An Appraisal of Power Sector Reforms and Delivery of Electric Services in Nigeria

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Abstract
The performance of the power sector in Nigeria since its reform as provided for in the Electric Power Sector Reform Act (EPSR Act, 2005) constitutes source of concern amongst government policymakers, stakeholders in the power industry and the public. Several efforts to ascertain how well the sector delivers electricity effectively to its users since the period seem to provide vague database. This study assessed the performance of the power sector before the 2005 reform and thereafter, to ascertain the implication within the electricity value chain, and how it affects the living standards of the people. As a descriptive study, it sourced information from secondary data, used content analysis method for discussion of the thematic issues and anchored the study on elite theory, primarily to demonstrate how a tiny segment of the society makes policies that target their mutual interests and benefits, other than the masses. The findings show, firstly, that government's interference and excessive control contributes to the failures in the reform and privatisation of the power sector. Secondly, members of the public pay exorbitant cost to use electricity facility even when it is scarcely available. Thirdly, the present predicaments of the power sector are not different from what it was before government embarked on the sector's privatisation. It recommends repositioning the privatised power sector operations for greater efficiency in service delivery.
Keywords*: Power Sector Reform, Service Delivery, Present Realities, Electricity Value Chain*

1. Introduction

Ordinary Nigerians have long seen the poor performance of Nigeria's hitherto state-controlled power sector, resulting in unstable electricity supply and frequent blackouts, as evidence of the ineffectiveness of their governments (The Economist, Feb 26, 2016). In essence, it has been a turbulent times contending with the maladies of the electricity industry. As a major critical national infrastructural facility that breathes life into all facets of the socio-economic and political structures in the system, electricity plays multifaceted roles in the society. It is not conceivable how the productive, manufacturing and the service sectors of the economy can operate or function effectively without an efficient power supply system.

With an estimated installed electricity generation capacity of 8,644 Megawatts and available capacity of just approximately 3,718 Megawatts to cater for the electricity needs of a population of over 170 Million people (Ayanruoh, 2013a), it is glaring that the inadequacy in the Nigerian power sector poses a challenge to the system. The gap between the demand of electricity and the available capacity leads to the recurrent widespread power shortages due to poor distribution network, inefficiency in the management of billing system, and therefore results in resort to self-generation of power by all the classes of electricity users in Nigeria.

In a bid to address this problem, President Olusegun Obasanjo signed the Power Sector Reform Bill into law in March 2005, to enable private companies to participate in electricity generation, transmission, and distribution (Sambo et al, 2010). The Electric Power Sector Reform Acts (2005) provides the legal framework for the power sector reform. It aimed at changing the monopoly enjoyed by moribund National Electric Power Authority (NEPA) that came into being in 1972. The idea of privatising NEPA elicited obtrusive expectations for improved electricity supply for all round purposes in the country.

Although the organised labour opposed power sector privatisation because of its national symbol and strategic importance in development, the velocity of public support for improved power supply suppressed the contradictory stance. This followed government's allegation that labour was obsessed by interests of workers in the sector (Nwachukwu, 2010) and perhaps not critical about the genuine intentions that reflected or identified with the national interests. Despite the currency and contextual significance of the debates for and against the power sector reform, many Nigerians believed that prior to the privatisation of NEPA and PHCN, the workers are the problems of their abysmal poor performances.

This notion intensified the call to cleanse the sector through reforms and perhaps privatisation, in order to restore sanity in the system. It was a consensus that such action will surely set machineries in motion for private sector ownership, investment, operation and management of the power sector; hence, the sector would begin to function well and deliver services effectively. Except for a privatised power sector, observers agree that neither NEPA nor PHCN could give Nigeria the amount of electricity that would guarantee industrial production and domestic needs. To provide adequate power to ensure that Nigeria is among the industrialized nations, Sambo et al, (2010) identified three priority focal action plans thus:

a. Adequate power must be generated;
b. The power must effectively be transmitted to all parts of the country; and
c. Finally, the power must be efficiently distributed to the consumers.

The enforcement of the action plan became imperative upon the realisation that barely few years of full reform and privatisation, the absence of the expected changes in the operation and performance of the power sector, proves the past stereotyping of decay in the matrix right. It reinforced the attribution of poor performance of electricity sector to diverse factors beyond the workforce. It also justifies a study that looks at the pre-reform and post-reform operations of the power sector in Nigeria. The essence is to find out why the efforts of the private sector successor companies and the government, have not been able to translate the reform plans into improved power generation, effective transmission and prompt distribution for delivery of efficient regular electrical services to Nigerians.

2. Problematising the Power Sector Problem

The history of the Nigerian power sector is replete with ugly narratives of consistent failure to meet its obligations to Nigerians. Ikeonu (2006) traced the root of the problems to the period between 1981 and 1985, during the fourth National Development plan, when there was oil boom and power demand was over 10%. The rapid growth rate in the economy made it difficult for the installed capacity to cope with the load requirement of residential, commercial and industrial consumers. It brought some serious challenges and setbacks in the operation and service delivery in the sector, which Sambo et al (2010) identified to include:

a. Weak and Inadequate Network Coverage;
b. Overloaded Transformers and bad Feeder Pillars;
c. Substandard distribution lines;
d. Poor Billing System;
e. Unwholesome practices by staff and very poor Customer relations;
f. Inadequate logistic facilities such as tools and working vehicles;
g. Poor and obsolete communication equipment;
h. Low staff morale and lack of regular training; and
i. Insufficient funds for maintenance activities.

The intractable nature of these problems coupled with heavy investments made in the sector without corresponding effects, irked government to consider thinking out of the box. Consequently, NEPA lost its monopoly over the operation of the Nigeria power sector in 1998, when the National Council on Privatisation (NCP) empowered a 23-member Electric Sector Reform Implementation Committee (ERIC) to develop guidelines to promote the policy goals of total liberalization, competition and private sector led growth of electricity sector (Asubiojo, 2007). The ERIC set out the Electric Power Policy statement, which is to ensure that, Nigeria has an Electric Power Industry (EPI) that can meet the needs of its citizens in the 21st century (Idemudia & Nordstorm, 2016).

In other words, reform is a total overhauling of a public enterprise with the aim of encouraging efficiency, effectiveness, competency and financial capability in handling the sector (Omoyefa, 2008). The idea of reform that government initiated primarily tended to repackage its public enterprises for better operation, management and performance. The emphasis on reform assumed strategic importance when privatisation ran concurrently with it in many instances. Thus, the privatisation programme of the reform agenda in the power sector formally took full effect in 2013 though the reform was already in place since May 31, 2005, which midwife the transition from NEPA to PHCN and set the process rolling.

From hindsight, power sector is the hub of economic activities; it provides a roadmap for either general progression or retrogression in a society. In many developing countries, power sector has become a subject for campaign agenda and a yardstick for measuring the ability of government to boost and sustain economic growth. Nigerian electric power has been so epileptic that the Nigerian economy is frequently described as a generator economy (Ekpo, 2009).

Aside that the productive sector grapples with epileptic power supply, it also contends with high cost of private power source to support production and other economic activities. Amid huge government investments in the power sector since inception, dearth of electricity supply, owing to the apparent comatose condition of the source of public power supply often compels investors to resort to private power source for their businesses.

This alternative power source is reasonably expensive due to cost of diesel or fuel used for powering the generating plants. It creates disparaging business environment that does not augur well for economic growth. Paradoxically, since the return to civilian rule in 1999, governments have spent on average about US$2bn annually on electricity provision, but with little service improvements to show for it (The Economist, Feb 26, 2016). However, in August 2010, the then president, Goodluck Jonathan, launched the Power Sector Reform Roadmap, aimed at shifting the running of power utilities to the private sector. It included the privatisation of the state-owned Power Holding Company of Nigeria (PHCN).

In late 2013 when almost all of the six power-generation plants and 11 distribution companies unbundled from PHCN were eventually sold, there was high public expectation that the new owners would bring a rapid end to frequent power outages in Africa's largest economy but the old song of poor service delivery in electricity supply seems to have persisted. Nigerians still experience the usual blackout for days, unmaintained facilities, low voltage most times due to overloading of transformers, high voltage sometimes, systems collapse, high bills (usually outrageous estimated bills), connection and reconnection charges, and inadequate generation, among others (Okolobah & Ismail, 2013).

It is noticeable that since after the privatisation of the power sector, every passing day, Nigeria seems farther away from the promise of privatisation, as not only has private monopoly replaced public monopoly of power generation and distribution, it is arguable if power supply during pre-privatisation era was not better than post-privatisation (Ahiuma-Young, 2017). The ugly trend affects the micro-economic activities so much so that a good number of artisans leave their crafts due to poor electricity supply situation and switchover to whatever type of business that does not rely or depend on electricity.

Similarly, it has forced many big business concerns, corporate bodies and prospective investors to leave Nigeria for other neighbouring countries like Ghana. At the household level (residential users), public power is no more relied upon but private power source that remains the hard alternative. Almost every household have one size of generating plant or the other. The development does not only result in huge job loss and unemployment at all strata of the economy but also breeds overwhelming crime surge and security challenges in the system.

3. Theoretical Framework

Elite theory provides explanation for reform and privatisation programmes in Nigeria. Higley (2010) emphasised that the origins of elite theory lie most clearly in the writings of Gaetano Mosca (1858-1941), Vilfredo Pareto (1848-1923), Robert Michels (1876-1936), and Max Weber (1864-1920). In other words, Mosca (1923/1939); Michels (1915/1962); Pareto (1901/1968); and Weber (1978), among other proponents of elite theory, discussed different perspectives to elite analysis. The discussion hinged on how the domineering roles of elites in decision-making process characterise their influence in birthing most government policies.

Mosca (1923/1939) emphasised the ways in which tiny minorities out-organise and outwit large majorities, adding that "political classes" (a substitute for political elite), usually have "a certain material, intellectual, or even moral superiority" over those they govern. In same vein, Pareto (1901/1968) argued that elites are those most adept at using the two modes of political rule, force and persuasion, and who usually enjoy important advantages such as inherited wealth and family connections (Marshall, 2007). Similarly, Michels (1915/1962) rooted elites (oligarchies) in the need of large organisations for leaders and experts, in order to operate efficiently. As these individuals gain control of funds, information flows, promotions, and other aspects of organisational functioning, power becomes concentrated in their hands. Weber (1978) held that political action is always determined by the principle of small numbers, which means, the superior political maneuverability of small leading groups.

What the analyses portray is the inherent potentials of the elites to outwit the non-elite class (masses) in policy formulation, resource allocation and distribution of rewards in the society. Reform in organisation, generally, is usually a reflection of emerging changes in the orientation about economic environment, as conceived by political leaders and entrepreneurs. In public enterprises that are under the control of government, reform is mainly elite policy. In the case of the latter, many privileged elites in the developing world, especially in Africa have used reform and the twin privatisation as smokescreen for policies that further either their economic monopoly or strategic interests in the control of public institutions.

The practical example is the case of reform and privatisation of government owned public enterprises in Nigeria, whereby a cluster of governing and non-governing elites orchestrated and contrived the programme to benefit select interests. The unbundling of power sector, for this purpose, and the consequent privatisation to elite class, buttresses the underlying objective of elite conspiracy against public interests. Reform merely repositioned the juicy money spinning enterprises and stealthily reallocated them to the proxies of those in government for ownership, operation, management and profit maximisation.

4. Review of Issues that Necessitated the Power Sector Reform

The African Development Bank Appraisal Report (2009) on Economic and Power Sector Reform Program in Nigeria indicates that about 45% of the population has access to electricity, with only about 30% of their demand for power being met. The power sector is plagued by recurrent outages to the extent that some 90% of industrial customers and a significant number of residential and other non-residential customers provide their own power at a huge cost to themselves and to the Nigerian economy. The total capacity of power self-generation units in Nigeria is estimated at about 2,500MW.

This background information rationalises the whole essence of a sectoral reform, to give a new lease of life to such sector. Even in the issue of administrative reform, it implies a periodic review of a part or whole of the machinery of government (Omoyefa, 2008). Such review always provides a blueprint as the basis of a white paper issued by government to address management maintenance intervention, organizational health-check or turnaround maintenance to re-engineer the structure, management and the entire being of the administrative system (Olaopa, 2008).

The rationale behind every reform is basically to improve on the performance indicators and service delivery output. The rationale for privatisation of the power sector falls in tandem with government resolve to transform the sector and make significant investment to improve on its operation and performance. This could not be feasible in a sector like NEPA, which government centrally controlled.

Fundamentally, the Nigerian public has always seen the National Electric Power Authority (NEPA) as replete with several problems that hinder service delivery. Observers consider the NEPA era as characterised by frequent power cuts, outages, incessant load shedding, transformers operating below installed capacities, feeder pillar units completely chopped off; lack of operating tools such as Insulators, Fuses, G&P units and other maintenance and faults clearing equipments (Iseoluwakanmi, 2014). They have remained major constraints bedeviling the power sector, and therefore needed serious attention. Banwo & Ighodalo (n.d.) listed some of the challenges that confronted NEPA prior to reform as:

a. shortage of electric power supply to meet the ever-increasing demand;
b. non-payment of utility bills by a large percentage of consumers;
c. loss of the already insufficient electric power due to dilapidated, obsolete and poorly maintained infrastructure;
d. shortage of gas supply for thermal stations and low water levels for hydro stations;
e. uneconomically high operating costs, especially of maintenance of the available power generation plants and other requisite infrastructure, equipment and machinery;
f. scarce foreign exchange to purchase spare parts to replace damaged parts; and the recurring vandalism of power installations.

On the marketing side, the experience in the billing system has been absurd. Nigerians get bills that they did not use and continue to get charges for unsubstantiated services, including for system maintenance and upgrade (Anyanrouh, 2013b; Edukugbo, 2014). On a general note, there is the problem of vandalism of installations, which escalates the issue of consumer's infidelity. Discoveries are made on regular basis about outright theft of current through illegal connections, by-passing of meter, direct connections, installation of appliances and equipment without due notification of the electricity providing sector (Okolobah & Ismail, 2013). There is also the issue of lack of Turn-Around Maintenance (TAM), gross incompetence of management and staff. The incompetence that radiates all segments of the power sector compels reform that looks into the whole system with a view to making changes in ownership, operation and performance that is business and profit oriented.

The federal government in 2000 adopted a holistic approach of restructuring the power sector and privatising of business units unbundled from NEPA (Oyeneye, 2004). Following this new vision, the National Electric Power Authority (NEPA) transformed to the Power Holding Company of Nigeria (PHCN), which splits into three major sub-sectors on operational and functional lines, like Generation, Transmission and Distribution/Marketing (Oladipo et al, 2018). Eighteen successor companies were created under the PHCN: (i) six for power generation; (ii) one transmission company; and (iii) eleven distribution companies (ADB, 2009), which includes Afam, Egbin, Kainji, Shiroro, Sapele and Ughelli. .

Generation has the duty to produce electric current from its Hydro and Thermal plants. Transmission sub-sector solely transports the produced electric current from Generation through its different (transmission) lines to the Distribution sub-sector. There is a designed network of operation and collaboration among the functional units in the power sector. The idea is to achieve unhindered quality power supply, build sustainable institutional capacity, increase power generation output, facilitate reasonable power distribution that reflects demand, ensure equilibrium in the regulatory system, and maintain a clean billing system that does not put customers on the edge for unnecessary extortion (Edukugbo, 2014).

According to Oladipo, et al (2018), ordinary Nigerians perceive the poor performance of Nigeria's hitherto state controlled power sector, resulting in unstable electricity supply and frequent blackouts, as evidence of the ineffectiveness of their governments. As various assessments show, while the reform has succeeds in unbundling the Generation and Distribution infrastructure, the performance of the power sector remains clumsy without significant changes in its supply chain despite government interventions. It means that the post-reform performance has not satisfied Nigerians that crave for regular power supply.

5. Institutional Mechanism for Power Sector Reform

Among the priority projects set out to achieve in reform were to create institutional structures or bodies, assign specific functions to them, provide laws that empower them to function, and commit them to undertake detailed activities that government proposed for implementation. According to Adesanya (2013), the reform gave birth to bodies such as:

a. Nigerian Bulk Electricity Training Companies Plc (NBETC), which buys electricity in bulk and sells to Distribution Companies (DisCos).
b. Nigerian Electricity Regulatory Commission (NERC): This body monitors and regulates the electricity industry.
c. Bureau of Public Enterprises (BPE): This is a body meant to undertake the issue of privatisation as it affects the power sector.
d. Nigerian Electricity Liability Management Company (NELMCO): This is in-charge of assets and liabilities of PHCN and presently paying pension of PHCN pensioners.
e. Electricity Management Services (EMS)
f. Niger Delta Power Holding Company of Nigeria NDPHCN)
g. National Integrated Power Project (NIPP): These are thermal power plants meant to support the existing ones in power generation with a view to attaining considerable Megawatts of electricity.

The NIPPs were initiated in 2004 to boost electricity generation capacity by the opening of gas power stations across the country (Okolobah & Ismail, 2013). In addition, the Independent Power Producers (IPP) established by the reform sought to encourage private sector's participation in power generation to support the productive sector especially where national grid is inadequate or inaccessible. It is to be located in areas where investors identify as business flashpoints and a beehive of economic activities. Table 1 shows the location of the power plants and their installed capacities.

TABLE 1: IPPs AND THEIR INSTALLED CAPACITIES

S/N	INDEPENDENT POWER PRODUCERS (IPPs)	INSTALLED CAPACITIES
1	AES Power Station: located at Egbin	224Megawatts
2	Shell (Afam IV) in Rivers State	650Megawatts
3	Agip in Okpei in Delta State	480Megawatts
4	ASG Ibom at Akwa Ibom State	155Megawatts
5	RSG – Trans Amadi in Rivers State	100Megawatts
6	RSG - Omoku also in Rivers State	150Megawatts

Source: EPSR Act, 2005; Adesanya, (2013)

The establishment and constitution of these bodies was to accelerate the process of implementing the provisions of the reform in conformity with government timelines. Okoro & Chikuni (2007) note that sequel to the approval of the Federal Executive Council (FEC), the reform bill set out five key objectives, to:

a. Unbundle NEPA
b. Privatise the unbundled entities
c. Establish a regulatory agency
d. Establish a rural electrification agency and fund
e. Establish a power consumer assistance fund.

By these instruments, government was keen to rely on the structures and experiment the programme, which promised to reposition the power sector for improved performance. The reform arrangement also provides for interdependence in the activities of the three main subsectors – GenCos, TCN and DisCos. It requires that they operate in close collaborations to ensure effective electricity services delivery. The role of NBETC in the electricity value chain is to sell produced current to DisCos through GenCos. Similarly, the National Power Training Institute of Nigeria (NAPTIN) trains engineers that effect the needed improvement in the industry generally and mitigate incidences of ineptitude in the sector. The aforementioned bodies appear as mere structures than as serious function driven mechanism.

6. The Impact of Electricity Generation and Distribution Capacities on Power Supply

The relationship between electricity generation and the distribution component that terminates with the end users depends solely on the electricity transmission capacity. If the generation translates to transmission and distribution, the result is effective service delivery, in the form of regular uninterrupted power supply, except where other external factors affect the process. According to Oladipo, et al (2018), in Nigeria, electricity is received from the transmission grid at 330/132kV and stepped down to lower voltages of 33kV, 11kV, 0.415kV and 240V, as it is distributed to end users. Domestic consumers receive their supply at 240Volts while industrial consumers (heavy users) can take their supply from either the 11kV or the 33kV lines. The 330kV and 132kV are referred to as high voltage while the 33kV and 11kV and below range is referred to as medium/low voltage.

Indications point to the fact that electricity generation, transmission and distribution margin from 1999 to 2017 shows significant fluctuation (Lawal, 2008). In 1999, when Nigeria had a population of about 120million people, it recorded 5,906 Megawatts installed electricity generation capacity. Out of this whole figure, the transmission wheeled just 1,750Megawatts for distribution to customers (Adoghe, Odigwe & Igbinovia, 2009).

The wide gap between installed capacity and actual figure available for supply became a recurring decimal and exposed the inability of transmission to wheel the entire installed capacity and enhance supply of electricity to prospective end users based on demand. In year 2000, though the installed capacity increased to 6,200Megawatts, transmission only wheeled 1,500Megawatts available for supply. The result is that while the power generation increased by 294 Megawatts, the distribution capacity decreased to 250 Megawatts from 1999 figures.

According to the World Bank Reports in 2009, Nigeria has the lowest electricity consumption per capital among the OPEC member states. The country generates 0.000021 Megawatts and 123.76KWH of electricity consumption per capital or unit of population, which is the lowest among its member states (Oluwa, 2012). However, in 2013 when privatisation became operational fully, the nation's electricity installed capacity rose to 6,953Megawatts, but the period it spanned (2000 to 2013) did not match the meagre increase of just 753Megawatts, which was the cumulative difference in 14years. This is because the country had already attained about 4,598Megawatts prior to the period (Sambo, et al, 2010).

In 2014, the survey conducted by the World Bank to ascertain Development Indicators in select countries show that Nigeria has attained 8,457Megawatts as the installed electricity generation capacity (World Bank, 2009). Despite this, the end users of electricity groaned in frequent blackout due to inability of the transmission to wheel sufficient megawatts for distribution (Idemudia & Nordstorm, 2016). The slide in transmission became glaring in the subsequent years when in early September of 2016, barely 4,285Megawatts of electricity was available and between April and June 2017, the National Bureau of Statistics reported that the 25 power plants in Nigeria generated between 2,503Megawatts and about 4,000Megawatts but the report was silent on what were transmitted for distribution to users.

Even with the fluctuation in electricity generation and decline in transmission, the marginal output remained worrisome; hence, the visible absence of any indicators of tangible improvement in power distribution and usage by the public. This is against the assertion that in April 2017, GenCos recorded installed capacity of about 12,500Megawatts with about 8,000Megawatts available for distribution (Utuk, 2017; Oladipo et al, 2018) but perhaps not transmitted for distribution. The Executive Secretary, Association of Power Generation Companies (APGCs) declared this figure as progress report but admitted in utter contradiction that paucity of fund to obtain gas to fire power plants led to reduction in power generation and distribution in the subsequent months. This contradiction, enveloped the reason that the power sector in August 2017, recorded substantial reduction in general output that measured 6,803Megawatts of electricity distribution from the previous 8,000Megawatts.

Nonetheless, on November 27, 2017, the Nigerian Electric System Operator (NESO) reported a peak generation of about 37% of total installed capacity of the power plants. This transient upsurge in power generation dramatically led the NERC to fix a Power Generation

Target in excess of 40,000Megawatts by 2020, comprising of 69% thermal, 17% hydro, 10% coal and about 4% renewable energy (Oladipo, et al, 2018). The tabulation in Table 2 below, extracted from January 2017 Power Generation Statistics produced by NERC, shows at a glance, the performance of the sector in providing electricity services delivery.

TABLE 2: GENERATION STATISTICS SHOWING SECTOR'S PERFORMANCES

VARIABLES	PEAK (MW/h)	CONSTRAINT LOSS (MW/h)	REVENUE LOSS (Billions ₦)	DAILY PEAK (MW/h)
Highest	4,148	3,531	1,695	4,933
Lowest	2,596	1,888	0.906	3,707
Average	3,723	2,716	1,303	4,372

Source: NERC, 2017

By implementing the power sector reforms, Nigeria targets 40,000Megawatts of electricity generation in 2020, (a short-term target, to be precise). To achieve this projection from the perspective of financial cost, the country needed to spend approximately $10Billion per annum on the sector for the next ten years (Ochelle, 2015; Oladipo, et al, 2018). In consonance, Banwo & Ighodalo (n.d.) note that Federal Government has taken some steps to provide funds to most of the privatised generation and distribution companies. Specifically, the Federal Government, on 2nd August 2014, extended a N213 billion (approximately US$1 billion) facility to power generation companies for the purposes of:

a. settling certain legacy debts especially those incurred by suppliers of natural gas;
b. paying off monies owed to certain electricity market participants from November 1, 2013; and
c. defraying costs incurred by virtue of infrastructural (especially metering) upgrade by distribution companies.

These huge capital supports from the government would suggest a determination to facilitate total transformation in the power sector for better service delivery, but the inherent problem refuses to abate. From all indications, table 3 provides ample evidence that the sector is operating both below installed capacity and below the projection given by the MYTO.

TABLE3: **MYTO POWER GENERATION PROJECTION (2016 - 2020)**

PERIOD (YEARS)	PROJECTION (MEGAWATTS)
2016	5,465
2017	7,199
2018	8,999
2019	10,493
2020	11,383

Source: NERC, 2017

The projection relied on the number and the capacity of the power generating plants. From available data, Nigeria currently has 14 generating plant, which supply electric energy

to the National Grid. Of the 14 generating plants, 3 are hydro and 11 are thermal (gas/steam). The national grid is made up of 4,889.2km of 330kV line, 6,319.33km of 132kV line, 6,098MVA transformer capacity at 330/132kV and 8,090MVA transformer capacity at 132/33kV (Sambo, et al, 2010). However, the projection in the table above has not matched with reality. Electricity usage has continued to fall and the impact remains conspicuous in the economy, which is predominantly a deplorable Nigerian factor compared to indicators from other countries. The development contradicts the goals of reform and post-reform programs.

To corroborate the slide in the power sector, Nigeria's electricity consumption on per-capita basis is among the lowest when compared with the average per-capita electricity usage in countries such as Libya (4,270kw/h), India (616kw/h), China (2,944kw/h), South Africa (4,803kw/h), Singapore (8,307kw/h) and US (13,394kw/h) (Iseoluwakanmi, 2014). Such ranking practically demonstrates deficient power sector that provides poor services. It means that reform has not actually uncovered the real problem of the power sector, to know whether it is operation and management ineptitude or a case of festering corruption in the sector.

7. The Power Sector Operational Structure and Performance Analysis

The data in the preceding section show the ever-increasing gap between the power generations installed capacity and the available generation capacity. It buttresses a serious mismatch that affects both transmission and distribution. Makinde, (2005); Adoghe et al, (2009); Adesanya (2013) relate the disconnections between the installed and the generation capacities to copious and persisting challenges of the power sector, which the reform has not redressed. It comes in different forms and manifest diverse symptoms, among which include:

a. Lack of liquidity and high losses referred to as weak commercial viability. This is where DisCos are not able to meet their revenue obligation because their customers could not pay bills and it was unable to block the leakages in the system. As such, the subsectors are starved of needed fund for their operations.
b. Insufficient transmission capacity and public management of the market and system operators, and
c. Insufficient and unstable gas supply that affect efficient power generation, transmission and distribution.

The reform provides that NBET purchase power generated by GenCos and IPP at agreed prices as stated in Power Purchase Agreement (PPA) and sells to DisCos who then sells to its customers. Once DisCos are not able to collect enough revenue from its customers, it becomes debtor to GenCos (Nnodim, 2014). The inability to pay for current makes GenCos unable to pay its gas supplier and on that account, they were unable to get more supplies. Thus, aside the reform and post-reform interventions, challenges subsist in the power sector.

a. The gratuitous interference in the activities of the Regulatory Body (NERC) through the appointment of its Chairman by the President that compromise its independence;
b. The continued government presence and control on the power sector when the private sector that becomes key player after the privatisation should operate the sector fully;
c. The over-centralisation of power generation does not encourage the private sector to come and invest in the sector. It affects electricity output and usage in the economy;

d. Privatisation conceived profit maximisation, as it driving force and most investors are not bothered that the people who it is actually meant for are schemed out;
e. The reform and privatisation was run with inherent personal interests;
f. Operational imbalance among the Sub-sectors of the Power Sector (GenCos, TCN and DicCos) lost the needed synergy and collaboration for effective performance;
g. Exclusion of the public from the centre of the reform and privatisation programmes starting from the conception up to the full implementation, which foisted impression of wrong motives and intentions on the program and thus intensified public distrust.

The situation has not improved much since after the privatization, even with continued government subsidies for some users. Oladipo et al (2018) listed the root causes as,

a. Lack of proper funding due mainly to the collapse of global oil prices;
a. The challenge of convincing frustrated electricity consumers that they must accept substantial increases in energy tariff if Nigeria is to achieve constant, stable and nationwide supply;
b. Structural problems that continue to hamper growth in the power sector, such as shortage of gas supply for thermal plants, high level of unpaid electricity bills and the country's outdated band poorly maintained transmission network, which the government still owns but put under private management;
c. Inability of the existing transmission network to handle much more load than current peak electricity production;
d. Struggle by the new power operators to make progress amid aging facilities that require substantial amounts of investments to upgrade and expand their capacities.

Generally, the problem with the issue of privatisation and under-performance after the reform specifically is that those who packaged the program did not design it to be a means towards ending the problem of irregular power supply in the country (Onochie et al, 2015).

8. Strategies for Achieving Desired Reforms in the Power Sector

The operation within the electricity value chain leaves more to be desired and it is evident in the fact that the subsectors are not operating in close collaboration; there is inadequate supply of gas to the thermal stations, which has hampered increased generation and DisCos debt profile has prevented the TCN from wheeling as much as all that is generated. Therefore, the non-performance of DisCos due to inability to meet its financial obligations denies Nigerians power supply. Nigeria has a lower electricity capacity than Slovakia, a country with about 3% of Nigeria's population (The Economist, Feb 26, 2016).

In other words, this major power gaps seriously impede the growth of the non-oil sector and, as a result, job creation and poverty reduction (ADB, 2009). Conversely, Nigeria has sufficient endowments to operate a people-oriented and development-based electricity industry in the absence of many political and environmental factors that hinder successful breakthrough in the barriers on the path of improved performance in the sector. It demands recourse to new work plans to make meaningful impact in the power sector, as listed below:

8.1.Critical Infrastructure Requirements

The operators rarely maintain equipment and installations due to paucity of fund. It poses challenges to the sector, and retards electricity delivery system in the power sector. In both short-term and long-term plans, the operators should address the under-listed issues:

a. Ease liquidity constraints, and cause DisCos to devise ways and means to collect its huge debts and settle its creditors.
b. Plug the leakages in the system, which had been conduit pipes for huge financial losses. There is need to reverse the idea of using casual staff in its workforce. Their job insecurity makes them prone to defraud, extort money from customers.
c. Provide ID (identity) card for staff to differentiate them from vandals who pretend equipment maintenance services and cash drive in the public space to commit crime.

8.2.Revenue Drive Enforcements

Rather than the use of disconnection as cash drive mechanism, the DisCos should not neglect their technical functions for cash collection. Faults should be cleared as at when due; general maintenance should be done. The Business Hubs should ensure light is available.

a. The NERC tariff system should be reflective and fair too in order that they are affordable to electricity users.
b. The use of prepaid meters should be popularised and made available to all customers. This will help to boost revenue.
c. The planned eligible customer registration and policy will not be in the best interest of the sector, especially DisCos who have already raised contrary opinion on the policy.
d. There is need to facilitate transaction and boost generation. Most power generating companies, including the Independent Power Producers (IPPs), are operating below installed capacities and it could change by clearing all arrears of gas supplies.

8.3.System Support Operations

The country has large proven quantity of natural gas reserve put at 187 Trillion Cubic Feet (TCF). This huge gas reserve can serve electricity generation to thermal stations for 44years. Nonetheless, the management and utilisation of gas resource in Nigeria for power generation has been a problematic issue, especially between GenCos and DisCos over claims and counter-claims on gas supply and inability to meet the financial obligation. For instance, Popoola & Mokuye (2018) posit that GenCos claim that DisCos owe them about N40Billion as cost of gas sold to it for power generation. The development requires intervention, thus:

a. There is need to reform and privatise TCN. This will help to resolve the centralised structure in electricity generation, transmission and distribution.
b. The gas sector too, which can as well be considered, as being part of the electricity value chain should be reformed. This will draw local and international gas companies to invest into the sector.

8.4.Product Standardisation

The strategy to ensure that the product is affordable should be developed. There is need to dispense the excessive profit oriented operation of the sector, as electricity remains a public utility service. In particular, NERC should ensure a reflective tariff system. Once the cost of electricity is no longer affordable it means it is not serving the public. For example, the eligible customer policy that permits those who can afford to buy electricity current direct from GenCos rather than through DisCos as had been the case, is not in the best interest of majority of electricity users in Nigeria. The eligible customer system is discriminatory, as electricity is made available to those who can afford it. Unfortunately, both the have and the have-nots face public power shortage due to poor performance of the reformed power sector.

9. Conclusion and Recommendations

The study reveals that critical issues that fueled public demands for reforms in the power sector remain alive in the post-reformed power sector. It draws attention to the significant difference between reform and privatisation. Reform entails internal restructuring in a system to change the operation methods, the management system, staff orientation that encompasses ways of doing things in the envisaged organisation, by defining financial obligations of all parties, the role of stakeholders and the public.

On the other hand, privatisation focuses on defining modalities for ceding public owned enterprises to private ownership and management. The power sector in Nigeria underwent through the two processes at different degrees but neither of the two has facilitated efficient operation of the sector to guarantee service delivery and reinvent micro economic activities in the country.

Despite efforts of government to address the recurring deficits in the operation and performance of the privatised power sector, the sector fails to deliver on its mandate. In fact, Nigerians suffer constant power outage amid the reform, privatisation and government's post-reform efforts. There are myriads of challenges that require immediate attention if the power sector is expected to play leading role in the transformation of the nation's economy.

a. Tackle the intractable cases of abuse of customers' rights, obligations and exorbitant tariffs imposed without reference to power usage.
b. Provide every electricity user with prepaid meter to determine the actual power usage and apply billing system that relates to electricity usage other than extortion and fraud.
c. Outlaw estimation and other forms of service or equipment maintenance charges on customers and provide a system of checks and balances that recognises the importance of the public in the electricity value chain.
d. Ease the bureaucratic process of gas supply to the power generating plants
e. Decentralise power generation to allow private investors participate
f. Invest in manpower training and regular maintenance of equipments

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