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POST-PRIVATIZATION POWER SECTOR PERFORMANCE: X-RAYING THE EXPERIENCES OF CUSTOMERS IN ENUGU STATE SOUTH-EAST NIGERIA

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Abstract: Many countries of the world especially developing countries like Nigeria perceived privatization as magical correctional device to eradicate the ineffectiveness and inefficiencies that marred the operations of state-owned enterprises. This perception is devoid of contextualization of administrative, economic, and political realities of each country. This study examined the performance of Nigerian power sector in the post-privatization era with emphasis on electricity supply, electricity billing/metering and to elicited factors that impede the power sector performance. Utilized both interview instrument and secondary data from official documents, media clips and relevant extant literatures, the researchers found that Nigerian power sector has not improved significantly in terms of electricity supply after privatization with the peak generation and distribution stood at 9,187,337 MWh in 2021 which falls far below the current energy demand of over 40,000.000 MWh by the end users. Also estimated billing and paucity of meter has continued to be recurring issues in Nigerian power sector in the era of post-privatization with 4,772,906 out of 12,784,685 being metered as of 2021. Infrastructural deficits and financial incapacitation are major impediments to the performance of power sector in the post-privatization era. The study proffered viable measures such as diversification of energy source, infrastructure overhauling and effective implementation of Meter Asset Provider (MAP) and Credited Advance Payment for Metering Implementation (CAPMI) to enhance the performance of Nigerian power sector.

Keywords: Post-privatization, power sector, Performance, Theory of Change, Nigeria, energy supply, metering, billing.

Introduction

Availability and accessibility to electricity has positive multiplier effects which cannot be overemphasized. This is based on its role as a prerequisite for poverty alleviation, sustainable development and essential force that drive all economics activities (Yusuf, 2014, & Ekpo, 2013). In situating the prime position of electricity amongst all modern energy types and it's place in terms of demand, Attigah and Mayer-Tasch (2016) asserted that electricity is the most undisputable considered in the strategic objectives of industrial growth, while Ahmad and Othman (2014) pointed out that electricity is the most demanded necessity currently in the world, in general. This portrays how countries that are endowed with such natural resources are placed in advantageous position over others. Premised on her natural resource's endowment especially oil, it will be expected that Nigeria will have good electrification as is the case with South Africa where not less than 80% of its households have access to electricity (World Bank, 2016).

However, comments by the United Nations Conference on Trade and Development (UNCTAD) in 2009 on the

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Nigeria's electricity power sector was an aptly description of its awful state. UNCTAD (2009) stated that "The Nigerian electricity power system, which has been run since 1972 by vertically integrated state-owned monopoly National Electric Power Authority (NEPA), is chronically dilapidated with respect to infrastructure, commercial standards, and customer service". In consonance with this, Omoleke (2011) precisely asserted that poor access to infrastructure, insufficient power generation, inefficient capacity utilization, low connection rate, inadequate transmission, and distribution facilities among others were challenges of National Electric Power Authority (NEPA) prior to its structurally transformed into Power Holding Company of Nigeria (PHCN) for privatization. The challenge of stable electricity supply in Nigeria with its harrowing effects on socio-economic development accounted largely for government decision for privatization of the power sector (Idowu, Ibietan & Olukotun, 2019).

The Nigerian electricity sector under the management of National Electricity power Authority (NEPA) was marred with inadequate power supply, high estimated billing, and fraudulent acts of its staff. Dikki in Adebayo (2017) vividly described the condition of electricity sector at the emergence of civilian rule in 1999. Dikki reported that out of 79 generation units in the country, only 19 units were functional, the transmission line was constructed in 1987. From 1991 to 1999, there was no construction of infrastructure in the power sector living an estimation of 90 million Nigerians with no access to electricity. While Ross in Igwemezie, (2016) reported that more than 50% of Nigerians lack access to electricity, KPMG (2015) expressed that less than 48% of those with access to electricity constantly experience power shortages and sometimes go for days without electricity. This placed the country as one of the bottommost percentages of household electricity accessibility globally. Asu in Audu, Paul & Ameh (2017) asserted that there have been consistent complaints from electricity end-users on absence or inconsistence of pre-paid meters allocation, issuance of unjustified estimated bills, fluctuating power supply and irrational high tariffs. This shows how the distribution of electricity is generally unreliable and inconvenient.

The damaging effects of poor electricity supply on socio economic development of the country highlights the criticism of NEPA's on its abysmal performance and increasing demands from customers and stakeholders, including international organizations, such as, World Bank, International Monetary Fund, for its privatization. Additionally at the domestic level, most of the commissions instituted on the review of public utilities service delivery by the government strongly recommended privatization or commercialization of public enterprises, especially the Onosode commission (Ibietan, 2013). It was argued that discontinuity of government's involvement in the generation, transmission and distribution of electricity will lead to proper utilization of resources and better performance. Advocates of privatization in developing countries tend to have a linear perspective that it will result in efficiency and improved performance of these firms. Consequent upon this, privatization is seen by many as the main solution to all the challenges encountered in the power sector.

The administration of President Obasanjo embarked on a series of reforms to revamp the power sector. Part of the reform was the enactment of the Electric Power Sector Reform (EPSR) Act, 2005. The Act stipulated measures to be taken to address the rot in the power sector. The objectives of the Act according to Aminu and Peterside (2014) include making electricity generation and supply available to consumers, making the sector investor friendly and dismantling NEPA's monopoly. Furthermore, the Act provided for a holding company; Power Holding Company of Nigeria (PHCN) to oversee the transition from NEPA to eighteen successor companies of one transmission company (Transco), six generation companies (Gencos) and eleven distribution companies (Disco). The Act also

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provided for the establishment of the Nigeria Electricity Regulatory Commission (NERC). In 2013, DISCOs and GENCOs were privatized while TCN was place under management contract agreement **(**Enoche, Egware, & Eyakanor, 2015). By these structural changes, PHCN existence ended, NERC fully assumed regulatory roles, and the sector became operational under a liberalized environment and private sector driven at the same time.

In 2013, the completion of power sector privatization process ushered in high hopes among citizens towards improved service provision. The expectation for improved service by the citizenry has been heightened by the huge financial investment into the power sector after privatization by the Federal government of Nigeria and other international agencies such as $1.6 billion invested through the World Bank, African Development Bank (AfDB) and other budgetary allocations (Jeremiah, 2021). Although existing literature discusses extensively issues surrounding electricity power sector and its privatization process in Nigeria. However, the dearth of studies on the performance of power sector since the completion of its privatization process specifically in Enugu state presents a yawning gap in the literature. This study assessed the performance of the Nigeria power sector in its post-privatization era in Enugu state with the following specific objectives: ascertain the level of improvement of Nigerian power sector in terms of electricity supply in the post privatization era in Enugu state, examine the state of electricity billing and metering in Nigeria in the post privatization era in Enugu state and identify the factors that impede the power sector performance in the post privatization era in Enugu state and Nigeria in general between 2016 to 2021.

Literature Review

Relevant literatures for this study were thematically reviewed under the following sub-headings below:

- Privatization in Nigeria: An Overview
- Power Sector Reform in Nigeria
- Post-Privatization in Power Sector: A perspective of Selected Countries

Privatization in Nigeria: An Overview

The issue of privatization has been a subject of intense global debate in recent years. The emergence of privatization in Nigeria was fundamentally premised on the abysmal performances of the Nigerian public enterprises which have left much to be desired. Most of the public enterprises were not viable to respond to the evolving necessities for developing and dynamic economy. However, the huge investments in these enterprises by successive administrations has not yielded desired results through their performances. (Omeleke, 2010).

The proper process of implementing privatization and commercialization in Nigeria commenced in 1998 through the establishment of the Technical Committee on Privatization and Commercialization (TCPC) as contained in Decree No. 25 of 1998. The TCPC was charged with the mandate of ensuring implementation of privatization and commercialization processes. This ushered in the privatization/commercialization of various organizations such as National Electric Power Authority, Nigeria Railway Corporation, Nigerian Telecommunication Limited, Nigerian Port Authority in which BPE employed concessions rather than outright privatization (Chukwuma, Odiwo and Kifordu, 2016). TCPC adopted five (5) different methods such as public offer of shares through the Nigerian stock Exchange (NSE), Private placement of shares, principally to institutional investors, core groups with demonstrated management and/or technical skills. Sale of Assets, Management Buy Out (MBO) and Deferred Public Offer.

Privatization in Nigeria has received mixed reactions and criticism from labour, academia, and individuals. Arowolo & Ologunowa (2012) noted that generally, privatization recorded few achievements at the initial stage such as reduction in the size of the State-Owned Enterprises (SOEs), capitalization of the capital market rose from W 12.0 billion in 1989 to N22.6 billion and W 65.5 billion in

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1991 and 1994, respectively and expansion of personal share ownership in the country.

Notwithstanding the relative achievements, the execution of privatization programme was not devoid of many hurdles like disparities in the shareholder membership allotment and administrative red tape that thwarted ambitions of many interested bidders. Other challenges were resistance from labour due to fear of retrenchment/downsizing, activities of institutional investors, and paucity of capital that discouraged many average working class and low-income earning workers. (Salaka, 2017). In Nigeria, the organized labour union had embarked on several strikes as well as issued threats of strike against privatizing key government corporations (Arowolo & Ologunowa, 2012). This was due fear of some incompatible ideologies and policies that could affect labour in general.

Power Sector Reform in Nigeria

Various factors have been recorded as the rationale for the Power sector reform in Nigeria. These factors emerged from either internal or external environments of the power sector. Macroeconomic factors which emerge from outside the power sector includes government fiscal constrain and structural adjustment and monetary lending policy of World Bank and IMF also facilitate the wide spread of the reform (Idowu, Ibietan, & Olukotun, 2019).

Quite a few of regulatory laws have been put in place by government to enhance the liberty of power sector, thereby create room for effective and efficiency performance. Some of these regulatory laws and policies that governs the Nigerian electricity market are the Electricity Corporation of Nigeria Ordinance (1950), Niger Dam Authority Act 1962, National Electric Power Authority Act, Cap 256, Laws of the Federation of Nigeria (LFN) 1990 (as amended); Electricity Act, Cap 106, LFN (1990) (as amended), Constitution of the Federal Republic of Nigeria 1999, CAP C23, LFN (2004), Public Enterprises (Privatization and Commercialization) Act, CAP P38, LFN (2004), Environmental Impact Assessment Act (EIA), Cap E12 LFN (2004), Electric Power Sector Reform Act, No. 6 of 2005 (EPSR Act), National Environmental Standards and Regulations Enforcement Agency (Establishment) Act No 25 of 2007, Electric Power Sector Reform (Transfer of Assets, Employees, Liabilities, Rights and Obligations) Order No. 1 of 2006 (SC Order), National Domestic Gas Supply and Pricing Regulations, National Domestic Gas Supply and Pricing Policy and Roadmap for Power sector Reform of 2010 (Ajumogobia and Okeke, 2015).

The power sector reforms were predicated on National Electric Power Authority (NEPA) inability to service customers' demands as expected. According to Ajumogobia and Okeke (2015), NEPA's insufficient transmission and distribution of electricity, limited access to infrastructure, inadequate power generation, and poor usage of capacity among others impaired provision of qualitative service to its household, commercial and industrial customers. Consequently, Technical committee on privatization and commercialization (TCPC) in 1989 first listed it for partial commercialization (Zayyad, 1992), and was eventually presented for privatization in 1999 as a total non-monopoly firm operating in a non-competitive section (Adelaja, 2007).

In 2005, Power Sector Reform Bill (PSRB) was passed into law which liberalized the sector; enabled private sector participation in the generation, transmission, and distribution; provided competitive electricity market; make privatization possible with establishment of Power Holding Company of Nigeria (PHCN) as new administrator and substitute to NEPA, and National Electricity Regulatory Commission (NERC) to regulate the sector. Furthermore, PHCH was unbundled into 18 units of six generation companies (GENCO), eleven distribution companies (DISCOS) and one transmission company (TCN). Except that TCN operates under management contract, the GENCOS and DISCOS were privatized in 2013 (Onoche, Egware and Eyakwanor, 2015).

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Though the six generation companies were unbundled under the Obasanjo regime, under the Yar'adua administration, the privatization programme was suspended. However, in 2010 President Jonathan created the Presidential Action Committee on Power (PACP) which was aimed at removing "red-tape", achieve policy consistency and cut-through bureaucracy in decision making (Nnaji in Onoche, Egware and Eyakwanor, 2015). A Presidential Task Force on Power (PTFP) was created for day-to-day planning, developing and driving forward the Reform Plan for the Nigerian Power sector which was the Electric Power Sector Reform Act (EPSRA) enacted in 2005. The essence of the Act was to drive the reform processes as follows; transfer NEPA's assets to PHCN and subsequent unbundling into: A transmission company, TCN, 6 generating companies, GenCos, 11 distribution companies, DisCos, NELMCO to take over PHCN stranded assets and liabilities, establish a bulk trader of power as a broker between power producers and DisCos, establish an independent sector regulator: (Nigeria Electricity Regulatory Commission (NERC) charged with the responsibility of tariffs regulation and monitoring of the quality of services of the PHCN, provide for a consumer assistance fund, develop competitive electricity market, licensing of IPPs and ring-fence distribution companies and establish a rural electrification agency, (REA).

With the full privatization of DISCOS and GENCOS, power sector becomes a complete private sector driven, open to competition and operates under regulatory institutional agency – NERC. Unfortunately, there has not been on record any acknowledgement by government and customers of significant improvement as far as efficient supply of electricity is concern. This seems to undermine private sector inherent efficiency application to Nigeria's context as obtainable in some developing and developed countries.

Post-Privatization in Power Sector: A perspective of Selected Countries

Countries in various continents have adopted privatization as a strategy to reposition their power sectors in order to enhance their performances. This study reviewed the performance of privatized power sector in selected five countries which includes: United Kingdom (UK), Germany, India, Argentina, and Cameroon.

In United Kingdom, A study carried out by Soukana and Amal (2015) titled "The British Privatization of Electricity Network industry: The effect of the Electricity reform on domestic electricity price in the United Kingdom" revealed that privatization of electricity sector did not have significant influence on price trend but respond to exogenous factors of local and natural gas prices. It was the outcome of a correlation of electricity domestic retail prices indices. The data for the work was sourced from Department of Energy and climate change (DECC). However, the finding implies coal and gas prices, though are susceptible to international price fluctuation because they are externally sourced, does not cause domestic price increase. Nevertheless, it is worthy of note that U.K. positive macroeconomic and other developed economy features, such as high-tech, are additional strength that might have helped to cushion the likely effects of import-constrains on importers or local consumers. In this context, exploring domestic power sources by developing countries would minimize their susceptibility to the risk of externally soured power generation as their economy may not be able to accommodate importation of inputs without repercussive effects, especially on end users.

In Germany, there was 50% and 73% increment of energy supply in 1995 and 2004 respectively. More so, German power sector post-privatization era recorded reversal of competitive market and liberalization of the sector. Consequently, it appears that the privatization of power sector could enhance the market dynamics to the benefit of service consumers (Heddenhausen, 2007).

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In India, records shows that privatized power sector showed increased in government's revenue. The Gross Domestic Product and electrified areas were improved by 12% and 13% annually. However, the programme was not nationwide perhaps due to the large size and internal political and economic structure of the country. Nonetheless, there is even distribution of benefits from the privatization amongst private firms and service consumers. In other words, while the government reap revenue generation increment, service consumers enjoy improved services (Zafar, 2017).

In Argentina, Pollit (2008) asserted that Argentina invested hugely on her power capacity installations that improved the nation's economic activities, reduction in the electricity charges, improved firm's financial performance, amongst others. It seemed that privatization of electricity brought about benefits like reduced electricity price, greater coverage of service and enhanced service distribution. It spurred private firms to establish heavy investments due to reduced energy losses. Since the privatization, the general contribution of electricity in the socio-economic lives of the people is undisputed.

In Cameroon, it was recorded that the aim of the country which was to grow her economy via private investment collaboration was relatively attained with low quality service delivery. More so, competitive price of electricity supply and utilization of hydraulic resources as stated in the country's objectives. From the evaluation done by the World Bank and Cameroonian government, there were inadequate ministerial oversight, non-reduction of price of electricity supply, absence of transparency, and lack of competition despite the less state interference in the management of power sector in the post-privatization era (Pineau, 2014).

The above reviews on the privatized power sector performances of various countries shows different implications due to their various socio-economic, political, and environmental peculiarities. These implications vary from influence on the price trend, reversal to market competition, increased in government revenue and increased alongside with the installed power capacity that consequently boosted economic activities. This implies that privatization does not come with a single universal implication; rather it has different effects in the performance of the power sector of various countries that has implemented it.

THEORETICAL FRAMEWORK

The theory of change (ToC) was adopted for this study. The Theory of Change was developed by Weiss, Carol in 1995 in his paper entitled "nothing as practical as good theory; exploring theory-base evaluation. It was within the tradition of theory-driven evaluation. Although definitions of ToC vary, it as an approach which describes how a programme brings about specific long-term outcomes through a logical sequence of intermediate outcomes (Breuer, Lee, De-Silva & Lund, 2016). It was made famous by Clark, Hlelene (2004) in her paper entitled: deciding the scope of a theory of change. The basic tenets Theory of Change evaluation as identified by Clark, H. (2004), are: outcomes, indicators, rationales, interventions, assumptions, and narrative.

Application of the theory to the study

Most public policy and programme interventions such as privatization are inherently complex, with multiple interacting components such as environmental factors, relevant agencies and stakeholders, data availability, etc. This complexity makes it difficult to evaluate public programmes using traditional experimental designs. Public policy and programme interventions often rely on ongoing quality improvement based on the implementation experience (Breuer, et al, 2016). The rationale for adoption of theory of change to this study is on its ability to measure progress and outcomes of power sector performance in the era of post-privatization programme in Nigeria. The reports of abysmal performance of power sector in various countries of the world which are linked to management problems, corruption, funding, etc. prompted the

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intervention of different frameworks, policies, and programmes such as privatization globally.

The mandate of the privatization programme which represents the outcomes of the theory of change is to revamp the deteriorating conditions of power sector. These outcomes are in the form of long term and short term. However, in the bid to evaluate the impacts of privatization programme in the performance of power sector, there is need for measurable and observable variables (indicators), to be established as evidence of achievement or failure of the privatization programme. These indicators involve improved access to energy supply, proper billing and improved metering.

The range of activities and reforms that came with privatization programme in the Nigerian power sector which are interventions in the theory of change are the process of breaking down the sector into generation companies (Gencos), distribution companies (Discos) and Transmission Company of Nigeria (TCN). The assessment of privatization programme will be premised on these interventions in order to ascertain their effects on how the energy supply reaches to consumers, how end user customers are properly billed and their access to meter.

Through the evaluation of the power sector performance in the post privatization era, the effects (outcomes) will be established. The challenges and intervening factors which forms the rationales and narratives of the will be identified which will form the change in the programme redesign. Adopting the theory of change through evaluation and impact assessment, can furnish powerful evidence of the success or failure of privatization programme. Theory of Change can bring a better understanding of how to improve the design and implementation of ongoing initiatives/programmers, and how to scale initiatives up or out.

METHODS AND MATERIALS

The study was anchored on descriptive survey design and documentary research design. This enabled the researcher to utilize interview instrument to harvest the views of customers on the services rendered to them and on the other hand, accessed relevant documents for the study through secondary sources such as official reports and publications by relevant agency such as Nigerian Electricity Regulatory Commission (NERC). The study area which is Enugu state was stratified into three senatorial zones which are Enugu East, Enugu North and Enugu West. Two communities (one urban and one rural) namely: Nsukka, Opi, Amokwe, Ngwo, Neke and Ikem were selected in which the end users were chosen for this study. The researcher utilized both primary (interview) and secondary sources of data. Participant observation was another mechanism utilized by researchers because they belong to the category of end users of electricity services. Thematic method/tool of analysis was adopted the study. This is because thematic method/tool is used in analyzing qualitative data usually interviews or transcript to draw meaningful conclusion (**Caulfield, 2019).**

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RESULTS AND DISCUSSIONS

Table 1: Socio-Economic Characteristics of Respondents

S/N	Name	Location	Profession	Number of years in the locality
1.	Mr. Edwin	Nsukka	Public servant	19 Years
2.	Mr. Osita Sunday	Opi	Electrician	21 Years
3.	Mrs. Amaka	Amokwe	Teacher	32 years
4.	Mr. Chidi Eneh	Ngwo	Businessman	25 years
5.	Mrs. Felicia Agbo	Neke	Businesswoman	20 years
6.	Mr. Bernard	Ikem	Welder	19 years

Source: Field work, 2021

The table 1 above shows the socio-economic features of the respondents which are important in any research findings. The role of these attributes of respondents such as location, profession, and number of years in a particular location may determine and shape pattern of responses to research questions. The table indicates that the respondents all reside in locations chosen for the study. It also indicates that they are consumers of electricity. The table as shows their number of years they have constantly reside in the locality. This enables them (respondents) to give true assessment of power sector performance in the locality before and after privatization.

Results

In line with the research questions and objectives of the study, the following findings were made:

- Nigerian power sector has not improved significantly in terms of electricity supply after privatization.
- Estimated billing and paucity of meter has continued to be recurring issues in Nigerian power sector in the era of post privatization.
- Infrastructural deficits and financial incapacitation are major impediments to the performance of power sector in the post-privatization era.

Discussion

Level of improvement of electricity supply in the post privatization era in Enugu State

The value chain of electricity runs across its generation, transmission, and distribution. The level of electricity supply depends on amount of power generated and the transmission process as well. Due to the poor and epileptic nature of electricity supply in Nigeria in pre-privatization era, on the completion of the privatization process in 2013, the generation companies (GENCOs) and distribution companies (DISCOs) were issued mandates by the Nigerian Electricity Regulatory Commission (NERC) to maximally explore unutilized resources for the generation and distribution of electricity to ensure steady and safe electricity supply (Saifuddin, Bello, Fatihah & Vigna, 2016). However, the assessment of the power sector in the post privatization era in consonance with the mandates given to respective bodies, the performance has not yielded the desired outcome.

Mr. Edwin who has lived in Nuskka urban lamented: *"I have lived here for over 19 years now. So, I can tell you how the power supply has been here before, during and after privatization. Since the end of privatization process in 2013, I can say that there has been little improvement in terms of power supply"*. Experience of Mr. Chidi Eneh who live at Ngwo was similar: *"I can say that there has*

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been improvement since the end of privatization. I think the improvement is because of presence of commercial activities, companies and industries around this 9th mile who need electricity for their operations and businesses. I think residents of this area can be said to be relatively satisfied because of load shading of the energy supply. Some hours and days off, some hours and days on". Mrs. Felicia Agbo, a businesswoman who live at Neke which is an urban area of Isi-uzo local government area of the state equally expressed her view on the improvement of electricity supply since end of privatization as little: "*Anyway, let me say that since 2013 till date, there is little improvement which I can place at 5 -10%. This is because before then, we can stay for weeks and even months without having light. But in recent years, we do have light at least once in a week. It is common around this area that is regarded as urban and commercial area".*

The responses of the above respondents have feature in the assessment of level of improvement of electricity supply in their location since the end of privatization. The common feature is "little improvement" which is generally echoed that the presence commercial activities play important role to that. However, people in the rural areas of the state had opposite views and expressions. Mrs. Amaka who live at Amokwe/ Umuaga, a rural community in Udi local government area of enugu state, described the state of electricity supply since the end of privatization: *"since I was married almost 32 years ago, I have been in this area because I was a teacher and retired recently. Before and after 2013, there is no improvement in terms of electricity supply at all. The only period we see light here is festive periods like Christmas and Easter. Immediately after people from the city go back, we go back to normal darkness".* Mr. Osita Sunday from Opi town and Mr. Bernard from Ikem town equally shared the same view of no improvement: … *"since the end of privatization which they told us that will improve the availability of light, there is no difference. Currently, we see light once in a week or two weeks".*

The above responses from the end users clearly indicated that electricity supply has not improved since the end of privatization. These responses are in tandem with some information on electricity supply as it concerns Nigeria in general which are published in relevant documents. For instance, there was unavailability of most of the installed capacity in Nigeria in 2015. This resulted to meeting barely one-third of the entire demanded power (4,500MW) (Latham & Watkins, 2016). This records energy generated annually in Nigeria which is far from expected is presented in table below.

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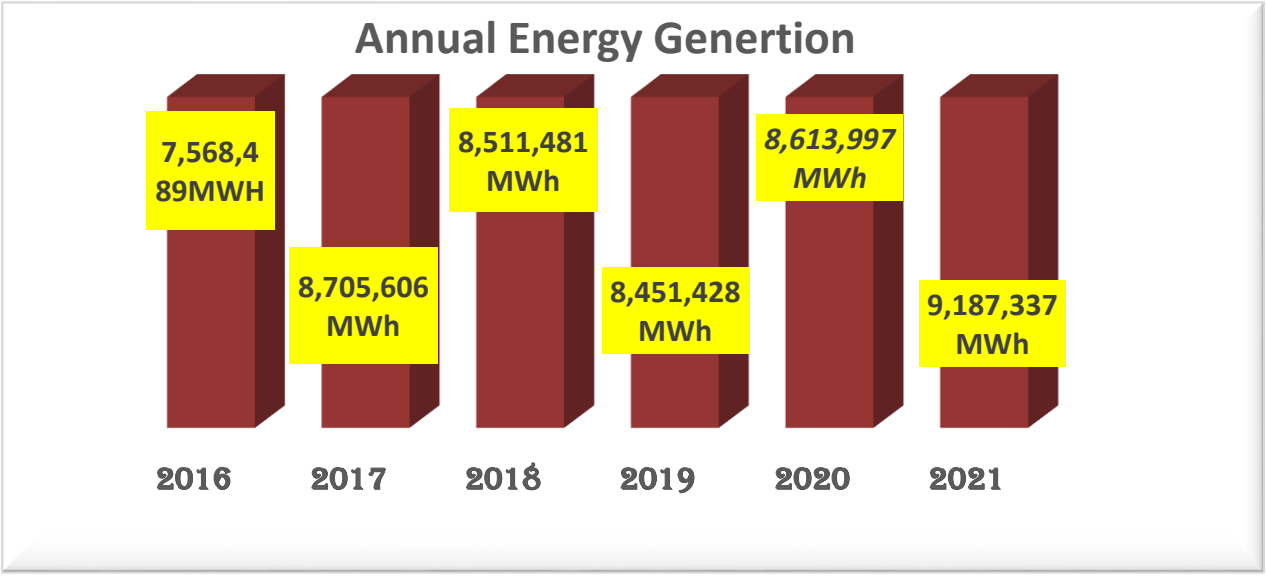
Table 1: Power Generated annually (MWh)



Source: NERC Quarterly Reports

The above table shows the amount of electricity generated at the last quarter of each year under review. At the last quarter of 2016, the total electric energy generated stood at 7,568,489MWH (NERC, 2016). During the fourth quarter of 2017, the total electricity generated stood at 8,705,606MWh. This was 15% more than the generation in the last quarter of 2016 and the highest quarter generation 2017. During the last quarter of 2018, the total electricity generated was 8,511,481MWh-2% less than the generation recorded in the last quarter of 2017 despite increase in available generation units. Total system collapses worsened, growing to six cases in 2018 from one case reported at the end of 2017. The causes of system collapse were described as gas inadequacy due to attacks on gas pipeline thereby resulted to poor generation. Militants' activities were seemed to be the cause of the pipeline's breakdown. For instance, Nigerian National Petroleum Corporation reported that there were about 3400 to 4000 attacks on pipelines in different parts of the nation between June 2014 and June 2015 (Kachikwu, 2015). This report commiserates with the curiosity expressed by the NERC in their reports on how these attacks disrupts various plants thereby resulting to grid instability with poor output.

During the second quarter of 2019, the total electric energy generated was 8,451,428MWh-5.59% less than the level of generation during the first quarter of 2019. The energy generated and distributed in the year 2020 and 2021 were 8,613,997.79MWh and 9,187,337MWh respectively.

The above analysis of the electricity generated and distributed shows that although electricity supply has relatively increased from its 4500MWh capacity in 2015 to 8,451,428MWh in 2019, it still falls far below the current energy demand of over 40,000MW estimation by the end users.

Electricity billing and metering in the post privatization era in Enugu State

One of the major persistent complaints of electricity customers before privatization was the indiscriminate billing process. These complaints revolved around high

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estimated bills, non-functional analog meters, and unavailability of pre-paid meters. However, the DISCOs were mandated to improve on the existing plan to issue meters to end user consumers and engage with NERC in tariff reviews and re-design. Five years after the completion of the privatization process, end users still experience similar challenges of estimated bills.

Mr. Bernard from Ikem lamented: *"till this moment I am talking to you, we do not have meter in this community even other communities around us. All they (EEDC staff) do is to come occasionally and ask us to fill form for pre-paid meter, after that, you won't see them again. In terms of bill, we are still on estimation through community bill. Each household pay between #700 to #1,000 monthly without seeing the light"*. This is same view with Mrs. Amaka from Amokwe/Umuaga who complained: *"we are still using community bill as it were before privatization. Each building pays between #1500 to #2000 monthly else; they will come and disconnect your wire and carry them"*. Mr. Chidi Eneh from Ngwo asserted that though some residents have been given pre-paid meters, but they paid huge amount of money: *"some houses and businesses especially around 9th mine have been given pre-paid meters within the last couple of years though they paid #40,000 for that. People that don't have such money to pay are still on the high estimation"* While the above negative reports on the issue of billing and metering from the service consumers are all coming from rural areas, the experiences of urban dwellers are not different if not worse. Mr. Godwin from Nsukka stated: *"there has been high inconsistency in bills even worse before privatization. Monthly bills started with initial increment of #4000 to #9000 to #12, 000 and more recently #15,000 per flat. There are few residents with pre-paid meters while many others still on astronomic estimated bill. Recently, post-paid meters were distributed to customers, but it is as good as estimated bills because EEDC personnel do not come to read meter before dishing out it bills at the end of the month. This is after months that many customers paid between #37,000 to #40,000 for their pre-paid meters which till date, they have not received the meter".* Similarly, Mr. Osita Sunday from Opi lamented: *".....we prefer the way we were charged for electricity before privatization. This is because we were using community estimated bill before privatization when each household pay #200 or #300 per monthly. But since the inception and end of privatization, they installed bulk meter in all transformers with each household paying #1,500 or #2,000 monthly. Painfully, there is not significantly improvement in the service they render".*

The above views of electricity consumers on the billing and metering are clear indication that even after privatization, the experiences of estimated billing and lack of meter have not changed. Despite the fact that in 2008, Nigeria Electricity Regulatory Commission initiated a Multi-Year Tariff Order that was eventually revised in the year 2012 to establish another tariff framework for electricity firm. This tariff path is expected to be minutely reviewed on annual basis putting into consideration certain factors like current prices of gas and rate of inflation. Nigeria Electricity Regulatory Commission in 2015, introduced a revised tariff path for electricity distribution companies to cover between 2015 to 2024. The revised tariff allows service consumers under various categories and locations to be charged divergent amount for each kilowatt-hour (Latham & Watkins, 2016).

However, proper metering on customers was mapped out as a viable mechanism to alleviate the menace of inappropriate tariff charges, high estimated bills and gross loss of revenue that occur because of inadequate metering. Challenges associate with the metering include estimated billing due to nonexistence of meter. Nigeria Electricity Regulatory Commission quarterly reports indicated that over 65 percent of complaints from customers revolves around inability of customers to rightly pay for the services consumed due to faulty meters or absence of meter in their household (PWC, 2016). The DISCOs were expected to alleviate the problem by systematically replace the non-

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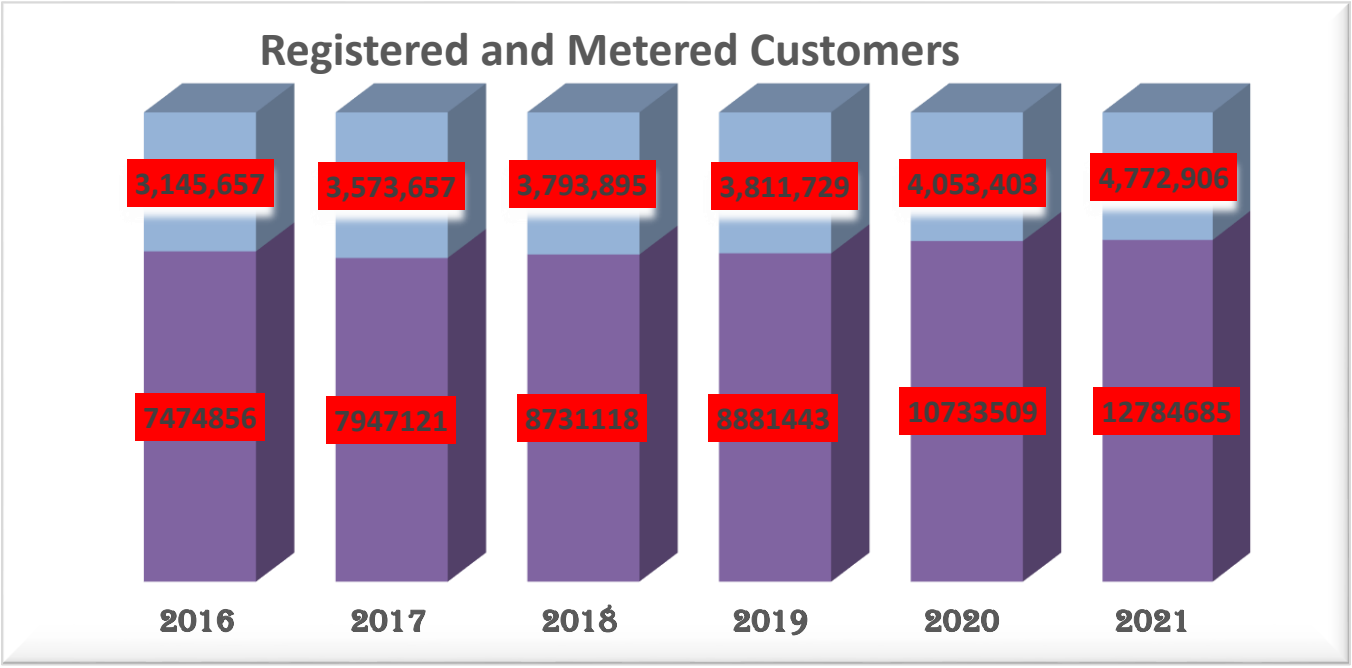
functional analog meters with prepaid meters. However, records show that within the period under review, the gap between the registered customers and actual metered which is in line with the views of respondents is very wide as shown in the table below.

Table 3: Registered customers and metered customers



Source: NERC Quarterly Reports

From the above chat, it shows that inadequate metering remains a serious challenge facing the Nigeria Electricity sector. At the end of last quarter of 2016, total registered customer population of 7,476,856 but total metered customers were 3, 145,657 billing platform representing 46% of registered customers leaving a metering gap of 54%. This is grossly lower than the quarterly average of 410,103 meter expected of DisCos as stated in their Performance Agreement with the Bureau of Public Enterprises (BPE), (NERC, 2016). In the subsequent year 2017, out of the 7,947,121 registered electricity customers only 3,573,657 (about 45%) have been metered. Thus, majority of customers are on estimated billing. During the fourth quarter, DisCos is significantly lower than the expected quarterly meters deployment of 410,103 as contained in their performance agreement with the Bureau of Public Enterprises (BPE) (NERC, 2017).

By the last year quarter of 2018, records indicate that, of the 8,731,118 registered electricity customers, only 3,793,895 (43.5%) had been metered as at the end of the fourth quarter of 2018. As such, most customers (56.5%) are still on estimated billing thus contributing to apathy towards payment for electricity.

In 2019, the metering gap for end-use consumers continued to be the major challenge to the performance of the power sector. The number of registered electricity customers

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were 8,881,443 while only 3,811,729 (42.92%) have were metered. However, it was recorded that 57.08 percent of registered customers are still on estimated billing. This has significantly resulted to poor attitude of service consumers towards payment of services consumed (NERC, 2019). According to NERC, in 2021, the was an increment in the number of metered customers by 17.7% from 4,053,403 recorded in the previous year (2020) to 4,772,906 (Udeme, 2021).

The data presented and discussed showed slow pace of improvement in terms of metering of end user customers of electricity. This shows massive implications not only on the poor revenue returns but evidence that over 50% of registered customers still contend with the estimated bills which has been described and irrational and exploitation before the inception privatization. This has contributed to persistent loss of expected service payment from customers for distribution companies This is equally alluded to the fault of distribution companies for not strictly complying to the National Electricity Regulatory Commission's prescribed method of billing measurement (metering) in spite the directive from National Electricity Regulatory Commission to distribution companies to exempt customers from the estimated billing system if they are not metered within 60 days of payment (KPMG, 2016).

Weak Infrastructures and Financial Loss impede the power sector performance in the post privatization era in Nigeria

The state of infrastructures across the value chain of electricity generation to distribution in Nigeria has been pinpointed as one of fundamental challenges that affects the level of service delivery in consonance with the demands made by the consumers. This is similarly described as a planning oversight on the part of distribution companies (KPMG,2014). Under well-articulated organizational plan, cost of maintenance and replacement of assets are captured to meet up with the demands and dynamic environment (PWC, 2013).

Mr. Bernard from Ikem in expressing the frequency and long power outage in his area lamented: *"the problem of transformer breakdown or other facilities occurs very frequent. Most times seem to be premeditated or deliberately done by the EEDC officials towards festive periods when many people from cities come home. They will contribute money for problem to be fixed. When this happens, it takes a minimum of a month and above to fix the problem. Most times, if it has to do with transformer, it may take up to 5 months. Likely till Easter or Christmas period before it will be fixed".* In similar vein, Mrs. Amaka from Amokwe/Umuaga expressed similar view: *"transformer and other facilities break down even more often since the end of privatization. It takes longer time like a month or two months as case may be to fix the problem. Regrettably, it is the same we the community people that levy ourselves to raised money before the problem will be fixed.* In similar fashion, Mr. Godwin from Nsukka stated: *"breakdown of EEDC facilities occurs Very often and even more after privatization because most of the inherited facilities are old and break down more often"*. On a lighter difference, Mr. Chidi Eneh from Ngwo stated that: *"we used to experience reoccurring cases of transformer breakdown, but the installation of prepaid meters seems to have reduced that recently".*

In consonance with the responses of the electricity consumers on the poor state of electricity company's facilities, Ogah & Onyewuchi, (2016), asserted that the Distribution companies are reluctant to improve the infrastructures they inherited by investing on them. Additionally, inadequate planning for maintenance could play a role in the state of electricity infrastructures. Nigerian DisCos lost over 46 percent of energy because of issue commercial, collecting, and technical issues (Nigerian Baseline Power Report, 2015). Similarly, Jeremiah (2022) asserted that it is very unfortunate that after eight years that the power sectors privatization was completed, its performance is still marred by aging infrastructures. The dilapidated equipment contributes to

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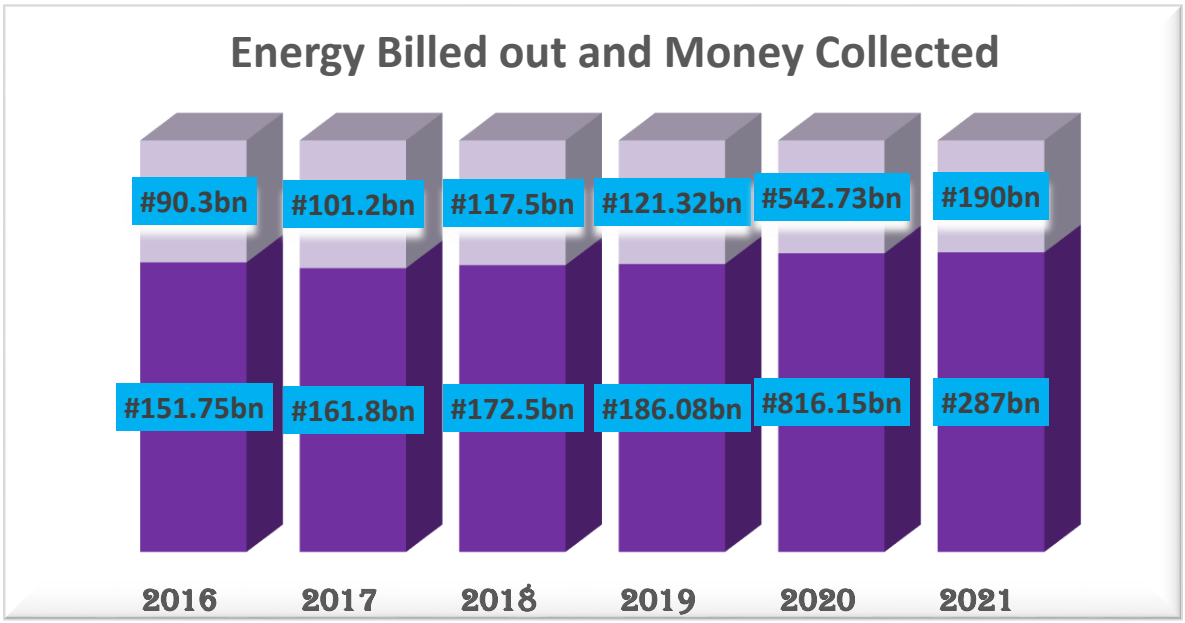
great loss energy resulting to shortage of supply to the demands of customers (Nnodim, 2020). This evident showed why the national grid three times in five months in 2021 and one hundred and thirty times in eight years (Atitebi, 2021).

Another hurdle that the power sector encounters is financial loss. This financial challenge which revolves around inadequate financial power of investors, tariff shortfall, receivable collection, technical, commercial and collection loss has posed a serious threat to the growth of the sector.

The weak financial status of the distribution company made it difficult for the companies to access commercial funding. While local commercial banks are unwilling to yield to the demands of the distribution companies, international investors were discouraged due to lack of convincing prerequisite to take the risk. Majority of the distribution companies ought to be restructured/refinanced, depending on the extent of their financial and operational performance (Okere, 2017). Alluding to financial loss as one of the major challenges of power sector in the post-privatization era, Anyaehie and Iwuamadi (2020) opined that funding is key challenging to power sector considering that fact that 70% loan was provided by Nigerian banks. More so, the Aggregate technical, commercial and collection losses (ATC&C) in Nigeria is about 50% consequently, there is high level of poor payment culture which seemingly caused by exorbitant estimated bills issue to consumers without meter and poor service delivery. This invariably results to poor revenue collection and low power availability to the end users. (Anyaehie, Nwadike and Iwuamadi, 2018). This has created a gap between the energy billed out and actual collected money as shown in the table below.

Table 4 Energy Billed out and Money Collected



Source: NERC Quarterly Reports

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From the above table, in 2016, the DisCos collectively billed a total sum of the #151.75 billion but only #90.30 billion was recovered through collections. This represents an average of 55% c0llection efficiency thus implying that of every #10 worth of electricity sold during the quarter, #4.50 remains uncollected from customers. Similarly, at the end of 2017, out of the #161.8 billion billed to customers in the fourth quarter, only #101.2 billion was recovered. This implies that out of every #10 worth of electricity sold during the last quarter, #3.75 is uncollected. The liquidity challenge in NESI was further reflected in the DisCos' remittances to NBET and MOs relative to invoice received (NERC, 2016). In the last quarter of 2017, whereas DisCos were issued a total invoice of #166.2 billion for energy received from NBET and for the service charge by MOs, only #40.1 billion was settled by DisCos, creating a shortfall of #126.1 billion (NERC,2016).

The trend of deficit collection in energy billed out was no different in 2018. The total billing to electricity consumers by the eleven (11) DisCos was #172.5billion in the quarter of 2018but only but only a total sum of #117.5 billion (representing 68.1% collection efficiency) was collected from customers as and when due. Although the collection efficiency increased by 2.5 percentage points from the third quarter of 2018, it indicates that about #3.19 out of every #10 worth of energy sold during the fourth quarter remained uncollected as and when due (NERC, 2018).

In 2019, the total billing to electricity consumers by the eleven (11) DisCos rose to #186.08 billion with total collection of #121.32 billion. As represented in figure A, these denote 80.18% and 69.10% billion and collection efficiency respectively, indicating 0.20% and 5.11% points increases respectively from the first quarter of 2019. The level of collection efficiency during the quarter under review indicates that as much as #3.09 out of every #10 worth of energy sold during 2019 remained uncollected as and when due (NERC,2019). In 2020 and 2021, 816.15bn and 287bn were billed out, 542.73bn and 190bn were recovered respectively with huge deficit.

The issue of poor revenue returns facing the power sector is not restricted to individual end user customers. Records show that various government agencies, ministries and departments equally have accumulated debts on energy supplied to them. The Association of Nigerian Electricity Distributors (ANED) stated that the electricity debts owed by Ministries Departments and Agencies (MDAs) at both the Federal and State government levels is a concern. By October 2019, MDAs owe #120billion; the military and security forces owe the highest portion. "Electricity debts owed by MDAs are currently, in excess of #100 billion; the MDA debts constitute a leakage from DisCos remittance" (Simon & Fidelis 2019).

Conclusion

The power sector is a catalyst for meaningful economic growth and development of any nation. Both local and foreign investors give concerted consideration on the availability of electricity in the localization of their industries and business. The privatization of the power sector has not yielded much desired results in spite the expectations and mandates given to various units (DISCOs and GENCOs) at the point of takeover. The service delivery and revenue returns have been far below expectation notwithstanding the enormous government financial commitment through subvention. Consequently, there is urgent need for total analysis and evaluation of Nigerian power sector starting from its privatization process, current management and different peculiarities and challenges. This will enable government to identify areas of outmost need and where precisely to channel its subvention.

Recommendations

Premised on the challenges of power sector performance in the post-privatization era in Enugu state and Nigeria in general as identified in this study, the following recommendations are made:

✓ **Diversification of Energy Sources**: Gas constitutes over 81% source of energy to Nigerian power sector. This has contributed enormously to the problem of

inadequate power availability in Nigeria. Consequently, it is of utmost important and necessity to reconsider other sources of energy especially with emphasis on renewable energy which is also called non-conventional energy (solar, hydropower, amongst others). This diversification of energy sources will reduce over burden placed on gas as only major source of energy in Nigeria. More encouraging, Nigeria has natural resources in abundance to achieve this diversification if the political will is assured.

✓ **Effective Implementation Meter Asset Provider (MAP) and Credited Advance Payment for Metering Implementation (CAPMI):** The number of registered customers and the actual metered customers shows that existence of wild gap to be filled. The greater percentage of customers is still unmetered despite some policies and frameworks established by NERC such as Meter Asset Provider (MAP) and Credited Advance Payment for Metering Implementation (CAPMI). While MAP entails the engagement of third-party meter providers to work with DisCos in bridging the metering gag in the industry was established in 2017 which became effective on April 2018, CAPMI on the other hand enables willing customers to pay in advance for the purchase and installation of meters which should mandatorily be installed within 45 days by the DisCos. These policies are as good as their effective implementation. NERC should improve their regulatory role to ensure proper implementation of MAP, CAPMI and other policies.

✓ **Infrastructure Overhauling:** It has been observed that there is no significant improvement of infrastructure of all the value chain in the power sector from pre-privatization, privatization, and post-privatization era. Most of the facilities are currently being used in the power sector are all inherited as at the takeover. Most of the infrastructural challenges are encountered in the transmission process. There is need to invest heavily on depreciating and aging equipment in order to curtail frequent collapse of grids, loss of energy and achieve steady electricity supply.

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