Nigeria: Ownership Models in Power Sector

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Introduction

In recent years, Nigeria's power sector has undergone a significant shift, from a centralized, government-run monopoly to a more open and market-driven structure. This transition was largely motivated by the need for energy security, efficiency and improved service delivery.

Historically, the Federal Government of Nigeria ("**FGN**") exercised exclusive control over the generation, transmission, and distribution of electricity managed by the former National Electric Power Authority ("**NEPA**") and later the Power Holding Company of Nigeria ("**PHCN**"). However, persistent inefficiencies, low generation capacity, ageing infrastructure, poor access in rural and semi-urban areas, and rising fiscal burdens made it clear that government monopoly was unsustainable.

In response to these challenges, the Electric Power Sector Reform Act, 2005 ("**EPSRA**") was enacted, and it laid the foundational legal framework for liberalizing the power sector as it provided for the unbundling of PHCN into distinct successor companies handling generation, transmission and distribution, and the subsequent privatization of these entities. The Electricity Act, 2023 (the "**Electricity Act**"), which repealed the EPSRA, expanded the scope of these reforms by reinforcing private sector involvement through licensing regimes, decentralizing ownership, and regulating the electricity market by the state governments[1].

As a result of the combined effect of these legal instruments, a range of operational and investment structures has emerged across the sector, reflecting a deliberate move toward a more inclusive, efficient, and sustainable electricity market. This article examines Nigeria's transition to a multi-structured power sector characterized by state coordination, private participation, collaborative frameworks, decentralized systems and its implications for energy security in Nigeria.

However, the effectiveness of these frameworks depends on robust regulation, improved market liquidity, enforceable contractual arrangements, and inclusive financing mechanisms that ensure equitable access. Accordingly, the article aims to examine the major structural frameworks operating in the sector, assess how each contributes to the pillars of energy security, identify the systemic constraints limiting their effectiveness, and recommend reforms focused on regulatory clarity, stronger institutional enforcement, investor confidence, and targeted support for vulnerable consumers. We concluded that it is important to have the right ownership model and owners in given contexts, but that these in themselves are not enough. More stringent enforcement of regulations and consumer protection, and capital are also needed going forward.

Conceptual Framework of Electricity Market Structures

The structure of participation in the power sector determines how electricity is generated, transmitted, and distributed, as well as how risks, responsibilities, and benefits are allocated among stakeholders. These frameworks exist along a spectrum ranging from fully state-driven systems to market-oriented arrangements involving private sector participation and hybrid collaborations. In addition, innovative service-based arrangements have emerged to address gaps in electricity access, particularly in underserved areas

Key Structural Models in Nigeria`s Electricity Market

1. State-Driven Model:

   This model refers to a structure in which the government retains full or majority control over electricity infrastructure covering generation, transmission and distribution. The government is both the operator and the regulator. This framework affords direct control of crucial aspects of the power sector within its borders.

[1] Electricity Act, s. 2(1) and 63.

This model was historically dominant in Nigeria through entities like the now-defunct PHCN, formerly NEPA.[2] Under this framework, the government, largely dependent on public funds, handled the planning, funding, and operation of the power assets in Nigeria. However, this centralized model was gradually phased out due to its inefficiencies, poor service delivery and financial constraints associated with its operations. While Nigeria has privatized large portions of its generation and distribution segments, the transmission infrastructure remains under government control alongside certain selected generation assets developed under the National Integrated Power Projects (the "**NIPPs**") such as Alaoji, Gbarain, Geregu.[3]

A notable recent development highlights the continued relevance and evolution of this model. On March 6, 2026, President Bola Ahmed Tinubu announced the constitution of an 11-member committee (the "**Committee**") to ensure the seamless incorporation and operationalization of the Grid Asset Management Company Limited ("**GAMCO**")[4]. GAMCO is intended primarily to modernize transmission evacuation and optimize stranded generation, beginning with the Benin–Lagos transmission corridor, which supplies bulk power to Ogun and Lagos states, Nigeria's most significant industrial and commercial centres.

The Committee's mandate includes a comprehensive review of the implications of the Electricity Reform Laws (2025) and related unbundling arrangements on asset management structures, institutional responsibilities, and regulatory oversight. It is also tasked with identifying areas of conflict, overlap, or inconsistency between the proposed GAMCO framework and existing legal and regulatory instruments. In addition, the Committee will assess the legal status, operational framework, and contractual obligations attached to the Niger Delta Power Holding Company and the NIPP assets, particularly the Omotosho, Olorunsogo, and Ihovbor plants, which are designated for GAMCO's pilot phase.

2. Public-Private Partnership ("**PPP**") Model

These arrangements involve "partnerships" between the state and private participants through mechanisms such as concession, lease, or joint ventures between the government and the private investor in relation to the operation of the generation, distribution and transmission infrastructure. In this model, private investors are typically awarded a concession to undertake the development and operation of power infrastructure for a designated timeframe. Once this agreed-upon period elapses, control and authority over the infrastructure revert to the state government.[5] In essence, a private operator takes over electricity distribution operations, handling billing, collections, customer service and network maintenance during the concession period, while the government retains ownership of infrastructure and procures power from generators.[6]

These concession agreements allow private investors to get consistent revenue during the concession duration, while simultaneously affording state governments the advantages of infrastructure advancement in the power sector without the need for initial capital outlay. Examples of these in the power generation, particularly our hydro plants in Shiroro, Jebba, and Kainji, are fully concessioned.[7]

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[2] Osayo O., "The History Of Nigeria's Power Sector" in https://powerlibrary.theelectricityhub.com/wp-content/plugins/download-attachments/includes/download.php?id=601 (Accessed June 30, 2025).
[3] Odeyinka O., "These are the Entities that Control Nigeria's Power Sector Value Chain" in https://nairametrics.com/2025/02/28/these-are-the-entities-that-control-nigerias-power-sector-value-chain/ (Accessed 25/06/25).
[4] https://statehouse.gov.ng/towards-optimising-the-power-sector-president-tinubu-inaugurates-committee-on-grid-asset-management-company-gamco/ (Accessed 31/03/26).
[5] Infrastructure Regulatory Commission, "Private-Public Partnerships in Nigeria", https://www.icrc.gov.ng/ppp/#:~:text=Build%20Operate%20Transfer%20(BOT)%20and,investment%20costs%20through%20user%20charges. (Accessed April 27, 2025).
[6] Gupta D.L. et al, "Operations Concessions for Electricity Distribution" in https://www.devdiscourse.com/article/other/3347572-efficiency-without-ownership-how-concessions-can-reform-electricity-distribution (Accessed June 25, 2024).
[7] Odeyinka O., *supra note*, 5.

A significant development that has expanded the relevance of this model is the Fifth Alteration Act, 2023, which amended the Constitution of the Federal Republic of Nigeria 1999 (as amended), together with the Electricity Act[8], to empower states within the federation to legislate on the generation, transmission, and distribution of electricity in areas covered by the national grid within their territories. Prior to this constitutional and statutory shift, states were limited to legislating only in off-grid areas not served by the national grid.

This reform has materially broadened the scope for sub-national public-private collaboration, as state governments can now directly structure partnerships with investors for electricity projects within their jurisdictions, including grid-connected generation projects, transmission support infrastructure, distribution networks, embedded generation, and rural electrification schemes. This reform is particularly significant because it enables states to design commercially responsive partnerships tailored to local industrial clusters, urban demand centres, and underserved communities.

GAMCO or no GAMCO, it is far from obvious that significant progress can be made in the transmission sub-section as long as the FGN remains the owner there. More private sector and state government ownership would appear to be needed. Abia State, for example has lately been indicating that it is going in this direction.

3. Community-Based Energy Model

This model incorporates localized participation in energy projects, often structured through cooperatives or community-led initiatives. These systems are designed to address the unique energy needs of specific communities, particularly in rural or underserved areas. In practice, project arrangements may be structured through a special purpose vehicle involving both a project developer and a community energy cooperative, with clearly-defined participation rights, responsibilities, and benefit-sharing terms across electricity generation, transmission, and distribution. This approach allows for collaborative project development while ensuring that community stakeholders remain actively involved.

Such arrangements promote inclusivity and local engagement, although their scalability in Nigeria remains limited due to regulatory, financial, and technical constraints. Despite these challenges, they represent a viable pathway for decentralized energy access particularly under the framework of the Rural Electrification Programme. This model has been deployed in areas including the Rije Community in Abuja (biogas mini-grid)[9] and the Mokoloki Community in Ogun State.[10]

4. Market-Oriented Private Participation Model

This structure involves private entities playing a central role in financing, developing, and operating electricity infrastructure. These can include Independent Power Producers ("**IPPs**"), privatized utilities, and mini-grid developers. One of the most significant IPPs in Nigeria is the Azura-Edo Power Plant, commissioned in 2018 in Edo State. [11] In Nigeria, several generation assets have undergone privatization, including those at Afam IV-V, Delta (Ughelli), Geregu, and Sapele.[12] There are also eleven privatized distribution companies, including the Aba Power Limited Electric, Enugu Electricity

[8] Section 2.
[9] Chinonso K., "How Nigeria's Only Biogas Mini-grid Project Failed With Lessons to Learn" in https://primeprogressng.com/deep-dive/how-nigerias-only-biogas-mini-grid-project-failed-with-lessons-to-learn/ (Accessed April 1, 2026)
[10] RMI et al, "Nigeria's First Commercial Undergrid Minigrid Project" in https://rmi.org/insight/mokoloki/#:~:text=A%20new%20undergrid%20minigrid%20pilot%20in%20Mokoloki%2C%20which,and%20communities%20can%20work%20together%20for%20mutual%20benefit (Accessed October 7, 2025).
[11] Julius Berger, "Engineering, Procurement and Construction of 459MW gas turbine, Aura Edo Power Plant", https://www.julius-berger.com/references/azura-edo-independent-power-plant (Accessed April 25, 2025).)
[12] Odeyinka O. *supra note* 8.

Distribution Company, Abuja Electricity Distribution Plc, Benin Electricity Distribution Plc, Ikeja Electric Plc.[13]

In Nigeria, this model has contributed to increased generation capacity and investment, particularly following the electricity sector reforms. Private participation has also extended to decentralized solutions such as mini-grids, which play a critical role in expanding electricity access in off-grid areas.[14]

However, the effectiveness of this model continues to be constrained by significant financial and market challenges within the Nigerian Electricity Supply Industry. Electricity Distribution Companies ("**DisCos**)", which serve as the primary revenue collection interface in the value chain, have recorded a combined loss of approximately ₦2.349 trillion over the past two years, largely due to billing inefficiencies, collection shortfalls, and energy losses[15]. These constraints have exacerbated the sector's liquidity crisis, undermining the ability of market participants to meet payment obligations across the value chain.

The resulting financial strain has triggered recapitalization and ownership restructuring among DisCos. Notably, this has manifested in transactions such as the sale of a 60% core investor stake in Eko Electricity Distribution Company to a Transgrid Enerco-led consortium comprising North-South Power, Axxela, and Stanbic Infrastructure. Moreso, other distressed DisCos such as Ibadan, Abuja, Kano, and Kaduna DisCos all formed part of the FGN's and Asset Management Corporation of Nigeria's (AMCON) divestment programme for financially troubled utilities, underscoring the broader trend of forced ownership changes driven by chronic indebtedness, weak remittance performance, and the need for fresh capital injection into Nigeria's electricity distribution market.

Generation companies ("**GenCos**") have also been affected by the persistent liquidity and settlement challenges. There is ongoing disagreement between the FGN and GenCos regarding the quantum of outstanding debts in the sector. While the government has indicated a figure of approximately ₦2.8 trillion as the verified legacy debt, the Association of Power Generation Companies has rejected this position, asserting that the actual indebtedness is closer to ₦6 trillion[16]. This divergence highlights underlying issues in market transparency, reconciliation processes, and financial governance within the sector.

These challenges illustrate that while private sector participation has introduced capital and operational efficiencies, the sustainability of this model is heavily dependent on resolving systemic liquidity constraints, strengthening revenue assurance mechanisms, and restoring investor confidence in the market.

5. Service-Based Energy Access Models (Pay-As-You-Go *et. al.*)

Service-oriented frameworks such as Pay-As-You-Go ("**PAYG**") have emerged to address affordability barriers. Under this model, service providers finance, install, and maintain (but do not own) energy systems, while end-users access electricity through incremental payments. It enables consumers to pay for the entire generation capacity in small instalments over a period of time. [17]

This approach has gained traction in renewable energy deployment, particularly solar systems, *e.g.* solar kits and panels which are equipped with information and communication technology that enables remote activation upon payment and automatic disconnection upon default,[18] enabling

[13] *ibid.*
[14] NERC Minigrid Regulations, 2023, Reg. 5 and 6.
[15] https://www.vanguardngr.com/2026/03/electricity-woes-worsen-as-discos-record-n2-4trn-in-financial-losses/ (Accessed 31/03/26).
[16] https://www.icirnigeria.org/gencos-reject-presidencys-n2-8trillion-debts-claims/#:~:text=Nigeria's%20power%20sector%20has%20struggled,N501%20billion%20of%20the%20deb (Accessed 31/03/26).
[17] International Renewable Energy Agency, "Pay-As-You-Go Models Innovation Landscape Brief" in https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2020/Jul/IRENA_Pay-as-you-go_models_2020.pdf (Accessed June 30, 2025).
[18] Rural Electrification Agency, "Project Appraisal Document", https://rea.gov.ng/wp-content/uploads/2018/07/Project-Appraisal-Document-PAD.pdf (Accessed April 25, 2025).

broader access in low-income and off-grid communities. Companies such as Arnegy, Sunfi, Infibrances Technologies Limited, and Lumos Global provide such services to consumers.[19] However, its sustainability is influenced by factors such as foreign exchange volatility, cost of equipment, and regulatory clarity.

Implications for Energy Security

Energy security refers to the uninterrupted availability, accessibility, and affordability of energy.[20] A key determinant of energy security is the underlying ownership model of the energy infrastructure. Nigeria's transition toward diversified frameworks has improved investment inflows and expanded electricity access, particularly through private participation and decentralized solutions.

Private participation models have significantly contributed to increased generation capacity and investment, as it prioritize operational efficiency and financial viability, often resulting in a more stable electricity supply. Also, PPPs have been instrumental in rural electrification efforts. A notable example is the Rural Electrification Agency`s Distributed Renewable Energy Scheme (DARES), which partnered with private companies to deliver 1,265 MW to underserved areas.[21] Innovative models such as PAYG solar systems have also expanded access for low-income households in off-grid communities by enabling instalment-based payments for energy services. Additionally, mini-grids developers have played a central role by supplying more than one customer with a generating capacity of up to 1MW, especially in underserved and rural communities.

The success of Nigeria's Energy Transition Plan, which targets universal access by 2030 and net-zero emissions by 2060 [22] will depend heavily on the structural models that can attract capital, deploy quickly, align with long-term sustainability goals, and offer scalable and decentralized solutions tailored to local energy needs.

Challenges and Systemic Constraints

While significant progress has been made, Nigeria's transmission infrastructure remains wholly under government control, and systemic challenges persist due to the monopolistic structure and limited capacity.[23]

The market-oriented model, though celebrated for its role in attracting capital and innovation, is equally not without its complications. IPPs grapple with off-taker credit risks, as distribution companies struggle with aggregate technical and commercial losses, remittances and liquidity shortfalls. Where power purchase agreements exist, delays in settlement of obligations by the market operator and gas supply arrears create uncertainty that discourages further investment. In turn, investors demand higher risk premiums, inflating the cost of capital and stalling the expansion of reliable generation[24]. This directly constrains availability and affordability, as end-users ultimately bear the cost of these inefficiencies**.**

The PPP model also reveals cracks when risk allocation is poorly defined. In Nigeria, concessions in hydro and distribution assets have often suffered from ambiguous contracts, weak enforcement of performance indicators, and regulatory bottlenecks. Where governments fail to enforce concession terms, private operators lack the incentive to reduce losses or inject adequate capital into system upgrades[25]. This creates

[19] Micheal C., "Instalmental Payment for Solar Gains Traction" in https://businessday.ng/news/article/instalmental-payment-for-solar-gains-traction/ (Accessed June 30, 2025).
[20] International Energy Agency, "Energy Security and The Green Transition", https://www.elibrary.imf.org/view/journals/001/2024/006/article-A001-en.xml, (Accessed April 24, 2025).
[21] Rural Electrification Agency, "Nigeria DARES Hits Milestone As REA Signs Grants With 8 Renewable Energy Companies To Expand Energy Access", https://nep.rea.gov.ng/posts/Press_Release_First_DARES_Signing.html (Accessed April 26, 2025).
[22] Nigeria Energy Transition Plan, https://shorturl.at/YjPMM, (Accessed April 27, 2025).
[23] Electricity Act 2023, s. 15.
[24] Eberhard, A. & Gratwick, "Independent Power Projects in Sub-Saharan Africa: Lessons from Five Key Countries", https://www.worldbank.org/en/topic/energy/publication/independent-power-projects-in-sub-saharan-africa, (Accessed July 27, 2025).
[25] International Energy Agency, "Africa Energy Outlook 2022"- Analysis, https://www.iea.org/reports/africa-energy-outlook-2022, (Accessed July 29, 2025)

a cycle of inefficiency where the public absorbs the risks while the private sector "partner" limits exposure, ultimately weakening both reliability and access to electricity.

The Community-based energy model, though viable, faces significant hurdles. While the Mini-Grid Regulations, 2023 recognize and accommodate community-led participation frameworks, there are still issues and concerns relating to land rights, community leadership structures, and benefit-sharing arrangements that continue to pose major risks to project implementation and long-term sustainability. Even where cooperative or community-based structures are properly established, unresolved land disputes and internal governance tensions can delay, undermine, or in some cases completely stall project execution. Without legal clarity, financial capacity, and technical capacity, this model may cause more harm than good. It has also been reported that the Rije Bio-gas Mini-grid is no longer functioning.[26]

Even the much-lauded PAYG and the Decentralized Renewable Energy (DRE) systems have their own challenges. Although they extend electricity to unserved communities, the models are vulnerable to foreign exchange volatility, high upfront hardware costs, and regulatory uncertainty regarding grid arrival compensation. For rural households with low and irregular incomes, even modest PAYG tariffs can become burdensome[27]. Without concessional finance or subsidy support, there is a risk that decentralized solutions reinforce inequality by limiting access to only those who can afford the technology, undermining the equity dimension of energy security**.**

Taken together, these challenges reveal that choosing a right ownership model is not silver bullets. Each comes with inherent limitations that, if unaddressed, could weaken the four pillars of energy security *i.e.* availability, accessibility, affordability, and sustainability.

Conclusion

The evolution of Nigeria's power sector from a centrally-owned and controlled monopoly to a multi-structure system characterized by a mix of government, private, and hybrid participation has significantly impacted energy security within the country. Each framework contributes uniquely to expanding access and improving reliability. Ultimately, aligning these structures with the goals outlined in Nigeria's Energy Transition Plan will be key to ensuring a resilient, equitable, and secure energy future.

However, structural diversity alone is insufficient to achieve energy security. A coherent and adaptive regulatory framework is essential to ensure effective coordination, equitable access, and long-term sustainability. The Electricity Act decentralizes authority, but clearer guidelines are still required on risk allocation, tariff design, off-taker obligations, and incentives for decentralized renewables. These inherent limitations, if left unaddressed, could weaken the pillars of energy security, that is, availability, accessibility, affordability and sustainability. Hence, to strengthen energy security, regulatory frameworks must prioritize enforceable contracts, market liquidity, and investor confidence, while introducing targeted subsidies or concessional financing for vulnerable consumers. Without stronger enforcement institutions and adequate capital flows, even the most well-designed sectoral frameworks may fail to deliver reliable, affordable, and equitable electricity access.

[26] Chinonso K., *supra note* 9.
[27] Global Off-Grid Solar Market Report, "Off-Grid Solar Market Trends Report 2024", https://www.esmap.org/sites/default/files/esmap-files/2024-Off-Grid-Solar-Market-Trends-Report.pdf (Accessed July 28, 2025).

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