ASSESSMENT OF THE IMPLEMENTATION OF POWER SECTOR REFORMS IN NIGERIA: A STUDY OF PHCN (2015-2023)

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Abstract

Research Problem: *This paper evaluates the implementation of Nigeria's power sector reforms during the Buhari led administration (2015–2023), using the Power Holding Company of Nigeria (PHCN) as a case study. The study explores the extent to which the administration's reform policies addressed persistent challenges of metering problem, perennial collapse of national grid, gas-supply constraints, outdated equipment, poor funding, high indebtedness by electricity consumers, accessing power without payment, epileptic power supply, arbitrary increases in electricity tariff, and low level of power generation capacity. A qualitative research design was employed, relying on the analysis of Electric Power Sector Reform Act, annual reports, approved budget, circulars, white papers, and relevance academic literature. The approach is largely descriptive and evaluative, focusing on policy implementation outcomes.*

Results: *The findings of the study revealed that Buhari could not make substantial progress towards addressing the challenges of persistent grid collapse, poor funding, epileptic power supply, low power generation capacity, replacement of obsolete equipment, shortage of meters and estimated billing system due to weak institutional coordination, regulatory inconsistencies, political interference and financial constraint.*

Conclusion: *The implementation of power sector reforms during Buhari administration recorded modest achievements in area of mass metering, more investment drive and engagement of World Bank and African Development Bank in rural electrification. However, cases of dilapidated infrastructure, epileptic power supply, arbitrary tariff increase and low capacity power generation persisted unabated.*

Key Contribution to Knowledge: *This paper contributes to existing literature by providing a focused evaluation of reform implementation within a specific political administration, highlighting the gap between policy formulation and execution in Nigeria's power sector. It also deepens understanding of the institutional and regulatory barriers that undermine reform outcomes.*

Recommendation: *The study recommends for institutional strengthening, accountability, transparency, capacity building, more funding and effective regulatory framework for the enhancement of effective implementation of Power Sector Reform Act and sustainable power sector development.*

Introduction

Nigeria's power sector continues to experience persistent supply shortages, unreliable service delivery, and limited access, despite decades of policy reforms aimed at transforming the industry into an efficient and competitive market. The enduring gap between reform intentions and actual outcomes reflects a deeper problem within the sector, one that lies beyond the formal design of policies and points to weaknesses in how reforms are implemented in practice. This shifts analytical attention from stated policy objectives to the conditions that shape actual performance. The Electric Power Sector Reform Act of 2005 initiated the unbundling of the Power Holding Company of Nigeria (PHCN) into 18 successor entities across generation, transmission, and distribution (Idowu et al., 2019). Despite these efforts, reliable service remains elusive, suggesting a significant gap between reform objectives and practical outcomes (Adoghe, 2023). The reforms were intended to improve electricity access, operational efficiency, and private investment inflows. However, structural weaknesses, such as aging infrastructure, weak regulatory enforcement, and financing gaps have limited their effectiveness (Adebayo, 2024). Evaluations indicate that, even after privatization, the sector continues to face persistent inefficiencies, questioning the suitability of market liberalization strategies in Nigeria's context (Idowu et al., 2019).

In response, a growing body of research shifts focus toward technical and financial constraints as key drivers of sector performance. This literature points to issues such as aging infrastructure, limited transmission capacity, inadequate metering, disruptions in gas supply, liquidity challenges, and weak revenue collection (Adebayo, 2024; Ajayi, 2025; World Bank, 2025; Reuters, 2025). Thispaper provide valuable insight into the operational realities of the sector and underline the importance of investment, improved infrastructure, and stronger cost recovery mechanisms. Yet, the continued persistence of these challengesdespite targeted interventions such as metering programmes, tariff reforms, and financing initiativessuggests that technical and financial factors alone cannot fully explain sector outcomes. This indicates that deeper structural issues may be at play.

Taken together, both the market-oriented and technical-financial strands of literature tend to treat Nigeria's electricity challenges as separate sets of problems, focusing either on market design or operational constraints. This fragmented approach limits a more comprehensive understanding of the sector, particularly by overlooking the broader institutional context within which reforms are implemented. Crucially, insufficient attention is paid to how weak regulatory enforcement, overlapping institutional responsibilities, political interference, and limited state capacity shape reform outcomes.

This gap in the literature is important. While existing studies offer detailed insights into specific aspects of sector performance, there is limited systematic analysis of how institutional and governance dynamics interact with technical

and financial factors to produce persistent challenges. As a result, issues such as metering gaps, estimated billing, grid instability, tariff disputes, and irregular gas supply are often examined in isolation, rather than as interconnected outcomes of deeper institutional weaknesses.

Against this background, this study adopts an institutional perspective to examine Nigeria's electricity sector reforms under the Muhammadu Buhari administration (2015–2023). It departs from existing research by moving beyond isolated technical, financial, and market-based explanations, and instead conceptualizes

sectoral challenges as the result of interacting institutional and governance dynamics. The study specifically investigates how regulatory enforcement, governance structures, and institutional capacity shape policy implementation and sector performance. By situating the operational realities of the post-PHCN framework within this broader institutional context, it offers a more integrated explanation of reform outcomes. In doing so, the paper contributes to the literature by linking policy design, institutional constraints, and implementation processes into a single analytical framework. This integrated approach not only clarifies why reforms have produced uneven and limited results, but also provides wider insight into the conditions that influence policy effectiveness in electricity sectors across developing countries.

Research Problem.

Despite more than two decades of reform efforts, electricity service delivery in Nigeria continues to be markedly unreliable. This persistent underperformance raises important questions about how effectively these reforms have been implemented. Although a substantial body of research has identified technical challenges such as metering deficits, grid instability, gas supply limitations, and financial constraints, these issues are often examined in isolation. In many cases, they are treated as purely operational shortcomings, with limited attention to the broader institutional and governance environments within which they occur. This narrow focus obscures the deeper structural factors that may be shaping sector outcomes and limits a more comprehensive understanding of reform effectiveness.

The limitations of this approach become particularly evident when examining the Muhammadu Buhari administration (2015–2023). During this period, several policy initiatives were introduced, yet improvements in sector performance remained marginal. Much of the existing literature tends to emphasize either the formal design of these reforms or observable performance indicators, without adequately interrogating the processes through which policies are implemented. As a result, there is insufficient clarity on how and why well-intentioned reforms fail to translate into measurable improvements in electricity delivery. This gap is significant because it highlights the disconnect between policy formulation and actual outcomes in practice.

Moreover, the persistence of challenges such as estimated billing, resistance to tariff adjustments, recurrent grid failures, and ongoing liquidity issues suggests that these problems extend beyond technical inefficiencies. Rather, they point to underlying weaknesses in institutional coordination, regulatory enforcement, and implementation capacity. Yet, current scholarship has not fully integrated these dimensions into a unified analytical framework capable of explaining their combined impact on sector performance. Without such an approach,

explanations of reform failure remain partial and fragmented.

Against this backdrop, there is a clear need for a more institutionally grounded analysis of power sector reforms in Nigeria. By examining the dynamics of reform implementation during the Buhari administration particularly through the operational realities of the Power Holding Company of Nigeria and its successor entities this study seeks to move beyond predominantly technical explanations. In doing so, it aims to provide a more nuanced and comprehensive account of why reform efforts have produced limited and uneven outcomes, thereby contributing to a deeper understanding of the governance challenges that continue to constrain the sector.

Objective of the Study

The major objective of this paper is to examine the implementation of Nigeria's power sector reforms during the President Muhammadu Buhari's administration with emphasis on the performance of Power Holding Company of Nigeria (PHCN). The specific objectives are to

1. To examine how Nigeria's power sector reforms under the Buhari administration (2025-2023) were implemented and how institutional capacity, regulatory enforcement, and governance structures influenced their outcomes.
2. To evaluate the operational performance of the PHCN and its successor entities, with particular attention to persistent challenges such ad metering deficits, grid instability, such as metering deficits, grid instability, tariff resistance, and gas supply constraints.

Methodology

This study adopted a qualitative research approach in examining the implementation of the power sector reforms during the Buhari administration between 2015 and 2023. This approach was considered appropriate because it gives room for an in-depth understanding of policy processes, institutional dynamics and reform outcomes (Creswell, 2018). The study relied primarily on documented resources collected from multiple sources, these included official policy documents such as the Electric Power Sector Reform Act (2005), the National Mass Metering Programme guidelines, the Meter Asset Provider regulations and the Siemens Presidential Power Initiative reports issued by the Federal Ministry of Power. Reports from government agencies, like the Nigeria Electricity Regulatory Commission (NERC), the Transmission Company of Nigeria (TCN), the Rural Electrification Agency (REA), and the Central Bank of Nigeria (CBN). Documents were sourced through official government portals, regulatory websites, academic databases and newspapers. The study employed content analysis to examine the collected documents, identifying patterns, themes and relationships relevant to the research objectives.This approach made it possible to compare policy intentions with actual outcomes during the study period. Overall, the qualitative documentary approach provided a reliable means of understanding the successes, limitations and challenges of implementing the Power Sector Reforms during the Buhari administration.

Conceptual Framework.

The analysis of electricity, policy formulation and implementation, and power sector reforms is motivated by the need to explain the persistent gap between extensive reform activity and weak service delivery outcomes in Nigeria's electricity

sector. These concepts are examined because they capture, in sequence, the outcome, the governing framework, and the operational mechanisms through which sector performance is shaped.

a) Electricity:

Electricity is commonly treated in the literature as more than a basic technical input; it is widely seen as a core public utility that underpins economic activity, social welfare, and the overall capacity of the state. Scholars such as Kessides (2012) and Eberhard et al. (2017) suggest that reliable electricity supply functions as an enabling condition for industrial production, effective public service delivery, and improved household living standards. In many developing economies, the performance of the electricity sector is not judged solely by installed generation capacity, but rather by everyday indicators such as reliability, affordability, access, and quality of supply. Adekeye (2024) conceives electricity an energy generated through the movement of electrons as a result of gravitational force between two points. By implication, electricity can only produce energy when positive and negative wires are connected together.

From a political economy standpoint, electricity provision often reflects how well state institutions actually function in practice. Persistent power shortages, according to Besant-Jones (2006), may point to deeper governance challenges, including weak regulatory oversight, poor coordination of investments, and limited fiscal and administrative capacity. Nigeria's experience appears to support this view. Unreliable electricity supply has long been associated with reduced industrial output, higher operating costs for businesses, and widespread reliance on self-generation through petrol and diesel generators, inverters and solar panels at the household and firm levels.

Empirical studies on Nigeria's electricity sector further indicate that problems such as repeated grid collapses, limited daily supply hours, and the continued use of estimated billing are not merely operational mishaps. Rather, they seem to reflect structural weaknesses in service delivery (Adenikinju, 2019; Eberhard et al., 2021). Focusing on electricity as an outcome variable allows this study to assess power sector reforms based on what consumers actually experience, instead of relying on formal policy statements or institutional restructuring alone. This emphasis aligns with broader public service delivery scholarship, which tends to treat citizen-level outcomes as the most meaningful test of policy effectiveness.

b) Policy Formulation and Implementation

Policy formulation generally refers to the stage at which governments define problems, set objectives, and select policy instruments within legal and regulatory frameworks. Implementation, by contrast, concerns how these formal decisions are translated into concrete actions and observable outcomes. Early implementation scholars, notably Pressman and Wildavsky (1973), argue that this stage is often where policies begin to unravel, not necessarily because of poor design, but due to administrative complexity, coordination failures, and limited resources.

Later contributions to implementation studies suggest that policy outcomes depend less on stated intentions and more on factors such as institutional capacity, inter-agency relationships, political backing, and the ability to adapt policies to local realities (Hill & Hupe, 2014). In sectors like electricity, where responsibilities are dispersed across ministries, regulators, private operators, financiers, and consumers,

coordination problems are almost unavoidable. This complexity increases the risk that policies will drift away from their original goals once implementation begins.

In Nigeria's electricity sector, the literature consistently points to a gap between policy commitments and actual outcomes. Although instruments such as the Electric Power Sector Reform Act, the MYTO tariff framework, and various national metering initiatives outline clear reform objectives, their implementation has been uneven at best (Adebayo, 2024). Regulatory inconsistencies, administrative delays, political interference, and chronic funding constraints have all played a role in weakening reform efforts. As a result, the quality of implementation, rather than policy design alone, has emerged as a key factor in explaining the sector's continued underperformance.

Against this backdrop, the present study adopts an implementation-oriented perspective. It examines how institutional arrangements, governance conditions, and administrative capacity influenced the real-world outcomes of power sector reforms during the Buhari administration, paying closer attention to practice than to policy intent.

c) Power Sector Reforms:

Power sector reforms cover a range of structural, commercial, technical, and regulatory mechanisms. Structurally, the unbundling of the Power Holding Company of Nigeria (PHCN) into separate generation, transmission, and distribution companies was intended to foster competition and improve efficiency (BPE, 2025). However, in practice this structural change has not consistently translated into improved reliability: Nigeria's national grid has collapsed multiple times in recent years, with at least 11 collapses recorded in 2024 alone (independent, 2024).

Commercial reforms, especially metering and revenue assurance initiatives, illustrate the disconnect between reform design and sector realities. In 2025, distribution companies (DisCos) were required to adjust energy credits for more than two million customers who had been overbilled due to estimated billing practices with refunds totaling ₦105 billion for households in Ikeja, Abuja, and Enugu (The Guardian, 2025). These kinds of large credit adjustments highlight just how entrenched metering challenges remain, despite numerous policy interventions.

Technical reforms aimed at stabilizing the grid have also struggled. Supply shortfalls often trace back to inadequate gas supply, vandalism of transmission infrastructure, and ageing equipment that limit the grid ability to sustain consistent output (InfoHub, 2025). Regulatory reforms like tariff increases under the Band A customer categorization were meant to ensure cost-reflective pricing and improve sector liquidity. Yet many consumers such as residents in Lagos suburbs who once enjoyed up to 22 hours of daily supply now report declining service even under the premium tariff regime (Nairametrics, 2024). These mixed outcomes suggest tariff reforms have not always been matched by improvements in tangible service delivery.

Thoeritical framework.

This study is grounded in Public Policy Implementation Theory and Institutional Theory, but it does not apply them in a routine or purely descriptive manner. Instead, it extends both perspectives to explain the persistent disconnect between formally designed electricity sector reforms and their actual outcomes in Nigeria. In doing so, the analysis takes into account the practical realities of weak enforcement, limited institutional capacity, and recurring political

interferencefactors that are often underemphasized in standard applications of these theories in developing-country contexts.

Public Policy Implementation Theory provides a useful starting point by stressing that policy effectiveness depends not only on how policies are formulated but on how they are executed. Classic contributions, particularly by Pressman and Wildavsky, show that implementation breakdowns frequently stem from administrative complexity, coordination failures, and inadequate resources. However, much of the existing literature applies this insight in a largely descriptive way, often assuming that the establishment of administrative structures will naturally produce compliance. The Nigerian case suggests otherwise. Key reformsincluding metering initiatives, tariff systems, and regulatory standardshave been only partially implemented and unevenly enforced. This pattern indicates that the problem extends beyond procedural challenges; it reflects a deeper limitation in the ability of institutions to compel compliance in practice. This distinction matters because it shifts attention from how policies are organised to whether they can actually be made effective.

Institutional Theory similarly highlights the role of formal rules, organisational arrangements, and governance systems in shaping outcomes. Conventional applications tend to assume that well-designed institutions will generate predictable compliance. Yet, in Nigeria, formal frameworks often exist without delivering their intended results. Weak enforcement mechanisms, misaligned incentives, and persistent political intervention reduce the effectiveness of these institutional arrangements. As a result, regulatory bodies may possess formal authority on paper but lack the operational capacity to enforce rules across the sector. This gap between formal authority and actual influence is central to understanding why reforms have produced limited results.

To address these limitations, this study introduces the concept of Institutional Binding Capacity (IBC) as its core analytical lens. IBC refers to the extent to which institutions can translate policy rules into consistent, enforceable, and sustained action. Rather than treating institutions as static structures, this concept evaluates their practical effectiveness. It is operationalised along three interrelated dimensions: regulatory enforcement capacity, institutional coordination capacity, and the degree of governance and political support. Together, these dimensions capture whether policies can move beyond formal adoption to meaningful implementation.
This study departs from earlier applications of both theories by moving beyond procedural and descriptive explanations and focusing instead on how institutional capacity shapes outcomes. Specifically, it treats Institutional Binding Capacity as the mechanism through which enforcement, coordination, and governance dynamics interact to determine the effectiveness of electricity sector reforms. While prior studies often emphasise policy design, technical constraints, or the mere presence of formal institutions, this approach redirects attention to whether institutions can make policy rules binding in practice. This shift is analytically significant because it links institutional performance directly to observable sector outcomes.

In extending existing theory, the study makes three key contributions. First, it reorients the analysis of implementation failure from a procedural focus to an enforcement-centred perspective, highlighting the importance of compliance mechanisms. Second, it advances Institutional Theory by moving it from a largely descriptive account of formal structures to a

more operational framework for assessing institutional performance. Third, it integrates technical, financial, and governance challenges into a single explanatory model. Persistent issues such as metering gaps, grid instability, tariff resistance, and gas supply constraints are therefore understood not as isolated problems, but as interconnected consequences of weak institutional capacity. This integrated view helps clarify why reforms that appear sound in design often fail in practice.
This theoretical framework guides the empirical analysis by focusing on how enforcement capacity, institutional coordination, and governance structures influenced both the implementation of reforms and the operational performance of PHCN and its successor entities during the Buhari administration (2015–2023). It provides a structured way to examine not just what reforms were introduced, but how effectively they were carried out.

The analytical relationship underpinning the study can be expressed as follows:

Power Sector Reform Instruments → Institutional Binding Capacity → Electricity Sector Performance Outcomes

By explicitly linking theory to sector performance, this framework shows that the success of electricity sector reforms depends less on policy design alone and more on the ability of institutions to enforce, coordinate, and sustain those policies over time. In this way, the study offers a context-sensitive extension of Public Policy Implementation Theory and Institutional Theory, contributing to a more grounded understanding of reform outcomes in developing-country electricity sectors.

Power Sector Reforms during President Mohammadu Buhari's Administration

Nigeria's electricity sector reforms under President Muhammadu Buhari (2015–2023) took place in the aftermath of the formal unbundling and privatization of the Power Holding Company of Nigeria (PHCN) in 2013, which left the sector structurally unsettled. Although operational responsibilities were transferred to 18 successor generation, transmission, and distribution companies, key conditions for a functional electricity marketsuch as robust transmission infrastructure, financially viable distribution companies, effective tariff enforcement, and strong regulatory oversightremained incomplete (World Bank, 2019; Bureau of Public Enterprises, 2015). Much of the existing literature focuses narrowly on technical problems, like inadequate metering or grid instability, or financial issues, such as poor revenue collection. This approach explains what challenges persist but provides limited insight into why systemic failures continue despite repeated reforms.
Metering gaps illustrate this limitation. By 2023, only about 44.4 percent of registered consumers were metered, despite regulatory initiatives including the Meter Asset Provider (MAP) Regulations (2018) and the National Mass Metering Programme (NMMP, 2020) (NERC, 2023). Scholars such as Dahunsi (2021) and Akinwale& Oseni (2020) largely attribute slow progress to financial constraints or weak compliance by distribution companies, treating these shortfalls as technical or external issues. This study argues that metering deficiencies reflect deeper institutional weaknesses, specifically, limited Institutional Binding Capacity (IBC), or the ability of institutions to enforce policies, coordinate actors, and sustain credible compliance.

Revenue and liquidity challenges further highlight the explanatory value of IBC. Between 2015 and 2019, tariff shortfalls and poor collections generated financing gaps exceeding ₦1.7 trillion, while sector-wide aggregate technical, commercial, and collection (ATC&C) losses surpassed 45 percent by 2022 (World Bank, 2020; NERC, 2023). Prior analyses (Adebayo, 2022) often frame these problems primarily as political-economy issues, emphasizing resistance to cost-reflective tariffs. However, separating political opposition from institutional dynamics overlooks how weak enforcement, poor coordination, and fragile governance collectively shape financial outcomes. Viewed through IBC, revenue shortfalls are not isolated policy failures but symptoms of systemic institutional fragility.

Technical and operational challenges, such as grid instability and gas supply constraints, underscore the interdependence of institutional and technical factors. More than 100 partial or total grid collapses occurred between 2015 and 2023, peaking in 2016 and 2023 (TCN, 2023; Reuters, 2023). While regulatory reports point to aging transmission assets and generation deficits (NERC, 2023), prior studies often treat these as discrete operational failures (Oyedepo, 2022). Gas shortages further limited generation to 4,000–4,500 MW of roughly 13,000 MW installed capacity (Adenikinju, 2020; World Bank, 2020). Literature examining pipeline vandalism, pricing disputes, or debt rarely connects these issues to broader institutional fragmentation. Using IBC as a lens, this paper contends that such grid and generation failures are systemic, stemming from weak enforcement and poor coordination rather than purely technical bottlenecks. Tariff reforms also illustrate the link between policy legitimacy, enforcement, and institutional trust. The introduction of Service-Based Tariffs (SBT) under MYTO 2020 generated widespread resistance, including nationwide protests led by labor unions (Reuters, 2024; BusinessDay, 2024). While some analyses attribute consumer pushback to sequencing and communication challenges (Dahunsi, 2021; World Bank, 2020), they overlook how unreliable supply, limited metering, and enforcement gaps interact to undermine reform acceptance. From the perspective of IBC, tariffs function as governance instruments: without credible institutional enforcement, even technically sound reforms fail to achieve their objectives.

Taken together, these patterns suggest that Buhari-era reforms were constrained less by a lack of policy ideas than by institutional capacity deficits. Prior studies often isolate operational or financial challenges but fail to synthesize them into a systemic explanation. By framing persistent sectoral issues, metering, revenue, grid stability, gas supply, and tariffsthrough the lens of IBC, this study shows that outcomes are largely determined by institutions' ability to enforce, coordinate, and sustain compliance. Integrating technical, financial, and political dimensions into a single analytical framework offers a more holistic understanding of electricity sector reform in developing countries, emphasizing the central role of institutional governance in shaping reform effectiveness.

Performance of the Power Holding Company of Nigeria (PHCN), 2015–2023

This paper examines why electricity sector reforms in Nigeria between 2015 and 2023 delivered uneven and largely limited results, despite the introduction of numerous policy initiatives. Evidence drawn

from key performance indicators indicates that these outcomes were driven less by flaws in policy design than by weaknesses in institutional enforcement and the practical challenges of implementation. This finding is consistent with Public Policy Implementation Theory, which stresses that policy outcomes depend more on execution than formulation (Pressman &Wildavsky, 1973), as well as Institutional Theory, which underscores the importance of enforcement capacity and governance structures in shaping results. In effect, the issue was not the absence of reform frameworks, but the inability to translate them into practice. The study's main contribution, therefore, lies in showing through empirical analysis, how formally established reforms failed to produce enforceable and effective outcomes on the ground. This gap between intention and reality is central to understanding the persistent inefficiencies in the sector.

Metering Reform and Governance Challenges

Metering reform has occupied a central place in Nigeria's electricity sector restructuring, given its direct link to billing accuracy, revenue assurance, and consumer confidence. Despite a series of policy initiatives since 2015, progress in closing the metering gap has remained uneven. Data from the Nigerian Electricity Regulatory Commission indicate that as of December 2023, only about 44.39 percent of end-use customers were metered. This leaves a majority still reliant on estimated billing, pointing to a reform process that has advanced but not yet achieved its core objective of universal coverage.

To accelerate deployment, several institutional mechanisms were introduced, notably the Meter Asset Provider (MAP) scheme in 2018 and the National Mass Metering Programme (NMMP) in 2020. The NMMP, supported by approximately ₦200 billion in funding from the Central Bank of Nigeria, was designed to scale up meter installations, reduce estimated billing, and improve revenue collection. Under its initial phase, about ₦59.28 billion was disbursed for nearly one million meters, with over 960,000 units financed through distribution companies. These initiatives were intended not only to improve measurement accuracy but also to strengthen financial flows by reducing commercial and collection losses.

However, implementation outcomes have been inconsistent. Evidence from 2023 shows a marked slowdown in NMMP deployment, with only 25,847 meters installed during the year. By contrast, the MAP framework accounted for over 585,000 installations in the same period, indicating a growing reliance on private-sector-led solutions. This divergence is notable because it suggests that publicly funded programmes have struggled to sustain momentum, while market-driven approaches have proven relatively more resilient. At the same time, it points to coordination and financing challenges within the broader reform architecture. Quarterly data further illustrate this uneven progress. In the fourth quarter of 2023, a total of 111,225 meters were installed across all schemes, representing a 25.72 percent decline from the previous quarter. Such fluctuations highlight the fragility of implementation efforts and suggest that deployment levels remain sensitive to funding cycles, regulatory enforcement, and operational capacity within distribution companies. In effect, metering expansion has lacked the consistency required for system-wide impact.

From a governance standpoint, the persistence of low metering coverage has significant implications. According to the Nigerian Electricity Regulatory Commission,

metering is the most effective tool for reducing Aggregate Technical, Commercial and Collection (ATC&C) losses, as it enhances billing precision and improves revenue recovery. Yet, the continued dependence on estimated billing reflects weak enforcement and limited accountability within distribution companies. This is consequential because it erodes consumer trust and creates incentives for non-payment, thereby reinforcing the sector's financial challenges. Although there have been measurable improvements relative to the pre-reform period, these gains remain unevenly distributed. By 2023, nearly all maximum-demand customers had been metered, while non-maximum-demand users, who constitute the majorityremained significantly under-covered. This imbalance suggests that reform efforts have been more effective where revenue potential is highest, raising concerns about equity and inclusiveness. It also indicates that commercial considerations continue to shape implementation priorities.

In general, the evidence points to incremental progress rather than systemic transformation. The coexistence of multiple metering frameworks, coupled with fluctuating deployment rates and the continued prevalence of estimated billing, reflects deeper institutional constraints. In particular, it underscores the difficulty of translating well-designed policies into consistent operational outcomes. Addressing these challenges will require stronger regulatory enforcement, improved coordination among sector actors, and more reliable financing mechanisms to sustain large-scale meter deployment.

Tariff Reform and Public Trust

Tariff reform has been a central pillar of electricity sector restructuring in Nigeria, intended to strengthen cost recovery, attract private investment, and improve financial sustainability. The process is anchored in the Multi-Year Tariff Order (MYTO), a regulatory framework developed by the Nigerian Electricity Regulatory Commission to guide periodic tariff adjustments based on variables such as inflation, exchange rates, and generation costs. In principle, this framework offers a structured and technically grounded approach to pricing. In practice, however, outcomes between 2015 and 2023 reveal a persistent disconnect between tariff adjustments and the quality of service delivered to consumers.

Evidence from the period shows that revenue collection has consistently lagged behind billed amounts, reflecting both operational limitations and consumer resistance. In 2022, distribution companies (DisCos) billed about ₦1.18 trillion but recovered only ₦841 billion, implying a collection efficiency of roughly 71 percent. A similar pattern was observed in the third quarter of 2023, when ₦267.61 billion was collected out of ₦349.55 billion billed. These recurring gaps are significant because they indicate that tariff adjustments alone have not translated into improved revenue performance. Instead, they point to underlying weaknesses in billing credibility and enforcement capacity.

One factor shaping these outcomes is the continued reliance on estimated billing, driven by limited metering coverage. A substantial share of consumers remained unmetered throughout the period, leading to billing practices that were often viewed as inconsistent or opaque. The Nigerian Electricity Regulatory Commission has repeatedly noted that such practices weaken consumer confidence and

reduce willingness to pay, especially when charges appear disconnected from actual consumption. This relationship matters because it creates a reinforcing cycle: low trust reduces compliance, and weak compliance further undermines revenue collection. Tariff adjustments introduced under the MYTO framework, particularly those linked to exchange rate movements and rising generation costswere frequently implemented without corresponding improvements in electricity supply. Service-reflective tariff reforms introduced in 2020, for example, aimed to align tariffs with hours of supply. However, implementation gaps meant that many consumers did not experience the expected service gains. As a result, tariff increases were often interpreted as unjustified, especially in a context of persistent outages and unreliable service. This perception is critical, as it shifts the debate from affordability to legitimacy.

Public trust, in this context, is closely tied to the credibility of regulatory institutions and the consistency of policy outcomes. Findings from the World Bank suggest that resistance to tariff increases is less about opposition to higher prices and more about dissatisfaction with service delivery and accountability. Where improvements in supply do not accompany price adjustments, the regulatory framework itself is called into question, making enforcement more difficult and reform efforts less sustainable.

Macroeconomic pressures during the study period further complicated the implementation of tariff reforms. Exchange rate volatility and inflation increased the cost of electricity generationparticularly for gas-fired plantsnecessitating periodic tariff revisions to maintain cost reflectivity. However, the political sensitivity of electricity pricing often constrained the extent of these adjustments. According to the World Bank, this resulted in persistent tariff shortfalls and the buildup of financial deficits across the sector. Government interventions, including subsidies and financial support mechanisms, helped stabilize the system in the short term but did not resolve underlying inefficiencies.

Overall, the experience between 2015 and 2023 suggests that tariff reform in Nigeria has been limited by a misalignment between pricing policy and service delivery outcomes. While the MYTO framework provides a technically sound basis for tariff setting, its effectiveness has been weakened by implementation gaps, low metering coverage, and inconsistent service quality. This indicates that tariff reform cannot succeed in isolation. Sustained progress will depend on parallel improvements in operational performance, transparency, and institutional accountability, which are necessary to rebuild consumer trust and ensure long-term sector viability.

Grid Instability and Coordination Problems

Nigeria's national electricity grid has been marked by repeated episodes of instability, largely traceable to weak coordination across generation, transmission, and load dispatch operations. Data from the Transmission Company of Nigeria indicate that between 2017 and 2022, the system recorded 46 collapses, peaking at 15 in 2017 and declining unevenly thereafter (12 in 2018, 9 in 2019, 4 in 2020, 2 in 2021, and 4 in 2022). While the overall trend suggests some reduction, the continued occurrence of collapses points to a system that remains structurally fragile rather than fundamentally stabilized. Notably, no collapse was recorded in the fourth quarter of 2022, as reported by the Nigerian Electricity Regulatory Commission, which may reflect the temporary effectiveness of specific interventions

rather than a sustained improvement in system resilience.

Technically, these collapses arise when grid frequency and voltage move beyond acceptable operating thresholdsaround 50 Hz and 330 kV (±5%). Such deviations typically signal an imbalance between electricity supply and demand, combined with limited real-time control capacity. In practice, this means that the system struggles to respond quickly to fluctuations, leaving it vulnerable to cascading failures when disturbances occur. This is not merely a technical issue; it reflects deeper operational and institutional weaknesses in how different segments of the power sector interact.

These vulnerabilities are further intensified by constraints in transmission infrastructure and persistent coordination gaps among sector actors. Transmission lines and substations are frequently described as ageing or overstretched, reducing their ability to evacuate generated power efficiently and increasing exposure to voltage instability. As a result, actual electricity delivery consistently falls short of installed generation capacity, with only a portion of available power transmitted due to fuel constraints and network limitations. This gap is significant because it shows that the problem is not only insufficient generation but also the system's inability to utilize what already exists. Consequently, even relatively small disturbancessuch as a generation unit tripping offlinecan trigger disproportionate frequency fluctuations that escalate into system-wide failures. This dynamic highlights the weak alignment between the Transmission Company of Nigeria, generation companies (GenCos), and distribution companies (DisCos).

Taken together, the persistence of grid instability over this period points to enduring governance and coordination challenges. The pattern of repeated collapses and operational disruptions suggests that improvements in one segment of the system are not being matched by corresponding adjustments elsewhere. This imbalance limits the effectiveness of reform efforts. A more stable grid will therefore depend not only on technical upgrades but also on stronger institutional coordination, particularly in real-time dispatch, infrastructure maintenance, and load management. Investments in modern monitoring and control systems, alongside clearer operational integration among sector actors, are likely to be critical in achieving more reliable system performance.

Outdated Equipment

Nigeria's electricity infrastructure remains significantly aged and inadequately maintained, with direct consequences for system efficiency and reliability. Large portions of the transmission and distribution network have operated for decades without comprehensive upgrades, leading to frequent equipment failures such as transformer faults, line disruptions, and substation outages. These failures contribute to recurring supply interruptions and rising maintenance costs. More broadly, the continued reliance on legacy infrastructure limits the system's ability to respond to growing demand or maintain operational stability, resulting in persistent brownouts and blackouts across multiple regions.

These constraints are particularly evident in distribution network performance. Data from the Nigerian Electricity Regulatory Commission show that Aggregate Technical, Commercial and Collection (ATC&C) losses across the 11 distribution companies stood at approximately 39.45 percent in the third quarter of 2023. This level of loss is substantial, reflecting both technical inefficienciessuch as

energy dissipation in ageing transformers and lines—and non-technical factors, including theft and billing inconsistencies. The persistence of such high losses suggests that the distribution network is not only outdated but also operating beyond its optimal capacity, with limited resilience to current load demands.

Concerns about infrastructure-related inefficiencies are not new. Earlier sector analyses have consistently identified ATC&C losses as a reliable indicator of both energy and revenue leakage within the system. This underscores the importance of targeted investment in network rehabilitation, particularly in areas with high loss concentrations. Despite the privatization of generation and distribution assets in 2013, these inefficiencies have persisted, indicating that ownership changes alone have not translated into sufficient infrastructure renewal. Meanwhile, the transmission segmentstill under the control of the Transmission Company of Nigeriacontinues to exhibit structural weaknesses, including frequent equipment faults and limited capacity to withstand operational stress.

Infrastructure limitations are also evident at the interface between generation and transmission. Although Nigeria's installed generation capacity is estimated at over 11,000–13,000 MW, the amount of power that can be effectively transmitted and distributed remains considerably lower. This gap reflects constraints in both transmission and downstream networks, which are unable to evacuate and deliver the full volume of generated electricity. The implication is that a significant share of available capacity is effectively stranded, not because of insufficient generation but due to bottlenecks within the grid.

In practical terms, the persistence of outdated and poorly maintained infrastructure continues to constrain both reliability and expansion. It limits the sector's ability to improve service delivery, reduce losses, and extend access to underserved areas. The evidence therefore points to a need for sustained and coordinated investment in asset replacement and modernization. Without such intervention, technical inefficiencies are likely to persist, reinforcing broader operational and financial challenges within the sector

Poor Funding

Financial weakness has remained a central characteristic of Nigeria's electricity sector, shaping both its day-to-day operations and long-term viability. Although generation and distribution assets were privatized in 2013, the expected financial turnaround has not materialized. Instead, the sector has continued to operate under persistent liquidity pressure, largely driven by the mismatch between cost-reflective tariffs and actual revenue realized. Estimates from the World Bank indicate that between 2015 and 2019, cumulative tariff shortfalls and market deficits exceeded ₦1.7 trillion. This gap is significant because it points to a system that is structurally unable to fund itself, even under a privatized framework.

A major contributor to this outcome is the weak revenue collection performance of distribution companies (DisCos). Data from the Nigerian Electricity Regulatory Commission show that collection efficiency has remained consistently below optimal levels. For example, in the third quarter of 2023, DisCos recovered ₦267.61 billion out of ₦349.55 billion billed, equivalent to about 76.56 percent. Similar trends across earlier years confirm that a sizeable portion of billed revenue is never realized. This shortfall directly constrains liquidity, as DisCos are unable to fully meet their payment obligations to upstream actors such as

generation companies (GenCos) and gas suppliers. In effect, the financial weakness at the distribution level transmits stress across the entire value chain.

The problem is compounded by the prolonged application of non–cost-reflective tariffs. While the Multi-Year Tariff Order (MYTO) was intended to align tariffs with actual costs, its implementation has often been moderated by political and social considerations. As a result, tariff adjustments have not always kept pace with rising operational costs, leaving DisCos with revenues that fall short of required market payments. According to the World Bank, this persistent mismatch between costs and revenues represents a core structural constraint, rather than a temporary imbalance. It also illustrates the limits of reform when pricing decisions remain partially insulated from market realities.

To manage these pressures, the government introduced a series of financial support mechanisms. The Central Bank of Nigeria, for instance, established the Nigerian Electricity Market Stabilization Facility, through which about ₦213 billion was disbursed to support sector operators and clear legacy debts. In addition, the Payment Assurance Guarantee scheme was designed to ensure minimum payments to GenCos for electricity supplied. While these interventions provided short-term relief, their impact has been largely palliative. They addressed immediate cash flow shortages but did not correct the underlying drivers of weak revenue collection and inefficient billing practices.

Liquidity constraints have also been reinforced by the accumulation of sector-wide debt. Arrears owed to gas suppliers and other service providers have grown over time, reflecting the inability of market participants to settle obligations in full. Because DisCos serve as the primary revenue entry point, any deficit at this level cascades upward, leaving GenCos unable to pay for gas and thereby constraining generation output. This cycle demonstrates how financial fragility in one segment can propagate across the system, reducing overall efficiency and reliability. It also underscores the interdependence of sector actors, where no segment can remain financially stable in isolation.

Beyond operational financing, limited investment in infrastructure has further deepened the problem. Persistent funding gaps have restricted both public and private capacity to upgrade transmission and distribution networks. The result is continued reliance on ageing infrastructure, high technical and commercial losses, and slow expansion of service coverage. In practical terms, inadequate funding does not only affect current performance; it also delays modernization and locks the sector into a cycle of inefficiency. Holistically, the pattern observed between 2015 and 2023 suggests that poor funding is not simply a matter of insufficient capital but a reflection of deeper structural weaknesses. Weak revenue recovery, tariff constraints, and limited institutional capacity combine to undermine financial sustainability. Although government interventions have eased short-term liquidity pressures, lasting improvement will depend on strengthening revenue assurance, enforcing more consistent tariff frameworks, and improving financial governance across the electricity value chain.

High Consumer Indebtedness

Consumer indebtedness has remained a persistent obstacle to revenue recovery and financial stability in Nigeria's electricity sector. Across the period under review, a wide gap

consistently existed between the value of electricity billed and the amount actually recovered. Data from the Nigerian Electricity Regulatory Commission show that in 2022, distribution companies (DisCos) issued bills totaling about ₦1.18 trillion but collected only ₦841 billion, leaving roughly ₦343 billion unpaid. This shortfall is not just a statistical imbalance; it directly constrains cash flow within the sector and limits the ability of operators to meet financial obligations.

This pattern extends beyond a single year and reflects a deeper structural issue. Collection efficiency has remained consistently below expected levels, with many consumers either delaying payment or defaulting altogether. For instance, in the third quarter of 2023, DisCos recovered ₦267.61 billion out of ₦349.55 billion billed, again leaving a substantial portion outstanding. The recurrence of such gaps suggests that indebtedness is embedded in the routine functioning of the sector rather than arising from temporary shocks. In effect, revenue underperformance has become normalized, which weakens financial planning and operational predictability.

A central factor driving this outcome is the continued reliance on estimated billing, largely due to limited metering coverage. In the absence of accurate consumption data, customers frequently challenge billed amounts, resulting in delayed or partial payments. The Nigerian Electricity Regulatory Commission has repeatedly observed that estimated billing reduces consumers' willingness to pay, particularly where charges are perceived as arbitrary. This dynamic is important because it shifts the issue from simple non-payment to a broader problem of trust and perceived fairness within the billing system. As confidence declines, compliance becomes more difficult to enforce.

Public-sector consumers, including government ministries, departments, and agencies, also account for a significant share of outstanding obligations. Evidence from the World Bank indicates that arrears owed by these entities have historically constituted a notable portion of total sector liabilities. When public institutions fail to settle their electricity bills in a timely manner, the effects go beyond immediate revenue losses. It undermines enforcement credibility, as private consumers may question why compliance is expected of them when government entities default without consequence.

The effects of consumer indebtedness extend across the entire electricity value chain. Because DisCos act as the primary revenue collection point, any shortfall at this level directly affects upstream payments to generation companies (GenCos) and gas suppliers. This creates a cascading liquidity constraint, where reduced revenue collection translates into lower generation output due to unpaid fuel costs. In this context, indebtedness is not confined to distribution inefficiencies; it becomes a systemic issue that disrupts the overall functioning of the market.

Policy responses have included stricter enforcement measures, customer enumeration initiatives, and expanded deployment of prepaid meters aimed at eliminating post-consumption billing. While these interventions address some operational weaknesses, progress has been incremental. The continued accumulation of arrears suggests that underlying concernsparticularly those related to affordability, institutional enforcement capacity, and trust in the billing systemremain insufficiently resolved.

Overall, the persistence of high consumer indebtedness between 2015 and 2023 points to

deeper governance challenges within the sector. Weak billing credibility, uneven enforcement, and poor public-sector compliance collectively limit revenue assurance. Addressing these issues is essential not only for improving collection efficiency but also for restoring financial viability across the electricity marke

Epileptic Power Supply

Electricity supply in Nigeria between 2015 and 2023 was marked by persistent instability and frequent outages, reflecting structural weaknesses and operational inefficiencies throughout the sector. Although installed generation capacity exceeded 12,000 MW, actual electricity delivered to the grid typically ranged between 3,500 MW and 5,000 MW. This wide gap between potential and realized output underscores the limited impact of capacity expansion initiatives in the absence of improvements in infrastructure and operational efficiency (World Bank, 2020; Nigerian Electricity Regulatory Commission, 2023).

Generation output during this period fluctuated considerably, contributing to inconsistent supply. Data from NERC indicate that daily energy output was frequently constrained by plant outages, gas supply shortages, and transmission bottlenecks. Thermal power plants, which form the bulk of Nigeria's generation mix, were particularly affected by irregular gas availability and pricing disputes, leading to recurrent reductions in capacity. Hydropower facilities added further variability due to seasonal water inflows, compounding supply instability during dry periods. These fluctuations reveal that capacity alone does not guarantee reliable delivery. Transmission infrastructure limitations also played a key role in shaping supply outcomes. Even when generation was available, the national grid often lacked the capacity to evacuate electricity efficiently, resulting in load rejection events where power could not be transmitted and generators were forced to curtail output. This demonstrates that supply shortfalls were not solely a function of insufficient generation but were also driven by weaknesses in transmission management and system design.

At the distribution level, technical and commercial inefficiencies further reduced the volume of electricity reaching end users. High Aggregate Technical, Commercial, and Collection (ATC&C) lossesestimated at over 40 percent in 2023meant that significant portions of generated electricity were either lost in transit or unbilled and unpaid (NERC, 2023). These losses contributed to voltage instability, localized outages, and uneven service across regions, reinforcing perceptions of unreliable supply.

The cumulative effect of these challenges has been the prevalence of frequent and unpredictable power interruptions, commonly described as "epileptic" supply. Households and businesses increasingly relied on alternative sources, such as diesel or petrol generators, raising the cost of energy and reducing economic productivity. From a governance perspective, the persistence of unreliable electricity undermines public confidence in sector reforms and weakens willingness to comply with billing and tariff policies. In summary, the evidence indicates that unreliable electricity supply during 2015–2023 resulted from interconnected challenges across the generation, transmission, and distribution segments. Addressing these systemic issues requires not only increased installed capacity but also coordinated investments and institutional reforms to improve operational performance, infrastructure integration, and service reliability.

Arbitrary Tariff Increases

Electricity tariff changes in Nigeria have often been perceived as arbitrary by consumers, especially when price increases occurred without noticeable improvements in service reliability or metering coverage. The Nigerian Electricity Regulatory Commission introduced the Multi-Year Tariff Order (MYTO) framework to provide a transparent and methodologically robust basis for periodic tariff reviews. This framework considers factors such as generation costs, inflation, exchange rate fluctuations, and operational efficiency (NERC, 2020). In practice, however, many consumers continued to view tariff adjustments as unfair when service quality remained suboptimal.

Data indicate a persistent disconnect between tariff changes and service delivery outcomes.

Between 2018 and 2022, NERC approved several upward adjustments under MYTO to align tariffs with cost-reflective pricing, yet distribution companies continued to experience high Aggregate Technical, Commercial, and Collection (ATC&C) losses, exceeding 40 percent. This limited the extent to which increased tariffs translated into improved electricity supply (NERC, 2023). Households and businesses often continued to face unreliable service, intermittent outages, and estimated billing, reinforcing perceptions that tariff increases were unjustified.

Consumer skepticism was further reinforced by weak communication and limited transparency in tariff-setting processes. World Bank assessments highlight that tariff adjustments are often poorly explained to the public, leaving many consumers unaware of how regulatory principles and cost drivers justify price changes (World Bank, 2020). This lack of clarity has fueled resistance to tariff increases, sometimes expressed through delayed payments, defaults, or public protests. The pattern underscores a broader governance challenge: even technically justified tariff reforms can be perceived as arbitrary if institutional processes are opaque and public engagement is insufficient.

The consequences of perceived arbitrariness extend beyond consumer dissatisfaction. Low compliance with billing undermines revenue flows for distribution companies, constrains liquidity for generation and transmission operators, and limits the sector's capacity to finance infrastructure upgrades. Public trust, therefore, functions as both a determinant and an outcome of tariff reform effectiveness. Strengthening transparency, improving metering coverage, and linking tariff adjustments directly to measurable service improvements are critical measures to enhance compliance and reinforce confidence in the sector.
In conclusion, evidence from 2015–2023 shows that tariff reforms, although grounded in technical frameworks like MYTO, have been compromised by weak service delivery, low metering penetration, and insufficient public communication. Addressing these shortcomings is essential to restore credibility in tariff-setting, improve compliance, and support the financial sustainability of Nigeria's electricity sector.

Discussion of Data

Institutional Capacity, Regulatory Enforcement, and Reform Outcomes

Nigeria's electricity sector continues to underperform despite multiple reform efforts, prompting a key question: why do formal regulatory frameworks fail to yield reliable outcomes? The data suggest that the core issue lies not in policy design but in institutional capacityspecifically, the ability to enforce

regulations and coordinate implementation effectively.

Although regulatory instruments were formally in place, compliance remained inconsistent. This indicates a gap between legal authority and practical enforcement: regulatory bodies had mandates but lacked the means to ensure adherence. Consequently, rules existed more on paper than in practice, revealing a structural weakness in the reform process. Institutional arrangements assumed effectiveness that was not realized. These findings extend Public Policy Implementation Theory by highlighting that the challenge is not simply the complexity of implementation but the institutional incapacity to guarantee compliance. Similarly, they challenge conventional readings of Institutional Theory, showing that formal structures alone do not ensure functional outcomes. While prior research acknowledges regulatory weaknesses, this study positions institutional capacity as the decisive determinant of reform success. Governance frameworks only influenced outcomes where enforcement was credible; without it, reforms remained largely procedural, producing minimal improvements in sector performance.

Operational Performance: Metering, Tariff Reform, and Grid Stability

The sector's operational challenges raise another critical question: are technical deficits the main obstacle, or do institutional failures drive these problems? Evidence points decisively to the latter.

Persistent metering gaps, despite targeted interventions, highlight the limits of reform in the absence of effective enforcement. Financial resources alone did not guarantee results; weak coordination and inconsistent execution largely determined the outcomes. This underscores that metering deficits are not purely technical shortcomings but reflect deeper institutional failures.

Tariff reforms show a similar pattern. Even with a structured pricing framework, revenue collection remained low and consumer resistance persisted. This resistance stems from perceptions of illegitimacy, fueled by unreliable supply and opaque billing practices. While prior studies attribute tariff rejection to trust or affordability, this analysis clarifies that trust itself depends on institutional performance. Without credible enforcement and visible service improvements, tariff reforms cannot achieve legitimacy or compliance. Grid instability and gas supply constraints further reinforce the institutional dimension of sector failures. These challenges are not merely the result of aging infrastructure but are exacerbated by poor coordination among generation, transmission, and distribution actors. Operational breakdowns thus reflect systemic institutional weaknesses rather than isolated technical faults. Collectively, metering gaps, tariff resistance, and grid instability are interrelated outcomes of limited institutional capacity rather than discrete technical issues.

Integrative Analysis and Theoretical Implications

The broader question emerges: why have reforms achieved incremental improvements rather than transformative change? The evidence indicates that persistent sectoral challenges are less about the absence of technical solutions and more about institutions' inability to implement them effectively. This perspective builds on existing studies of structural inefficiencies but shifts the focus from isolated factors to systemic interdependencies. Technical, financial, and operational constraints

interact within the institutional environment, reinforcing one another. This approach provides a more integrated explanation of reform outcomes.

Theoretically, these findings refine key frameworks. Public Policy Implementation Theory is extended by identifying enforcement capacity as a critical variable in weak governance contexts. Institutional Theory is likewise nuanced by emphasizing that effectiveness should be judged by practical enforceability, not formal structures alone. Additionally, this study introduces the concept of Institutional Binding Capacity (IBC) as an analytical tool, linking enforcement, coordination, and governance support. IBC explains why policies that appear adequate on paper fail in practice and offers a more precise lens for analyzing reforms in developing-country settings.

Position of the Study

This study maintains a clear stance: power sector reforms in Nigeria from 2015 to 2023 were primarily limited by weak institutional capacity, especially in enforcement, coordination, and governance, rather than deficiencies in policy design or technical solutions. Reform outcomes remained modest because institutions lacked the ability to translate policy into sustained, enforceable practice.

Conclusion

This study set out to explain why electricity sector reforms in Nigeria between 2015 and 2023 have not translated into stable and reliable power supply, despite the existence of formal policies and regulatory frameworks. The evidence suggests that the problem is less about how reforms are designed and more about the limited capacity of institutions to enforce rules, coordinate actors, and sustain implementation over time. In effect, well-crafted policies have struggled to produce results because the structures required to make them work remain weak.

At a conceptual level, the study departs from the common tendency in the literature to examine issues such as metering gaps, tariff resistance, grid instability, and liquidity shortages in isolation. Rather than treating these as separate challenges, the findings show that they are closely linked and rooted in the same institutional deficiencies. This perspective matters because it redirects attention away from surface-level inefficiencies to the deeper governance conditions that reproduce them. Without addressing these underlying constraints, reforms are likely to generate only limited or temporary improvements.

Theoretically, the findings both support and extend existing approaches. Public Policy Implementation Theory rightly underscores the importance of execution, but this study demonstrates that execution itself depends fundamentally on the strength of enforcement institutions. Where enforcement is weak, implementation becomes inconsistent, regardless of policy intent. Similarly, while Institutional Theory draws attention to the role of formal structures, the evidence here indicates that the mere existence of institutions does not guarantee effectiveness. What matters is whether those institutions can compel compliance and sustain coordinated action. This challenges the implicit assumption that formal arrangements alone are sufficient to shape outcomes.

Building on these insights, the study advances the concept of Institutional Binding Capacity (IBC) as a more precise way of explaining reform performance. The findings indicate that reforms are unlikely to succeed

unless institutions can make rules binding, align the incentives of sector actors, and maintain continuity in implementation. IBC therefore goes beyond being an additional variable; it represents a basic condition for policy effectiveness, particularly in contexts where governance systems are fragile. This contribution provides a clearer lens for understanding why technically sound reforms often fail in practice.
In relation to prior research, the study both aligns with and diverges from existing explanations. It agrees with earlier studies that highlight persistent inefficiencies in Nigeria's electricity sector. However, it moves beyond fragmented accounts by showing how these inefficiencies interact and reinforce one another through institutional weaknesses. This integrated explanation offers a more coherent understanding of reform outcomes and helps bridge gaps in the literature.

Taken together, the study concludes that the success of electricity sector reforms in Nigeria depends fundamentally on institutional capacity. Without credible enforcement mechanisms, effective coordination, and sustained governance support, reforms are unlikely to achieve meaningful or lasting impact. This suggests the need for a shift in reform priorities—from an emphasis on policy design and technical fixes to a stronger focus on building the institutional conditions necessary for implementation.

Recommendations

Drawing on the study's objectives and empirical findings, the following recommendations are offered to support more effective power sector reform in Nigeria:

Stabilising Gas Supply for Power Generation

Persistent generation shortfalls suggest that electricity reform cannot succeed without addressing the gas supply problem. Greater policy emphasis should be placed on securing reliable domestic gas supply for power plants. Incentives for gas producers to prioritise the local market, combined with improved gas transportation infrastructure and enforceable domestic supply obligations, may help reduce generation volatility. A more stable gas–power relationship is likely to improve system reliability and reduce the frequency of sudden supply disruptions.

Accelerating Metering and Strengthening Revenue Assurance

Universal metering should be treated less as a technical add-on and more as a central reform objective. Faster deployment of meters, supported by stricter enforcement of existing regulations and clearer accountability for distribution companies, would reduce reliance on estimated billing. Beyond its technical benefits, accurate metering has an important trust-building function. Transparent and verifiable billing practices are essential for improving consumer confidence and strengthening revenue collection across the sector.

Addressing Infrastructure Deficits and Funding Constraints

Ageing transmission and distribution infrastructure remains a major source of technical losses and service interruptions. Addressing this deficit requires sustained, long-term investment rather than sporadic upgrades. Access to affordable financing, performance-based investment obligations for operators, and closer coordination between public and private

stakeholders are all necessary. Without predictable capital flows and clear investment incentives, operational inefficiencies are likely to persist, regardless of policy reforms.

Enhancing the Credibility of Tariff Reforms

Although tariff adjustments are difficult to avoid, their credibility depends largely on how they are implemented. Pricing reforms should be clearly tied to measurable service delivery standards, rather than introduced in isolation. Transparent communication, genuine consumer engagement, and effective grievance-resolution mechanisms could improve public acceptance over time. In practice, tariff reforms are more likely to gain legitimacy when consumers can see—and feel—real improvements in electricity supply and service quality.

Reducing Sector Indebtedness and Improving Liquidity

The sector's chronic liquidity challenges are unlikely to ease unless accumulated debts are addressed in a systematic manner. Of particular importance are outstanding obligations owed by government ministries, departments, and agencies. A structured and time-bound public-sector debt settlement framework would strengthen cash flows across the electricity value chain and enhance the investment capacity of sector operators.

Strengthening Institutional and Regulatory Effectiveness

Ultimately, sustainable reform outcomes depend on the strength and credibility of sector institutions. Regulatory bodies need sufficient autonomy to enforce rules consistently, publish performance data regularly, and resist undue political interference. Improved institutional capacity, transparency, and accountability are critical if reform policies are to translate into tangible and lasting improvements in electricity service delivery.

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