily achieved through contracts of some form.

The general trend has been to move towards a more disaggregated structure within an overall national (or, in the case of larger countries, regional) market framework, rather than, as intended in Nigeria, provide for the development of state markets alongside an existing national market. The new provisions in Nigeria reflect the fact that the national market has not developed as hoped, and as noted above there are significant benefits to be gained from state-level markets, provided they are implemented well.

One useful aspect of international experience lies in the rules and mechanisms implemented when national markets have been created above and alongside the existing state markets, e.g., in Australia. The United States of America also provides a good (albeit somewhat complicated) case study.

Another relevant aspect of international experience lies in the cross-border markets developed to co-exist with national markets, which go far beyond previous import/export agreements between neighbouring countries. NordPool in Scandinavia was an early example, but active market arrangements now cover much of Europe. Arrangements in Africa, including the West African Power Pool (WAPP), may develop in a similar direction.

5. Conclusions

- Introducing state electricity markets can bring significant benefits – in terms of increasing supply, improving reliability, and enabling developments – but must be carefully handled; the possibilities for things to go wrong are real.
- The most important underlying factors are governance and finance. The financial viability of new projects depends on investors receiving the reliable revenue streams needed to support them. These will be easier to achieve initially for projects that can be ring-fenced from the main system. The importance of good governance, including but not only regulation, in overseeing the path to a flourishing state electricity market cannot be over-emphasised.
- Successful reform is unlikely to happen simply by putting the right rules and regulations in place (though that is essential). Determination on the part of state governments to see the reform process through, and continuing effort, will be necessary. The regulatory framework must be strong, independent, and transparent. There will need to be close collaboration with NERC and Federal Government agencies, which will need to be understanding and supportive.
- A fully competitive state market, interfacing with the national market, is only a realistic prospect in the long term; there need to be several participants on both the generation and supply sides, and finances need to be sufficiently strong. However, those states who wish to achieve this (or have it as an option) should set the steps towards it.
- Regulation of retail supply – consumer tariffs – in advance of establishing the state electricity sector on a sustainably sound financial footing (meaning cost-reflective tariffs, reliable revenues and no significant debt overhang) is difficult, and likely to place very strong pressures on the state market Regulator. Providing for lower tariffs than NERC would give rise to strong pressures from the companies and probably Federal Government and CBN; providing for higher prices would probably result in a public backlash.
- Competition in retail supply will only be feasible at an advanced stage when there is a financially healthy sector and several potential suppliers. It is unclear whether retail competition at a state level is a realistic proposition, even in the long term, for most states except as part of a national market.
- Competition to provide new generation is much more straightforward to implement (though there will probably be external scrutiny to check that it is a more economic option than generation contracted on the national market). The state Regulator will have an important role in ensuring that the procurement process is transparent and efficient. Potentially this option could bring a worthwhile amount of new capacity onto the system.

- The easiest activities to introduce at state level are the development of isolated grids with associated generation, and captive power schemes. Starting with such activities will provide a useful learning opportunity before any more ambitious market development.
- While states provide the obvious legal basis for sub-national markets, there would be a stronger economic case for larger regional markets in many ways. It would be sensible to look at the options for enabling collaboration between states so that they could move towards this if they choose. This might take the form of sharing of institutions (where permissible) and certainly of sharing capabilities and resources. It will also be important to avoid states taking courses of action that are inconsistent with those of neighbouring states or with the national system.
- Whilst responsibility lies with individual states to drive forward their reform processes, an ongoing dialogue will be needed by which the states and others can monitor and discuss developments and proposals to ensure that outcomes are as good as possible and that failures are avoided.