REGULATORY MECHANISMS FOR STIMULATING POWER SECTOR REFORM IN NIGERIA

By

FASUYI BABATUNDE OLUMUYIWA

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SUPERVISOR: PROFESSOR DAYO AYOADE

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CHAPTER 3

ELECTRICITY GENERATION IN NIGERIA: HISTORY, REGULATORY REGIME AND THE REFORM

DECLARATION

NAME:

Fasuyi, Babatunde Olumuyiwa

STUDENT NUMBER:

55735673

DEGREE:

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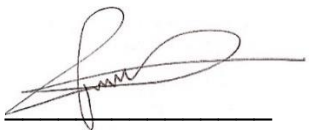
I declare that the above study is my own work, that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references, and that all direct quotations from such sources have been clearly and correctly indicated.



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SIGNATURE **DATE**

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ABBREVIATIONS/ACRONYMS

The following abbreviations/acronyms are used in the text unless the context in which they are used indicates otherwise:

ADR	Alternative Dispute Resolution
AEDC	Abuja electricity distribution company
AEMO	Australia Electricity Market Operator
AFUR	African Forum for Utility Regulators
ANED	Association of the Nigerian Electricity Distributors
APGC	Association of power generation companies
ATC&C	Aggregate Technical, Commercial and Collection losses
ATCC	Aggregate Technical, Commercial and Collection
ATCC	Aggregate Technical, Commercial and Collection
BEI	Brazil Electricity Industry
BPE	Bureau of Public Enterprises
CAISO	California Independent system Operator
CAPEX	Capital Expenditure
CBN	Central Bank Nigeria
CERC	Central Electricity Regulatory Commission
CNE	Commission Nacional de Energia
CNY	Chinese yuan
COAG	Council of Australian Governments
CTC	Competition Transition Charge
DERC	Delhi electricity regulatory commission

DISCOs	Distribution companies
DOE	Department of Energy
DPLU	Direct Power-Purchase for Large Users
DSM	Demand Side Management
DVB	Delhi Vidyut Board
E.C.N	Electricity Corporation of Nigeria
EEDC	Eko Electricity Distribution Company
ELDC	Economic Load Dispatch Centre
EMS	Energy Management System
EOIs	Expression of Interest
EPIC	Electric Power Sector Implementation Committee
EPSR Act	Electric Power Sector Reform Act
EPSR	Electric Power Sector Reform Act
EPSRA	Electric Power Sector Reform Act
FERC	Federal Electricity Regulatory Commission
FGN	Federal Government of Nigeria
FPA	Fuel Price Adjustment
GE	General Electric
GENCOs	Generation companies
GSA	Gas Sales Agreement
GSA	Gas suppliers agreement
GSB	Graduate School of Business
GTA	Gas transportation agreement
IEDN	Independent Electricity Distribution Networks
IETN	Independent Electricity Transmission Networks

IOUs	Investor- Owned Utilities
IPPs	Independent Power Producers
ISO	Independent System Operator
ISO-NE	New England Independent System Operator
ITSO	Independent transmission system Operator
KW	kilo watt
LC	Letter of Credit
LDCs	Least Developed Countries
LTSO	Legally-Unbundled Transmission System Operator
MAP	Meter Asset Providers
MDAs	Ministries, Department and Agencies
MEP	Ministry of Electric Power
MIR	Management Programme in Infrastructure Reform and Regulation
MISO	Midcontinent Independent System Operator
MO	Market Operator
MW	Mega Watt
MYTO	Multi-Year Tariff Order
N.E.S.C.O.	Native Authority stations
NBET	Nigerian bulk electricity trading
NBS	Nigeria Bureau of Statistics
NDA	Niger Dam Authority
NDPHC	Niger Delta Power Holding Company Limited
NDRC	National Development and Reform Commission
NEC	National Energy Commission
NELMCO	National Electricity Liability Management Company Ltd

NEM	National Electricity Market
NEMSF	Nigerian Electricity Market Stabilization Facility
NEPA	National Electric Power Authority
NEPP	National Electric Power Policy
NERC	Nigeria Electricity Regulatory Commission
NESCO	Nigerian Electricity Supply Company
NESI	Nigerian Electricity Supply Industry
NIALS	Nigerian Institute of Advanced Legal Studies
NIPP	National integrated power project
NTEP	Nigeria Transmission Expansion Project
NTP	Normative Turned Positive
NYISO	New-York Independent System Operator
OPEX	Operating Expenditure
OSEB	Orissa Electricity Board
PBDR	Price-Based Demand Response
PHCN	Power Holding Company of Nigeria
PIP	Performance Improvement Plan
PPA	Power Purchase Agreement
PPAs	Power Purchase Agreements
PPIAF	Public-Private Infrastructure Advisory Facility
PSRP	Power Sector Recovery Program
PUHCA	Public Utility Holding Company Act
PVs	Photovoltaic Cells
PWD	Public Works Department
RAPDRP	Restructure Accelerated Power Development and Reform Programme

RFP	Request for Proposal
RPI	Retail Price Index
RTO	Regional Transmission Operator
SCADA	Supervisory control and data acquisition
SEB	State Electricity Boards
SERC	State Electricity Regulatory Commission
SGC	State Grid cooperation
SIC	Sistema Interconectado Central
SING	Sistema Interconectado del Norte Grande
SO	System Operator
SOE	State-owned Enterprises
SPC	State Power Corporation
SPC	State Power Corporation
SPC	State Power Corporation of China
SPDC	Shell Development Corporation
STC	State Economic and Trade Commission
STC	State Economic and Trade Commission
T&D	Transmission and Distribution
TCN	Transmission company of Nigeria
TEM	Transition Electricity Market
TEP	Tiered Electricity Price
TREP	Transmission Rehabilitation and Expansion Programme
TSP	Transmission Service Provider
TUOS	Transmission use of system
UCT	University of Town Cape

US	United States
VAD	Distribution Value Added
VIU	Vertically Integrated Utilities

SUMMARY OF THESIS

Prior to the introduction of private participation in the value chain of the power supply system, some of the major challenges bedeviling the system are; the inadequate generation capacity, failing and limited transmission network, poor distribution system marred with technical, commercial and collection losses.

The main reason for these challenges is that government was ill equipped in the management of power utility. Therefore, the introduction of the National Electric Power Policy (NEPP) spelt out the rationale for the reform of the power sector which is to encourage private participation alongside government participation to drive efficiency. Adopting the World Bank recommended power sector reform principles which typically emphasizes transparent regulatory framework, commercialization and corporatization, and independent power producers as a basis for financial support, the Nigerian government enacted the Electricity Power Sector Reform Act in 2005 (the Reform Act), unbundled its vertically integrated power assets, sold the unbundled assets and formally open up the power market for private privatization in 2013.

However, while the power market achieved private participation, necessary regulatory mechanisms for stimulating the reform as well as solving market challenges have either being lacking, weak, or not properly implemented in the post privatized power market. Some of these regulatory mechanisms are namely; the Aggregate Technical and Commercial and Collection losses reduction mechanism, tariff adjustment mechanism (MYTO), estimated billing and metering mechanisms (Meter Asset Provider Regulation and National Mass Metering Programme), load allocation mechanism, transmission expansion plan mechanism, and Grid Code operation.

The study analyses some of the regulatory mechanisms vis-a-vis the market problems they are intended to solve. The study equally identified market situations that require regulatory intervention with a view to making findings. Analysis of some selected regulatory mechanism initiatives of other power markets was carried out in order to draw out useful options and lessons for the Nigerian power market. At the conclusion of the

study, findings and recommendations were made. To address the findings, three recommendations were made. First, the decentralization of power supply system in the country. Secondly, deemphasizing the overreliance on the transmission network and the restructuring of the network. Thirdly, the underutilized available capacity of the Gencos be utilized before any generation capacity expansion is carried out.

KEY TERMS

Aggregate Technical Commercial and Collection losses; cost reflection crisis; contract inefficiency; distribution capacity; distribution constraint; Distribution Companies; distribution segment; electricity market; eligible customer regulation; Federal Government of Nigeria; Generation Companies; generation capacity; hybrid theory of regulation; independent power plant; Megawatt; mini grid; Multi Year Tariff Order; transmission capacity; transmission constraint; Transmission Company of Nigeria; load dumping and load rejection; market design; Multi Year Tariff Order regime; natural monopoly; power generation; performance crisis; power generation constraint; Power Purchase Agreement; post–privatized market; public interest; public enterprise; regulatory approach; regulatory mechanism; regulatory design; regulatory intervention; State participation; system operation; tariff methodology; tariff adjustment; theories of regulation; utility reform.

CHAPTER 1

1.1 RESEARCH PROBLEM

The World Bank through its Regulatory Indicators for Sustainable Energy assesses countries' policy and regulatory support for each of the three pillars of sustainable energy namely; access to modern energy, energy efficiency, and renewable energy. This assessment provides a reference point to help policymakers benchmark their sector policy and regulatory framework. It is acknowledged that almost 80% of 111 countries (96% of the world's population) have begun to implement elements of supportive policy framework and over a third (some 45) are already at a reasonably advanced stage but there remains significant gaps in policy and regulatory frameworks.[1]

Sub-Saharan Africa is said to be the least electrified continent and home to 600 million people without electricity.[2] The region has one of the least developed policy environments to support energy access. Of particular concern are Ethiopia, Nigeria and Sudan, three of the most populous energy deficit countries with a total unserved population of 116 million people. As many as 70% of Africa's least electrified nations, each with access rates below 20% of the population have barely begun to establish an enabling environment for energy access. However, some good performers such as Kenya, Uganda and Tanzania have strong policy frameworks in place. For instance, policy frameworks for grid densification and expansion which constitute the mainstay of electrification efforts, lag substantially behind and still need much progress. Also, neglecting enabling policies for stand-alone solar home systems makes so many of these countries miss out on the solar revolution's access dividend.[3]

Before the advent of major power reform in Nigeria in 1999 which led to the liberalization process, the Nigerian government maintained a monopoly system of

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1 Banergy S.G. et al "Regulatory Indicators for Sustainable Energy a Global Scorecard for Policy makers" International Bank for Reconstruction and Development/the World Bank 2017.at xvi online:http://documents.worldbank.org/curated/en/538181487106403375/pdf/112828-REVISED-PUBLIC-RISE-2016-Report.pdf (Date of Use: 3 October 2018).

2 Morlot J.C et al "Achieving clean energy access in sub-Saharan Africa" OECD Case Study key findings at 1 online: https://www.oecd.org/environment/cc/climate-futures/Achieving-clean-energy-access-Sub-Saharan-Africa.pdf (Date of use: 15 July 2023).

3 Banergy S.G. et al "Regulatory Indicators for Sustainable Energy a Global Scorecard for Policy makers" International Bank for Reconstruction and Development/the World Bank 2017.at xviii online: http://documents.worldbank.org/curated/en/538181487106403375/pdf/112828-REVISED-PUBLIC-RISE-2016-Report.pdf (Date of Use: 3 October 2018).

electricity supply through its wholly-owned utility company, the National Electric Power Authority "NEPA". NEPA was in charge of the generation, transmission and distribution of power in Nigeria with a total generation capacity of about 6,200 MW consisting of two (2) hydro and four (4) thermal power plants. Under it, power supply was largely unstable and unreliable , with an industry characterized by lack of maintenance of power infrastructure, outdated power plants, low revenues, high losses, power theft and non-cost reflective tariffs.[4]

NEPA was established by the promulgation of the National Electric Power Authority Decree No. 24 of June 1972 "the Decree"[5]. The military government merged the operations of the Electricity Corporation of Nigeria[6] and Niger Dams Authority[7] and vested the monopoly of power generation, transmission, and distribution on one entity. The Decree established the National Electric Power Authority "NEPA" to develop and maintain an efficient, co-ordinated, and economical system of electricity supply for all parts of the Federation by generating or acquiring the supply of electricity, providing bulk supply of electricity for distribution within or outside Nigeria and providing supply of electricity for consumers in Nigeria.[8]

However, arising from long years of neglect in infrastructural growth to meet the increasing rate of electricity demands particularly in the urban centers in Nigeria, the electricity sector suffered great deficit in terms of infrastructural growth, government mismanagement and an appropriate legal framework; leading to a massive shortfall in

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4 NERC "History" online: http://www.nercng.org/index.php/home/nesi/401-history (Date of use: 14 September 2018).

5 Generally, a decree is an official and express order that has the force of law. Under the Nigerian military government, it operates as a Federal law which is usually passed by the head of state/government while an edict operates as a state law which is usually passed by the military governor. In Nigeria, the constitutional instrument of the military regime was the Constitution (Suspension and Modification) Decree No. 1 1966 which provides that the Constitution shall not prevail over a Decree, render any provision of a Decree void, no court of law can entertain any question as to its validity and suspends the operation of some parts of the Constitution. This enables the military government to pass decrees by rule of conduct as against a more rigorous approach under a civilian rule which requires the National Assembly (representatives of the people) to propose a bill that will pass through different stages before it becomes law by the assent of the President. (Elias T.O "Military Decrees in Nigeria and Ghana" 1971 (5) Nigerian Law Journal 129 – 132.

6 Electricity Corporation of Nigeria was established as a utility company by the Electricity Corporation of Nigeria (ECN) Ordinance No.15 of 1950 passed by the colonial government's legislative council to coordinate the distribution of electricity, integrate electric power development and generally make the electricity supply industry efficient.

7 Niger Dams Authority was established as a utility company by the Niger Dams Act (No. 23) A95 Laws of the Federation of Nigeria of 1962 to oversee the development and management of the proposed hydro power stations.

8 Section 1 subsection 1(a) &(b) of National Electric Power Authority Decree No. 24 Laws of the Federal Republic of Nigeria of 1972.

electricity production. The *Nigerian Institute of Advanced Legal Studies (NIALS)* at a one day round table on Power Infrastructure, Investment and Transformation Agenda[9] organized for stakeholders, experts in the power sector, erudite scholars, and experienced Chief Executives provides a summary of the challenges of the power sector in Nigeria through a Communiqué. Some of the problems highlighted in the communiqué by NIALS are that 40% of the country's population of about 160 million have access to electricity with a total consumer figure of 4.5 million. Pre- 1999 available power) was at an abysmally low level (1500- 2000 megawatt (mw)) out of 6000 MW capacity and supply was grossly inadequate and epileptic. From 1999-2005, there was a marked improvement from 2000MW to 4500MW out of 6500mw; from 2006 – 2007, there was a sharp drop in power generation to below 2000MW despite additional generation from newly commissioned power stations. As of 2007-2011, power generation fluctuated between 2000-3500MW with additional generation from a few newly commissioned plants. In 2012, power generation stood at 3000-4000MW but supply remained generally very erratic and unsatisfactory following faults and deficiencies caused by a drop in power generation and transmission network and also the concentration of power plants in a limited area causing grid insecurity.[10]

These problems were prevalent from the inception of NEPA in 1972 to 1999 when the Federal Government in Nigeria kick-started the reform of the sector. According to the Bureau of Public Enterprises[11], as at 1999, the Nigerian electric power sector had reached the lowest point in its 100 year history. It further stated that only 19 units of the generating units in the country were operational, average daily generation was 1,750 MW, no new electric power infrastructure was built between 1991-1999, the most recent plant in 1999 was completed in 1990 and the last transmission line was built in 1987. An estimated 90 million people were without access to grid electricity; accurate and reliable estimates of industry losses were unavailable but were believed to be in excess of 50%.[12] High technical and non-technical losses (estimated at 45 –

9 Azinge http://www.nials-nigeria.org/round_tables/communique_on_power.pdf (Date of use: 1 October 2018).

10 Azinge http://www.nials-nigeria.org/round_tables/communique_on_power.pdf (Date of use: 1 October 2018).

11 The Bureau of Public Enterprises is charged with the overall responsibility of implementing the FGN policies on privatisation and commercialization.

12 This was the reason for the introduction of Aggregate Technical, Commercial and Collection (ATC&C) by the BPE into the privatisation bidding exercise. ATC&C was used as a basis for the determination of successful bidders of the 11 Power Holding Company Nigeria successor Distribution Companies, in addition to their financial submissions, bidders were evaluated based on their ability to project realistic reduction in losses in the distribution network, usually categorised. as technical and commercial losses. https://aesidotcom.wordpress.com/2014/03/14/the-atcc-loss-parameter/

50%), low generation, distribution and transmission capacity, large number of employees (over 47, 000 in the industry), poor maintenance culture, frequent power outages, lack of commercial orientation, not commercially viable and no audited financial statements.[13] Most of these problems were directly traceable to NEPA as a result of the monopoly status it enjoyed during this era.

Indubitably, by 1999, it has become necessary to arrest the situation for there to be any economic development. The most suitable mode of sector reform considered by the FGN for the electricity sector in Nigeria was expressed in the National Electric Power Policy document. The document set out institutional arrangements for introducing competition and for an appropriate regulatory framework for the sector. The structure was designed to be achieved by taking the following steps: (i) unbundling NEPA's vertically integrated structure into several generation and distribution entities and a transmission entity that would also act initially as the national electricity dispatch entity/system operator, (ii) divestiture of the state's ownership in the thermal generation and distribution facilities, and either divestiture of the state's ownership or long term concessioning of the hydropower facilities, (iii) allowing private independent power producers (IPPs) and electricity suppliers to enter the power market, and (iv) establishment of arm's-length trading mechanisms among these entities.[14]

The reform proceeded on this premise and it found favour with the World Bank from whom the FGN sought credit. The Bank proposed to finance technical assistance and capacity-building required for the design and implementation of the reform, including priority measures in the short-term action plan. The main components' cover of the financial assistance was the creation of the new legal and regulatory framework, and of the revised tariff system; the establishment of a new regulatory body; the creation of the new dispatch and settlement system; the unbundling of NEPA, and privatization of the generation and distribution units of the restructured NEPA; as well as the establishment of a regulatory and institutional framework for rural power supply.[15]

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13 Dikki B. E. Update – Privatisation Issues (A presentation at the 1st National Council on Power Conference NACOP the Presidency Bureau of Public Enterprises, 11 August 2014) 3 & 9.

14 World Bank "Project Appraisal Document on a Proposed Credit in the Amount of SDR 90.2 Million (US$114.29 Million Equivalent) to the Federal Republic of Nigeria for a Privatisation Support Project" (Private Sector Unit, African Regional Office, World Bank 21 May 2001) online: http://documents.worldbank.org/curated/en/191771468759310071/pdf/multi0page.pdf (Date of Use: 15 September 2018) 6 - 7.

15 World bank "Project Appraisal Document on a Proposed Credit in the Amount of SDR 90.2 Million (US$114.29 Million Equivalent) to the Federal Republic of Nigeria for a Privatisation Support Project" (Private Sector Unit, African Regional Office, World Bank 21 May 2001) online:

In 2010, it became clear to the Nigerian Government that the reform process needed some momentum, judging by the government's statement as contained in the Roadmap to Power Sector Reform geared towards fast-tracking the process. In August 2010, the Government issued a Roadmap to Power Sector Reform wherein it stated that it will accelerate the pace of activity with respect to reforms already mandated under the Electric Power Sector Reform Act "EPSR Act", and to also improve on short term service delivery. The Government stated that it will fast-track the ongoing structural reform by removing obstacles to private sector investment, clarifying government strategy on the divestiture of Power Holding Company of Nigeria, successor companies and reforming the fuel-to- power sector.[16]

Following the handover of the unbundled units of PHCN to the private sector in 2013, the Nigerian power sector experienced major set-backs resulting in serious liquidity challenges. Electricity prices are currently below production cost, so the industry is barely able to generate enough revenue to cover its operating costs let alone meet its considerable capital expenditure.[17]The review in electricity prices by the regulator under the Multi-Year Tariff Order (MYTO)[18] in 2012, 2015, are also not cost reflective. The Distribution segment of the value chain which is widely considered to be the weakest link had a face-off with the Federal Minister of Power who had insisted that the provision of meters to consumers is still the responsibility of the Distribution Companies (DISCOs) regardless of the creation of a class of operators called Meter Asset Providers by the Metter Asset Provider Regulation.[19]

To overcome the impasse, there have been public arguments and proposals that the Federal Government should recapitalize or repossess the Discos. Any proposed policy

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http://documents.worldbank.org/curated/en/191771468759310071/pdf/multi0page.pdf (Date of Use: 15 September 2018) 8.

16 The Presidency Roadmap for power sector reform (The Presidency, Federal Republic of Nigeria August 2010) 4.

17 Joseph I "Issues and challenges in the privatized power sector in Nigeria 2014 (6) Journal of Sustainable Development Studies 61-174.

18 The Multi Year Tariff Order is an order issued by the Nigerian Electricity Regulatory Commission pursuant to a methodology established under Section 76 of the Electric Power Sector Reform Act 2005 effective from January 15, 2015 to December 31, 2018. It is a major tariff review for each of the sectors in the Nigerian Electricity Supply Industry (NESI) namely generation, transmission and distribution which takes into consideration the level of the ATCC losses for each Disco, exchange rate, rate of inflation, generation capacity and gas price.

19 The Punch "Meter supply is Discos' responsibility says FG" (August 14, 2018) online: https://punchng.com/meter-supply-is-discos-responsibility-says-fg/ (Date of use: 1 November 2021).

shift to government's recapitalization[20] or repossessing[21] of the Discos by the TCN and the Federal Ministry of Power[22] cannot be in tandem with current realities and will be counterproductive for two reasons. First, poor government prudence in utility management constitutes a major rationale for utility privatization; therefore, any policy shift to government will be unhelpful. Secondly, no modality of implementation of the recapitalization or repossessing has been fashioned out for thorough consideration of how current investors will recoup their investments in the assets/Discos or how the FGN will obtain funds to repossess the Discos given the $2.5 billion[23] that will be required for such exercise. A mismanagement of these issues by the FGN will further increase the risk of investment in the country.

Similarly, the agitation[24] for cost reflective tariff for the Discos in Nigeria has to take into consideration economic realities in the country. Four (4) out of ten (10) individuals in Nigeria has real per capita expenditures below N137, 430 per year which translates to $242[25] while the unemployment rate has grown to 33.3 per cent.[26] Also, considering the facts that 40.1 per cent of the population are considered to be poor (by national standards, individuals living in households whose per capita annual consumption expenditures is below 137,430 Naira),[27] 78 per cent of the consumers still receive less than 12 hours daily access to on-grid power,[28] and access to electricity is still

20 The Punch "Recapitalization: TCN to waive N270bn Discos' debt" (22 July 2019) online: https://punchng.com/recapitalisation-tcn-to-waive-n270bn-discos-debts/ (Date of use: 1 November 2021).

21 The Punch "FGN' ll pay failed investors N736 bn to repossess Discos" (15 August 2019) online: https://punchng.com/fgll-pay-failed-investors-n736bn-to-repossess-discos/ (Date of use: 1 November 2021).

22 The Federal Ministry of Power answers to questionnaire submitted by Babatunde Olumuyiwa Fasuyi (September 2019) 5.

23 The Punch "FGN' ll pay failed investors N736 bn to repossess Discos" (15 August 2019) online: https://punchng.com/fgll-pay-failed-investors-n736bn-to-repossess-discos/ (Date of use: 1 November 2021).

24 ANED the Discos' Challenges & Proposed Solutions (ANED presentation 15 November 2019) 8.

25 National Bureau of Statistics (NBS) "2019 Poverty and inequality in Nigeria" online: file:///C:/Users/HP/Downloads/2019%20POVERY%20AND%20INEQUALITY%20IN%20NIGERIA.pdf 6 (Date of use: 1 November 2021).

26 National Bureau of Statistics (NBS) "Labor force statistics: unemployment and underemployment Report Q2" online: https://www.nigerianstat.gov.ng/pdfuploads/Q2_2020_Unemployment_Report.pdf (Date of use: 1 November 2021).

27 National Bureau of Statistics (NBS) "2019 Poverty and inequality in Nigeria" online: file:///C:/Users/HP/Downloads/2019%20POVERTY%20AND%20INEQUALITY%20IN%20NIGERIA.pdf 6 (Date of use: 1 November 2021).

28 The Punch "FG spends N568.5bn annually on power tariff shortfalls – World Bank" (26 April 2021) online: https://punchng.com/fg-spends-n568-5bn-annually-on-power-tariff-shortfalls-world-bank/ (Date of use: 1 November 2020).

considered as the world largest energy deficit with 43 per cent of the populace without access to grid electricity.[29]

It is said that the power sector reform is not an event but an ongoing process[30] and so it must constantly be reviewed and assessed to ensure optimum performance. The development in the post-privatization era of the Nigeria power sector reform clearly suggests that the entire reform has not achieved its fundamental objective of access to electricity by Nigerians. The post-privatization era has now presented its challenges to the Government, the regulators, investors and the consumers. Some of the challenges are stated as follows:

a. Ageing facilities requiring substantial investment to upgrade and expand by investors[31]
b. Debt liability of investors to banks preventing further investments[32]
c. Inadequate gas supply[33]
d. Consumer fraudulent practices and metering problem[34]
e. Cost reflective tariff[35]
f. Reconciliation of assets and liabilities of PHCN[36]
g. High level of unpaid electricity bills[37]
h. Enforcement of contractual obligations of the investors by the regulators[38]
i. The Regulator's monitoring of investors' business plans[39]

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29 The World Bank "Nigeria to improve electricity access and services to citizens" (5 February 2021) online: https://www.worldbank.org/en/news/press-release/2021/02/05/nigeria-to-improve-electricity-access-and-services-to-citizens (Date of use: 1 November 2021).

30 Kapika J and Eberhard A Power-Sector reform and regulation in Africa (HSRC Press South Africa 2013)130.

31 EIUViewswire "Challenges facing the Nigeria power sector" (26 February 2016) http://country.eiu.com/article.aspx?articleid=1003980684&Country=Nigeria&topic=Economy_1 (Date of use: 26 February 2016).

32 Joseph I "Issues and challenges in the privatized power sector in Nigeria JSDS 161-174.

33 Joseph I "Issues and challenges in the privatized power sector in Nigeria" 2014 Journal of Sustainable Development Studies 161-174.

34 Joseph I "Issues and challenges in the privatized power sector in Nigeria" 2014 Journal of Sustainable Development Studies 161-174.

35 Joseph I "Issues and challenges in the privatized power sector in Nigeria" 2014 Journal of Sustainable Development Studies 161-174.

36 Joseph I "Issues and challenges in the privatized power sector in Nigeria" 2014 Journal of Sustainable Development Studies 161-174.

37 Joseph I "Issues and challenges in the privatized power sector in Nigeria" 2014 Journal of Sustainable Development Studies 161-174.

38 Joseph I "Issues and challenges in the privatized power sector in Nigeria" 2014 Journal of Sustainable Development Studies 161-174.

39 Joseph I "Issues and challenges in the privatized power sector in Nigeria" 2014 Journal of Sustainable Development Studies 161-174.

j. Unavailability of skilled manpower[40]

k. Rapidly changing market and unpredictability[41]

The FGN through its Power Sector Recovery Implementation Program had equally admitted that the sector is in a state of emergency which could cause further deterioration in power supply and that the failure of the sector will severely constrain the country's economic growth. From an economic perspective, the FGN stated that the electricity sector is fraught with several challenges which include; market indiscipline, lack of cost reflective tariff, and loss of investment. The FGN equally stated that it will require about US$7.6 billion as funded subsidy between July, 2017 and 2021 to implement its recovery plan (the government subsequently committed funds which was largely directed to the payment of Gencos' invoices).[42] It is quite baffling how the country went from perceived comprehensive sector reform in 2013 to a state of emergency in 2017 (a period of four years).

Interestingly, the flaws in the World Bank privatization support project in Nigeria were pointed out in a power sector reform review which is clearly suggestive that the model adopted by Nigeria is not foolproof.[43] It is said that although the project was well conceived, the Bank applied the conventional wisdom of reform namely; corporatizing, unbundling, training of staff, passing an electricity law but failed to reference the expansion of grid and reaching those off grid. There was no mention of the use of a household survey, while tariff reform was mentioned but there was no hint of how the bank would have reconciled widespread poverty or inability to pay on the part of consumers. The extensive cross-subsidies and the need to increase tariffs were also not considered. There was no consideration of the Nigeria's ample gas resources, no consideration of an alternative to unbundling NEPA. The Review concluded that there was either no plan, or political will for the plan to succeed. It suggested that the press of politics and the urgency of Nigeria's power crisis may make creative restructuring a

40 Joseph I "Issues and challenges in the privatized power sector in Nigeria" 2014 Journal of Sustainable Development Studies 161-174.

41 Joseph I "Issues and challenges in the privatized power sector in Nigeria" 2014 Journal of Sustainable Development Studies 161-174.

42 Power Sector Recovery Implementation Program (March 2017) POWER_SECTOR_RECOVERY_PROGRAM.pdf (Date of use: 5 November 2021) 11 17 – 22.

43 Goldwyn D. "Power Sector Reform Review" 2003 The World Bank Operations Evaluation Department.

luxury and that if the Bank does not provide the knowledge base for this kind of thinking, or at least finance it, no one will.[44]

Current developments in the electricity sector in Nigeria seem to have shown that reforming the electricity sector involves far more than changing technical and institutional models. Beasant-Jones argued that the power market reform has faced substantial difficulties and departed from the conventional economic model for reform, especially in developing countries. This is because the fundamental reform of a power sector is an extraordinarily complex undertaking, even for reforms that fall short of attempting to introduce a fully unbundled and competitive market. Yet, governments have been attracted by complex, state-of-the-art market models and regulatory regimes that were designed and, to some degree, implemented in countries much better suited for this approach. In most cases, the funding agency staff, politicians, regulators, and the host government had a poor conception of the difficulties involved, the scale and scope of needed changes and the realities of the physical, social, legal, commercial, and political constraints. In other words, it would seem that the selected reforms were too ambitious for the country's conditions.[45]

The condition of the privatized market in Nigeria does not suggest a departure from this argument largely because the performance of the sector is farther away from the objectives namely; attracting sufficient investment to increase capacity in meeting electricity demand, relieving the fiscal burden on the government, and to guarantee efficiency. It remains to be seen whether the current reform regulatory framework can sustain any meaningful development in the post-privatization era which is already facing numerous challenges, and if not, how best to enhance the regulatory mechanisms to stimulate reform in post-privatization era. The current privatization reform seems to be lost in the complexities of state and private participation in sector reforms because reform simply cannot be only a matter of economics. Other factors such as political, social, and personal goals ought to be considered in formulating reform policies and regulations.

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44 Goldwyn D. "Power Sector Reform Review" 2003 The World Bank Operations Evaluation Department 19.

45 Beasant-Jones J.E. Reforming Power Markets in Developing Countries: What Have We Learned? (World Bank Group Energy and Mining Sector Board Discussion Paper No. 19, 2006)13.

1.2 RESEARCH QUESTIONS

This study will seek to answer the following questions against the backdrop of the problem described earlier:

Are there appropriate regulatory mechanisms to stimulate the ongoing reform of the privatized Nigerian electricity market?

The main research question will be broken down into the following sub-questions:

a. Is the public interest theory the basis and rationale for the regulatory regime of the power sector reform in Nigeria?
b. What role has the historical experience of the Nigerian power sector played in policy formulation and the regulatory interventions in power sector reform?
c. To what extent can the Nigerian experience in the electricity sector be said to be a direct influence on the regulatory mechanisms adopted for the sector reform and the privatized market?
d. Are the regulatory mechanisms directed at solving specific challenges of the privatized market impactful on the reform process with respect to the generation, transmission, and distribution segments of the industry?
e. What are the benefits of analyzing power sector reforms of selected reform economies around the world and drawing out lessons and options from their regulatory mechanisms initiatives of their generation, transmission, and distribution segments?
f. Are there ways of freeing the Nigerian Electricity Supply Industry from identified constraints in the ongoing reform process through effective regulatory mechanisms?

1.3 RESEARCH OBJECTIVES

The objective of this study is to analyze the regulatory regime of the post-privatization era of the electricity sector with a view to drawing out the deficiencies and making recommendations where appropriate. The incidental objectives of this study are:

1.3.1 To identify the rationale for the regulatory structure of the post-privatization era of the Nigeria electricity sector.
1.3.2 A deconstruction of the regulatory structure of the Nigerian Electricity Supply Industry (NESI).

1.3.3 Identifying the constraints of the three segments of NESI; power generation, transmission, and distribution, with a view to providing practicable solutions to the said problems.

1.3.4 Analyzing the regulatory approach of selected reform economies to the distribution, transmission, and generation segments of their electricity supply industry with a view to drawing out lessons for NESI.

1.3.5 Identifying the options available to the Nigerian Government and the operators in the reform era of the Nigeria electricity sector in the light of the various challenges and problems bedeviling the sector.

1.3.6 Whether the current regulatory mechanisms of NESI can sustain the operation of the privatized market considering the numerous economic and regulatory challenges, if not, providing useful recommendations for the reform of NESI.

1.4 LITERATURE REVIEW

Regulatory mechanism is a combination of two words with separate meaning but not mutually exclusive. Regulatory from the word regulation describes an act or process of controlling by rule or restriction[46] or tending or serving to regulate[47] while mechanism is defined as a natural or established process by which something takes place or is brought about.[48] Regulatory mechanism means an ordinance, permit, standard, contract language, or any other procedure, that will be enforced by the regulator.[49] For the Nigerian electricity privatized market, regulation is centralized by

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46 Black's Law Dictionary Eight Edition 1311.

47 The New International Webster's Comprehensive Dictionary of the English Language 1062

48 https://www.google.com/search?q=mechanism&hl=en&ei=dkhUYrHeK4TYaM3joaAB&oq=mecha&gs_lcp=Cgdnd3Mtd2l6EAEYADIICAAQsQMQkQIyCAgAELEDEJECMgoIABCxAxCDARBDMgQIABBDMggIABCABBCxAzIICAAQgAQQsQMyCAgAEIAEELEDMggIABCABBCxAzIICAAQgAQQsQMyBQgAEIAEOgQIABBHOgoIABDqAhC0AhBDOg0ILhDUAhDqAhC0AhBDOgoIABCRAhBGEPkBOgUIABCRAjoICC4QgAQQsQM6CAguELEDEIMBOgsIABCABBCxAxCDAToFCC4QgAQ6CwguELEDEMcBEK8BSgQIQRgASgQIRhgAUOMFWIEVYMEiaAFwAngAgAGMBIgBig2SAQczLTIuMS4xmAEAoAEBsAEKyAEIwAEB&sclient=gws-wiz (Date of use: 11 April 2022)

49 https://www.google.com/search?q=Regulatory+mechanism&hl=en&source=hp&ei=4-JOYtCaI86V8gLumIaIDQ&iflsig=AHkkrS4AAAAAYk7w82rwtFasQUhWjP_dA4TaK-m1LFZ-&ved=0ahUKEwiQmLSsg4L3AhXOilwKHW6MAdEQ4dUDCAc&uact=5&oq=Regulatory+mechanism&gs_lcp=Cgdnd3Mtd2l6EAMyDggAEI8BEOoCEIwDEOUCMg4IABCPARDqAhCMAxDlAjIOCC4QjwEQ6gIQjAMQ5QIyDggAEI8BEOoCEIwDEOUCMg4IABCPARDqAhCMAxDlAjIOCC4QjwEQ6gIQjAMQ5QIyDggAEI8BEOoCEIwDEOUCMg4ILhCPARDqAhCMAxDlAjIOCC4QjwEQ6gIQjAMQ5QIyDggAEI8BEOoCEIwDEOUCULYRWMAuYM8zaABwAHgAgAGOE4gBjhOSAQM5LTGYAQCgAQGwAQo&sclient=gws-wiz(Date of use: 11 April 2022)

design. In effect, electric power regulation is listed under the concurrent list[50] in the 1999 Constitution (as amended) but the State can only make laws in areas not already covered by the national grid system within the state with respect to generation, transmission and distribution of electricity.[51] By this arrangement, the power of the State Governments is largely whittle down by the constitutional provision so much so that their power to make law for the establishment of electric power stations in the state is made subject to the powers of the Regulator to issue license pursuant to the reform law (a federal law).

Until the proposed constitutional amendment seeking to delete the constitutional provision limiting the power of the state to make laws only in areas not covered by the national grid system within the state is approved,[52] regulatory mechanism in the Nigeria electricity privatized market will remain solely instruments of the Regulator made pursuant the federal laws.[53] It will be apt to also define regulatory mechanism as a vehicle through which a particular objective is achieved, objectives set out in government policy, statutes, decisions and regulations. In Re London United Investments Plc, the Court of Appeal (England Wales), civil division held that the power of the Secretary of State to appoint inspectors to investigate the affairs of a company and to report is an important regulatory mechanism for ensuring probity in the management of companies' affairs under Section 432(2) of the Companies Act 1985 (UK).[54]

Also, a Report prepared by the Working Party of the Law Society in readiness for the Lord Chancellor's Green Paper on contingency fees of lawyers recommended regulatory mechanisms to protect clients and meet conflict of interest criticism, including the setting of maximum percentages, to be exceeded only with the advance agreement of the court or the Law Society.[55] At the inception stage of the privatization of government infrastructure in India, the India government reliance on regulatory

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50 Part II second schedule of the 1999 Constitution containing matters to which both the Federal and State government in Nigeria can legislate upon and the extent to which such legislation can be carried out.

51 Paragraph 14(b) Part II second schedule of the 1999 Constitution (as amended).

52 Bill No.33 Devolution of powers (National Grid System) of the Constitutional amendment Bill (5th Alteration) 2022.

53 The Nigerian government had recently carried out an amendment of the Constitution as well as the reform law to allow for a more decentralized power market allowing states' participation in the electricity structure in the country.

54 Re London United Investments Plc (1992) 2 All ER 842.

55 The Law Society "No Win No Fee Reform" 1989 139 New Law Journal 4.

mechanism in concession agreements was discovered to hamper the progress of its privatization process. As a result of the inadequacy of this type of regulatory mechanism, in September 2008, the Planning Commission published a comprehensive paper titled Approach to Regulation to Infrastructure ('the Approach Paper') which considered the scope of regulator's power, the regulator's independence and autonomy and the regulator's accountability as regulatory mechanisms. These mechanisms were to ensure certain objectives which includes; empowering the regulator to issue licenses, set performance standards, determine tariffs and to carry out disciplinary actions, regulator's autonomy and independent of government control.[56]

The general focus of any regulatory mechanism in a reform sector should at the very least ensure that a regulator is legally and structurally independent. It should specify the regulator's objective in clear and unambiguous terms, limit the scope for the regulator to exercise personal discretion, make regulatory procedures transparent and easy to administer, empower the regulator to obtain direct access to information about service quality and user satisfaction, with a mechanism to consult with the public, empower the regulator to function free from political direction, make the regulator properly accountable by a prompt and effective appeal process and have the requisite expertise and competence.[57]

The Nigeria Electricity Regulatory Commission (NERC) is the electricity regulator in the reform era in Nigeria. Beyond the copious powers and functions available to it under the Electric Power Sector Reform Act "EPSR", it is questionable whether NERC could be said to be organizationally and functionally independent, free from political intervention and has the requisite expertise and competence in ensuring that appropriate regulatory mechanisms are put in place in the privatized market. Ebenhard et al[58] made a case for the need to redesign regulatory institutions in sub-Saharan Africa, noting that from the analysis of data collected in the initial sample of 24 Africa Infrastructural Country Diagnostic (AICD) countries, the power sector performs better

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56 Kachwaha S and Sagar A "Regulatory Framework in India Airports" 2013 8 Construction law International 9.

57 Saidu B "Committing to legal and regulatory reform: an analysis of the legal and regulatory framework of the electricity supply industry in Nigeria" 2011 Energy and Natural Resources Law 364-365.

58 Eberhard A et al Strengthening sector reform and planning in Africa power infrastructure (World Bank: Washington 2008) 94.

in countries with regulators than those without, yet the same countries show no obvious improvements in cost recovery, transmission & distribution losses and or reserve margin. They stated that some regulators have exacerbated the very problems they were meant to address while creating regulatory risks for investors. The authors found out that in many cases, regulators are far from being independent and are subject to pressure from governments to modify or overturn decisions, turn-over among commissioners has been high, the disconnect between law (or rule) and practice is often wide, tariff setting remains highly politicized and governments are sensitive to popular resentment against price increases, which are often necessary to cover cost.

Ebenhard et al[59] observed that an independent regulator requires a strong regulatory commitment and competent institutions and that while it is necessary to restrain regulatory discretion over substantive issues, regulatory models and governance system should be securely located within political constitutions and legal arrangements of the country. In considering the political and constitutional context of the Nigerian power sector's regulatory governance, Saidu[60] states that there are at least three different kinds of goals which policy-makers should pursue in policy choices. Policy goals which refer to the substantive policy goals of an administration, including its legislative and administrative objectives, partisan goals which refers to efforts to shore up political support for the President or the party in power and personal goals which refer to an effort to favour or protect personal friends, associates and or a particular constituency.

While Saidu concluded that elements of all the three goals are found to be present in the choice of policy for the electricity supply industry in Nigeria, the study's utilized the similar elements of a hybrid theory of regulation to demonstrate that the reform failed to consider the elements of the three goals identified by Saidu. Although the author did not state the effect of the policy considerations, it is evident that partisan and personal considerations cannot foster a viable regulatory environment but a consideration of the significance of these elements in regulation will ensure that potential pitfalls in initiating regulatory mechanisms are avoided.

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59 Eberhard A et al Strengthening sector reform and planning in Africa power infrastructure (World Bank: Washington 2008) 96-98.

60 Saidu B "Committing to legal and regulatory reform: an analysis of the legal and regulatory framework of the electricity supply industry in Nigeria" 2011 Energy and Natural Resources Law 365.

Against the above background, the literature covers the three broad areas of the study namely; theories and conceptual framework of electricity regulation, power sector reforms and the Nigeria power sector reform. For now some selected literatures will be briefly considered while the conceptual framework will be discussed in the next chapter.

Koop & Lodge,[61] in their study of the concept of regulation, assesses how regulation is conceived in the most cited articles in six social science disciplines (business, economics, law, political science, public administration and sociology) and came to the conclusion. First, explicit definitions of regulation are scarce, which has led the literature to be largely silent on some conceptual questions. Secondly, the scope of the concept is vast, given the wide range of manifestations referred to as regulation. Thirdly, a shared conception can be identified: regulation is about intentional intervention in the activities of a target population. According to the authors, regulation can be defined as an *intentional intervention in the activities of a target population, where the intervention is typically direct-involving binding standard-setting, monitoring and sanctioning and exercised by public sector actors on the economic activities of private-sector actors.* This definition is a shared conception of regulation across disciplines.

Several scholars and proponents of theories of regulation have formulated several theories and attempted to justify the reason for regulation. Ogus[62] emphasized public interest justification (the desire for collective goals) for social regulations which deal with matters such as health and safety, environmental and consumer protection, and market failure. He argued that in dealing with these matters, policy-makers can choose from a range of regulatory instruments classifiable according to the degree of state intervention required, one of which is referred to as 'command and control' in which standards, backed by criminal sanctions are imposed on suppliers.

Ogus also stated that economic regulation which covers a much narrower range of matters like industries with monopolist tendencies are regarded as undesirable and

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61 Koop C and Lodge M "What is regulation? An Interdisciplinary Concept Analysis" 2017 Regulation and Governance 104.

62 Ogus A Regulation: legal form and economic theory (Oregon: Hart Publishing Oxford and Portland 2014) 29-54.

are prohibited in some climes as anti-competitive. He advised that the principal function for regulation in this regard will be to provide a substitute for competition in relation to natural monopolies. For example, first, the firm can be publicly-owned, the expectation being that the mechanics of political direction and accountability will be sufficient to meet public interest goals. Secondly, the firm may remain in, or be transferred to private ownership but be subjected to external constraints in the form of price and quality regulations. Thirdly, firms desiring to obtain a monopoly right may be forced to compete for it and as part of their competitive bid, they are required to stipulate proposed conditions of supply, relating especially to prices and quality and those conditions then become terms of the license or franchise under which they exercise the monopoly right.

Baldwin,[63] agrees with Ogus justification for regulation above, but suggests that, first, contemporary critics note that regulation represents major barriers towards competitiveness and economic growth and that such criticism is fuelled by some international organization's attempt at benchmarking regulatory and administrative constraints on business environments (such as the World Bank's 'Doing Business') which could lead to an overload and excessive bureaucratization of economic and social life. Secondly, the focus on the quality and direction of regulation which stemmed from widespread advocacy of 'deregulation' in key industries such as utilities. The authors noted that the current literature has observed a privatization bandwagon, where markets were liberalized, state-owned enterprises transferred into private ownership, and regulatory agencies and other devices, such as long-term contracts, became prominent features of the policy landscape.

However, it is said that three decades of regulatory reform in infrastructure regulation suggest that regulation is not only necessary for the functioning of a market economy but that regulatory oversight remains essential in the running of such public services, in particular in those aspects that reflect genuine natural monopoly elements, such as networks. Thirdly, the authors noted that apart from representing an uneasy compromise between the two trends mentioned above, the 'better regulation' agenda was also fuelled by a third dynamic, namely a long-standing interest in introducing 'rational planning' tools into regulatory policy-making and thereby limiting the scope

63 Baldwin R Cave M and Lodge M the Oxford Handbook of Regulation (Oxford University Press Oxford 2012) 7-8.

for bureaucratic and political knee-jerk regulation. One key example of such rationalist tendencies in the practice of regulation has been the spread of 'regulatory impact assessments' and 'cost benefit analysis.

It would seem that the most acceptable rationale for the regulation of market economy is the public interest ground for regulation as suggested by Ogus above. However, it is not always the case, private interest equally plays a major role in formulating regulations. For instance, from a political trade viewpoint, Ogus'[64] analogy is that in devising an electoral strategy, a political party will recognize that, in broad terms, potential voters fall into two categories: either they are marginal voters who are uncommitted; or they are infra-marginal voters who remain committed to the party. Rationally, to attract marginal voters, the political parties will offer policies which concentrate benefits to that group, the costs being borne either by infra-marginal voters or those who would, in any event, not contemplate voting for the party.

Also, organized labour like the Nigerian Labour Congress and other pressure groups motivated by self-interest and in the pursuit of that self-interest; will significantly influence government policy and consequently, the form and content of regulation. The bureaucrats' ability to do this arises from the key role they play in policy-making. They are typically assigned the responsibility of exploring policy options to a given set of problems and in discharging this responsibility they can set agenda on what can and cannot be done. The private interest ground for regulation has it obvious flaws given the fact that it is narrow in scope but as suggested by Ogus, it does not mean that the theory should be rejected out of hand particularly as the form of regulation adopted in certain areas can plausibly be explained only on the basis that they serve to generate profits for firms within the regulated industry.

Reynolds also posited that a theory of regulation should encompass more than just the neoclassical (traditional approach) concept of efficiency; it must consider the institutional framework of society, which includes, among other things, ethics and values. This framework determines how participants in the economic process will respond to a given stimulus, such as an explicit regulation or a change in relative prices

64 Ogus A Regulation: legal form and economic theory (Oregon: Hart Publishing Oxford and Portland 2014) 63.

in a market setting.[65] This theory is regarded as the institutional theory of regulation that introduces a consideration of the institutional framework of a regulatory environment in regulating.

The rationale stated above has largely formed the basis of most of the utility reforms around the world. Ahuja[66] acknowledges that power sector reform programmes often involve restructuring of the sectors by shifting supply responsibility to private enterprises (privatization) and relying on competition and associated market mechanisms, rather than price and entry regulation, to allocate resources to and within potentially competitive segments of the infrastructure sectors. However, in most infrastructure sectors subject to reform, important segments continue to be natural monopolies requiring continuous regulation. Based on other studies, the author stated that the success of infrastructure sector reform depends in part on the creation of effective regulatory institutions to govern the sector.

Victor and Heller[67]opined that despite challenges like high capital costs, political visibility, network monopoly effects, technological stasis and daunting regulatory tasks, reformers have found ways to introduce market forces into the electricity business. They argued that one track for reformers has involved the model that dates to nearly the beginning of the electric power industry: regulated franchises (USA and Hong Kong), where private firms would operate the entire integrated electric power system, earn a guaranteed return on their investment if they perform well, and be subject to the oversight of regulators.

The drive to provide electricity in the general interest of the public and for economic purposes informed most of the reform policies and regulatory models adopted for the reform in most of the emerging economies. Eberhard[68] in his publication which is the fruit of the collaboration and support from the African Forum for Utility Regulators (AFUR) by the Public-Private Infrastructure Advisory Facility (PPIAF) acknowledged the trend that most widespread feature of infrastructure reforms in developing countries and emerging economies have been the establishment of new regulatory

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65 Reynolds L “Foundations of an Institutional Theory of Regulation” 1981 (15) Journal of Economic Issues 642 – 643.

66 Ahuja H Reforming power sector reforms (Excel Books New Delhi 2010)1-55.

67 Victor D and Heller TC The political economy of power sector reform (Cambridge University Press Cambridge 2007)1-30.

68 Eberhard A Infrastructure Regulation in Developing Countries An Exploration of Hybrid and Transitional Models (Public-Private Infrastructure Advisory Facility working paper No.4 2007) 2-33.

laws, institutions, contracts, regimes and processes which are designed to respond to natural monopolies and market failures associated with network industries. Utility regulatory systems in developing countries have been shaped by two broad traditions namely; the establishment of independent regulatory agencies within a legal system based on common law and regulatory contracts administered within a tradition of civil law and various provisions for contractual renegotiation or arbitration. However, the hybrids of these traditions which involve combining independent regulators with regulatory contracts are increasingly being explored and implemented. In order to meet up the challenges of funding the reform-driven economies, most countries seek financial assistance from international financial institutions and of course as a condition to assessing some of the aids provided, the financial institutions came up with its own standard model for reform.

Kapika and Eberhard[69]in their book which is the outcome of the African Electricity Regulator Peer Review and Learning Network (Peer Learning Network), an initiative of the Management Programme in Infrastructure Reform and Regulation (MIR) at the University of Cape Town (UCT) Graduate School of Business (GSB) recognize the deficit in power sector infrastructure across Sub-Saharan African countries. This deficit provides the basis for the sector reforms driven by donor communities like the World Bank which proffered a Standard Model as a basis for funding. The standard model elements principally include transparent regulation, importation of services, commercialization, and corporatization. However, the standard model was not fully realized anywhere in Africa. The reform has largely taken place to varying extents driven by the unique circumstances of each country and its national priorities.

The Federal Government of Nigeria (FGN) seems to have adopted the standard model of reform in its power sector judging from the acceptability of the reform model by the World Bank in its Project Appraisal Documents on the FGN's privatization policy. However, there is no proof yet as to whether the regulatory structure/model adopted by the Nigerian government is capable of addressing the challenges currently being experienced in the power sector. It may well be plausible that improvising suitable regulatory mechanisms under the model can solve the problems.

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69 Kapika J and Eberhard A *Power sector reform and regulation in Africa* (HSRC Press Cape Town 2013) 21-195.

Eberhard focused on regulatory governance arrangements and investigated whether they have resulted in outcomes that have met the expectations of consumers, operators, and investors in developing countries. He sought to answer questions like: have appropriate regulatory models been selected, have they been securely located in the political, constitutional, and legal arrangements of individual countries? Has implementation been effective? He concluded that ultimately the question is whether regulation facilitates an appropriate balance between development and investment outcomes: that is, are consumer and country benefits advanced while maintaining the financial health of utilities and incentives for further investment.[70]

It is against the above background, that this thesis seeks to make an analytical foray into the privatized market of the power sector reform in Nigeria with a view to identifying regulatory mechanisms that can stimulate the reform process which is currently faced with several challenges. Oni provides an insightful analysis of the history of the Nigerian electric power sector, legal & regulatory regime of the Nigerian electric power sector, the Nigerian electric power sector reforms, financing power sector projects, power projects and environmental protection, intellectual property and power projects in Nigeria, drafting, reviewing and negotiating power sector documentation, what to expect after privatization, dispute resolution and allied issues in the Nigerian electric power sector and Nigerian electric power sector investors' guide.[71]

The author also discusses some of the issues that may arise in the post-privatization era for instance in terms of investment, and argued that consumer demand alone cannot propel private entities to take the decision to construct and operate power generation plants. It is essential that both the underlying economic conditions and regulatory and legal structures are in place to enable appropriate investment to occur in an economically viable way. Clearly, from the recent financial crisis of the privatized market, it has become evidently clear that funding in the power sector cannot be driven by consumer demand or the realization of the challenges alone. As electricity demand keeps growing in the face of privatized market challenges, other alternatives to bridging the gap and ensuring efficiency ought to be explored.

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70 Eberhard A Infrastructure Regulation in Developing Countries An Exploration of Hybrid and Transitional Models (Public-Private Infrastructure Advisory Facility working paper No.4 2007) 1 – 41.

71 Oni A *the Nigerian electric power sector* (CI-Plus 2013)1-295.

The FGN has responded to some of these challenges, Amadi[72] while listing some of the achievements of the Nigeria Electricity Regulatory Commission (licensing of 40 independent power producers, development of technical codes, standards and regulations to ensure safety, reliability and quality in electricity supply, development and review of the Multi-Year Tariff Order (MYTO 1 & 2), approval of market rules and training of industry operators, development of four regulations on consumer protection, election into the Executive Council of the African Forum of Utility Regulators, AFUR), admitted some of the market challenges such as gas supply, off-take problems, low tariffs, grid instability, lack of incentives. However, he stated that in addressing the challenges, the Commission (the regulator) has made substantial progress on key strategic projects such as: the development of the regulatory framework for Independent Electricity Distribution Networks (IEDN), development of regulatory framework for Independent Electricity Transmission Networks (IETN), development of open access regulations and so on. The comprehensive response by the FGN with respect to financial challenges is the Power Sector Recovery Implementation Programme[73] which identified the main components of the financial challenges and how best to mitigate or resolve them in the short and long term.

This study does not intend to import regulatory mechanisms or ideal for the ongoing reform process in Nigeria. The aim is to fashion out regulatory mechanisms within the Nigerian context and situation that best suit the ongoing power sector reform process. In so doing, the study aims to contribute to the body of literature on the subject matter by means of the recommendations made in chapter 6. In the attempt to fashion out regulatory mechanisms within the Nigerian context, analyses of regulatory mechanisms initiatives in power generation, transmission and distribution in Indian, China, Brazil, Chile, Australia and U.S.A. will be carried out in chapter 5 of the study. These countries were carefully chosen for their effective reform approaches to the different segments of the power value chain based on efficiency goal. The regulatory mechanisms adopted were internalized for easy implementation and were largely successful in their application to specific problems. India's (New Delhi) successful approach in utilizing the loss reduction and Brazil's performance based rationale for

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72 Amadi S The structure of the Nigerian electricity supply industry, on-going transformation, opportunities and challenges (Presentation to the Public and Private Developmental centre, procurement monitors training, 19-21 July 2012).

73 Power Sector Recovery Implementation Program (March 2017) POWER_SECTOR_RECOVERY_PROGRAM.pdf (Date of use: 13 March 2020).

the privatization of its distribution segment are examples of these approaches. However, the analysis carried out shows the point of departure in the implementation of similar mechanisms in Nigeria. China reform of its power sector differs from the widely accepted privatization model but focused on the reorganization and rearrangement of its utility with the adoption of specific regulatory mechanisms particularly for the transmission and distribution segments of its power market.

Chile as a pioneer of the privatization reform model liberalized its distribution market by ensuring that eligible consumer can bypass the distribution network but regulated prices for consumers using the distribution network. It equally ensured an open access to it transmission network by which it effectively allows a non-discriminatory use of energy capacity by the coordination of an independent system operator. Australia and U.S.A. provide examples of how the concept of independent system operator can best serve the power value chain.

1.5 METHODOLOGY

The research methodology is an adoption of the doctrinal and non-doctrinal legal research. The doctrinal research was utilized to understand legal theories through analysis of statutory provisions and cases by application of reasoning as well as development of legal theories.[74] The search for the applicable law on the subject by way of statutes and case law, textbooks, legal commentaries, journals, authoritative legal periodicals, encyclopedias and other legal sources to discover scholars thoughts on regulatory issues or rule which is the subject matter of the thesis' investigation was utilized all through the chapters.

Doctrinal research was adopted in discussing the history of the Nigeria power sector, experiences in the pre privatization and transition era and the former legal framework in the pre-privatization era and other related issues. It was utilized to collate, organize and describe legal rules and to offer commentary on the emergence and significance of the authoritative sources in which the regulations are considered by identifying and underscoring the need for a reform regulation. The research gathered relevant data from specified documents to analyze the material and arrive at a comprehensive

[74] Wigwe C Legal Research Methodology and Practice (Princeton and Associates Publishing Company Limited 2019) 12.

understanding of the regulatory framework and its impact on the Nigerian power sector.

The non-doctrinal methodology used the qualitative approach[75] including the use of interview to seek opinions or the underlying reasons for the challenges of the electricity value chain. Qualitative research is the use of qualitative data such as interviews, documents and observation to understand and explain phenomena. This research method includes data sources with observation and respondent observation, interviews and questionnaires, documents and the researcher's impression and perception. It focuses on the interpretation of phenomena in their natural settings to make sense in terms of the meanings people bring to bear on these settings.[76]

This research method was adopted because of its inductive nature to allow the researcher collect information and draw conclusions from observation to help understand the challenges of the targeted power sector players. It will help in the investigation of local knowledge and understanding of their experiences, relationship with one another, social processes, contextual factors that are peculiar to these groups of people.[77] The rationale for this method lies in the dearth of published academic works and research on the post privatization era of the Nigerian electricity market.

A detailed analysis was required for the regulatory issues arising in the post-privatization era which is the primary concern of the study. Here, various interviews were conducted to gather opinions from some market participants like the Generating Companies, transmission Company, Distribution Companies, Ministry of power, Gas Aggregate Company of Nigeria, and the Regulator, NERC. An average of one (1) hour was dedicated to each interview session which was mostly conducted face to face except for the interview with the Ministry of Power done by sending questions and returning answer by courier/post. The consent of all the interviewees were sought before participation and the data collected through a Sony audio recording device was immediately transcribed to ensure that expressions and nuances are not lost with time. This is necessary in order to gain an empirical knowledge and an understanding of

75 Mohajan H.K. "Qualitative Research Methodology in Social Sciences and Related Subjects" (2018) (7) Journal of Economic Development, Environment and People 23.

76 Wigwe C Legal Research Methodology and Practice (Princeton and Associates Publishing Company Limited 2019) 41.

77 Wigwe C Legal Research Methodology and Practice (Princeton and Associates Publishing Company Limited 2019) 41 – 42.

how the current regulatory mechanisms in the power sector (post-privatization) have impacted on market operation for the purpose of identifying areas for improvement.

The interview method is triggered by the dearth of academic work on the post-privatization era in the Nigeria power sector reform which is a developing sector as well as the challenges of getting up-to-date data of the power market. Since the research method is less structured in description because it formulates and builds on new theories rather than focus on statistical analysis and empirical calculation, it helps to explore the perspectives of participant by their observation through open-ended interviews[78]. The interview is a face to face interaction between the researcher and a respondent. Except in cases where questionnaires will be utilized, questions asked and issues addressed in interviews are fluid and take shape as the interview progresses within a period of about one hour to two hours with the consent of the interviewee. The data will be collected by an audio recording device to be immediately transcribed so that invisible information such as body language and expressions are not lost in the annals of time.

The interview yields rich data and new insights, it allows face to face interaction with major participants in the electricity market, allows in-depth conversation about subjects of the interview, and gives an opportunity to clarify thoughts and can capture both the affective and cognitive aspects of the interview. Qualitative data such as observation and questionnaire on the other hand helps create wider understanding of behavior and abundant data about real life, people, and situations.[79] The reliance on non-numerical primary data such as words makes the research well suited for providing factual and descriptive information. The method makes it easy for participants to contribute to shaping the research.

1.6 LIMITATIONS

The scope of this study is wide by design. It covers the relevant aspects of the Nigeria power sector reform taken into consideration the dynamism of the electricity market which covers generation, transmission, and distribution segments. The necessary interface of these segments requires frequent regulatory interventions which tend to

[78] Wigwe C Legal Research Methodology and Practice (Princeton and Associates Publishing Company Limited 2019)42.

[79] Wigwe C Legal Research Methodology and Practice (Princeton and Associates Publishing Company Limited 2019)46

increase the scope of research on a recurrent basis. It remains an arduous task in conducting an in-depth collation and analysis of all the regulatory interventions and government decisions affecting the ongoing reform across the sector. Another daunting task relates to the number of players whose role directly affects the reform. For instance, it would have been an easy task in monitoring the activities of the GENCOs and DISCOs directly from the regulator, but it does appear that the Ministry of Power as well as other government departments (System, Market Operator, Nigerian Bulk Electricity Trader) share this regulatory responsibility in some areas in market operations.

Furthermore, the study was conducted over several years. Therefore, the statistics, case law, legislation, policy documents, government decisions, events, regulations are up to date at the different timeframes indicated in the relevant references.

1.7 CHAPTER OUTLINE

This study consists of six chapters, which can be summarized as follows:

Chapter 1 introduces the problem statement, research questions, research objectives, literature review, methodology and limitations of this study.

Chapter 2 introduces the concepts that underlie this study, namely the concept and theories of regulations as a rationale for regulatory mechanism, the emergence and regulatory challenges of electricity utility companies, rationale for the adoption of the concept of regulation and regulatory mechanisms governing power sector reform in Nigeria and whether the regulatory mechanisms adopted in the privatized market best suits Nigeria's circumstances.

Chapter 3 introduces the history of electricity, sources of electricity and harnessing the sources, a summary of the history of electricity generation in Africa, history of electricity generation in Nigeria, electricity generation in the Colonial era, electricity generation in the post-independence era, and the regulatory regime of the pre-privatization era. The chapter then discusses the problems and challenges of the pre-privatization era and the rationale for reform.

Chapter 4 is an analysis of some regulatory mechanisms responses to market issues in the privatized market with specific focus on; (i) the value chain of the supply industry, the objective of the power market and rationale for regulatory mechanism intervention, (ii) Specific market situations, their impact and regulatory mechanisms responses in the distribution, transmission and generating segments of the market (iii) Analysis of some of the independent regulatory mechanisms solution to Gencos, TCN and Discos' constraints

Chapter 5 is an analysis of regulatory mechanism initiatives from selected electricity power markets. The power markets chosen for the generation and distribution segments of the electricity value chain were chosen because the regulatory mechanisms adopted for the different segments of their power market are largely contemporary and considerably efficient in stimulating the reform. The choice of the USA and Australia for the regulatory mechanism management of the transmission segment is largely due to the success attained from the use of Independent System Operator mechanism. How these power markets dealt with specific and similar challenges of the segments of the power market was analyzed while lessons and options were drawn out as potential alternatives for the Nigerian privatized market.

Chapter 6 provides a summary of findings made by the study, and makes recommendations regarding policy reformulation, necessary regulatory mechanisms for achieving the objectives of the policy and existing regulations. The study's contributions to law were identified and tied to different aspects of the study previously discussed.

CHAPTER 2

THEORIES AND CONCEPT OF REGULATION: A CONCEPTUAL FRAMEWORK OF ELECTRICITY REGULATION

2.1 INTRODUCTION

This chapter introduces the framework of concepts that underpins the study. It gives a general context of the evolution of regulation of electricity utility in developing countries. Through discussion of the ambit, limitation, and relevance to the Nigeria power sector of the identified theories of regulation, the study seeks to provide a rationale for the regulation of electricity utility in the Nigeria Electricity Sector Industry (NESI). The concept of natural monopoly helps to understand the policy shift from public ownership of government utility with natural monopoly status, to private ownership and the approach adopted for the reform of public enterprises in developing countries. It sets the prism through which the first three objectives of this study are considered.[80]

The discussion of the theories of regulation outlines each of the components and explains their utilitarian value for analyzing regulation of electricity utilities in relation to the regulatory mechanisms for the reform of the electricity sector in Nigeria. The factors leading to the emergence of electricity utility companies and regulatory challenges that confronted these companies in the course of history serve as a basis for understanding rationale for utility regulation. The study pointed out the oscillation between regulation and deregulation of the electricity sector in the U.S.A and the need for regulation which came about principally from abuses of market power by the vertically integrated companies with natural monopoly in the sector. This discussion sets the tone for the economic and institutional approach of the Nigerian government to the reform policy, regulatory design and post privatization electricity market challenges undertaken in Chapters 3 and 4 of the study.

The discussion uses the economic approach to regulation to explain natural monopoly as an incident of market failure to justify regulation in the electricity sector in Nigeria. This was pursued through different scholarly arguments regarding the desirability of regulation in the face of market failure and whether market failure alone can justify the intervention of regulatory control of the sector. The conclusion shows that market

[80] See objectives 1.3.1 – 1.3.3 in Chapter 1 above.

failure alone can justify government intervention as shown by the reform policy adopted by the Nigerian government for the electricity sector reform in Nigeria which required the unbundling of the government utility company to pave way for private sector participation (privatization) as a tool to increase electricity generation, transmission rehabilitation and expansion and effective distribution of electricity generated.

The discussion on the reform of public enterprises in developing countries is a direct fall out of the failure of government ownership of utilities. The reform is rooted in the concept of privatization driven by an efficiency goal and explains the switch in policy between public-owned enterprises to private ownership. It further lays the basis for the challenges of the post-privatized electricity market in Nigeria which is the focus of the study in Chapter 4. The experiences of the privatized electricity market in Nigeria question the efficiency goal of the concept of privatization of government utility adopted by the Nigerian government. It opens up a debate on the appropriateness of the regulatory mechanisms for the electricity market in Nigeria by the analysis of the experiences of other power markets in generation, transmission and distribution in Chapter 5 and the findings and recommendations made in this regard in Chapter 6. The discussion concludes that any regulatory mechanism adopted for resolving market issues and to stimulate the reform should be based on country specific situation and circumstances which should be well analyzed and articulated before implementation. It is also important for the purpose of improving performance and efficiency of the utilities for customer satisfaction.

2.2 REGULATION AND ITS THEORIES

2.2.1 Introduction

Defining regulation proves to be very difficult[81] which is why it is not surprising that it is conceded that regulation is not a term of art, and unfortunately it has acquired a bewildering variety of meanings. Sometimes it is used to indicate any form of behavioural control.[82] However, Adler made an attempt at defining regulation as nontax, noncriminal, and public law: legal directives (of some sort) that are issued by

81 Adler D.M (Blackwell Publishing Limited 2010) "Regulatory Theory in a Companion to Philosophy of Law and Legal Theory" https://0-onlinelibrary-wiley-com.oasis.unisa.ac.za/doi/pdf/10.1002/9781444320114 (Date of Use: 16 October 2018).

82 Ogus A.I "Regulation: Legal Form and Economic Theory" (Hart Publishing Oxford and Portland, Oregon 2004) 1.

governmental bodies; enforced by governmental bodies, rather than by private litigants that are principally enforced through sanctions or incentives other than criminal penalties.[83]

Also conceding to the expansive nature of regulation, Koop and Lodge state that since regulatory bodies have been established around the world, the language of regulation has become widespread in public and academic discourse and the effectiveness of different modes and tools of regulation has come under scrutiny, particularly in the context of financial crisis, environmental disasters and the safety of food and medicine but the question of what the main concept of regulation is remains unanswered as a result of the variations attributable to the differences in disciplinary concerns with lawyers, political scientists and economists and socio-legal scholars. Their findings suggest that there are shared conceptions of regulation across disciplines,[84] with research interests that are not discipline-specific driving the variation in conceptions and subsequently defined a shared concept of regulation.

According to Black's Law Dictionary, regulation is defined as the act or process of controlling by rule or restriction or a rule or order having legal force usually issued by an administrative agency.[85] Owing to the multi-disciplinary approach to the concept of regulation, it is difficult to provide a leading definition but the approach in this study is to consider regulation within the context of a system of organization as will be shown under the discussion on theories of regulation.

Given this multiplicity of forms of expression, regulation may, therefore, be viewed as essentially a socio-economic concept and, as such, can best be understood by reference to different systems of economic organization and the legal forms which maintain them[86] but before then we will consider the emergence of regulation.

2.2.2 Emergence of regulation of electricity utility

Tracking the emergence of regulation helps to understand how the various theories of regulation evolved. With technological advancement and growth in electricity generation and distribution came, challenges, just like in any other utility industry like

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83 Adler D.M (Blackwell Publishing Limited 2010) "Regulatory Theory in a Companion to Philosophy of Law and Legal Theory" https://0-onlinelibrary-wiley-com.oasis.unisa.ac.za/doi/pdf/10.1002/9781444320114 (Date of Use: 16 October 2018).

84 Koop C and Lodge M What is Regulation? An Interdisciplinary Concept Analysis" 2017 Regulation and Governance 95-96.

85 Black's Law Dictionary Eight Edition 1311.

86 Ogus A.I. "Rethinking Self-regulation" 1995 15(1) Oxford Journal of Legal Studies 97 – 108.

water, telephone and transport. In its beginning, at the end of the nineteenth century, electricity was an unregulated competitive industry. The industry, for the most part, consisted of investor-owned utilities (IOUs) that owned and operated the generation, transmission, and distribution. Later on, as the industry consolidated, government regulation was justified as a way to stem the abuses of market power exercised by vertically integrated utilities.[87]

The institutional perception of regulation can be traced back to the British common law during the seventeenth century. In the case of *De Portibus Maris*,[88] *Lord Chief Justice Hale* held that when private property was affected with the public interest, it ceased to be private property only, rather it must submit to whatever constraints society might impose on it. In effect, all of the essential elements of regulation were set forth by Hale, including the conflict between public and private interests, reasonableness of rates, adequacy of service and the authority of government to punish for noncompliance.[89]

Also in the landmark case of Munn vs. Illinois,[90] Chief Justice Waite took note of both the market power of grain elevator operators to set extortionist prices and the weak bargaining position of farmers. His decision reaffirmed Hale's concept of property affected with the public interest and emphasized the differences between public and private objectives as a rationale for regulation. This decision was given during a period of significant technological advancement; the railroads were America's first large industry, and the introduction of telephone and electricity was about to change the nation's lifestyle.[91]

The term 'regulation' at that time implied government control through its designated agencies, operating under established laws of the economic activities of individuals and associations of individuals who, within the framework of the legal structure act autonomously in the conduct of their economic affairs. Industry regulation further limits the term regulation to business organizations which are permitted to act autonomously.[92]

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87 A utility that owns all levels of supply chain: generation, transmission and distribution.

88 I Harg. Law Tracts 78.

89 Trebing H.M. "Regulation of Industry: An Institutionalist Approach" 1987 (21) Journal of Economic Issues (Evolutionary Economics II : Institutional Theory and Policy) 1709.

90 Munn v Illinois (1876) 94 U.S. 113.

91 Trebing H.M. "Regulation of Industry: An Institutionalist Approach" 1987 (21) Journal of Economic Issues (Evolutionary Economics II : Institutional Theory and Policy) 1709.

92 Pegrum D.F."Government Regulation of Industry (The Annals of the American Academy of Political and Social Science" 1939 (206) Government Expansion in the Economic Sphere 86.

The major imperfection of this period was natural monopoly which was considered as an industry in which production and consumption are concomitant, and investment was necessarily so large in proportion to income that direct competition in all phases of pricing and production was not possible. The electric industry is one of the best examples of this situation. From both the theoretical and practical points of view, regulation was the form of price control. Only one enterprise needs to be dealt with at any time, because customers have practically no choice. Monopoly was established by the simple device of allowing only one producer to serve a given area although many producers existed in the country all at the same time, but their monopoly was preserved by a limitation of the territory which any one can serve. The customer cannot disrupt this situation by receiving his supply from a producer which does not physically contact his locality.[93]

As the electric industry evolved worldwide, some countries adopted regulatory systems that best suited their situation. Others did blind adoption, copied established systems, and when traditional utility regulation appeared to have run its course following market distortions policymakers began to look at regulatory reform and deregulation. Financial institutions like the World Bank equally set their own regulatory standard as a condition precedent to obtaining loans and credit for electric industry projects. However, the underlying theories and principles behind the various regulatory decisions have been scholarly developed over the years by several scholars.

2.2.3 Theories of regulation

Considering the concept of regulation within the context of a system of economic organization, in industrialized societies, there is tension between the two systems of economic organization namely; the market system and the collectivists systems. In the market system, individuals and groups are left free, subject only to certain basic restraints, to pursue their own welfare goals without regulation playing any significant role. By contrast, in the collectivist system, the state seeks to direct or encourage behaviour which would not occur without such intervention. The aim is to correct

[93] Pegrum D.F. “Government Regulation of Industry (The Annals of the American Academy of Political and Social Science” 1939 (206) Government Expansion in the Economic Sphere 86 – 91.

perceived deficiencies in the market system in meeting collective or public interest goals.[94]

This explains the basis for the proposition that in the third world (emerging economies), the private sector has often been depicted as weak, prone to speculation and profiteering and likely to sell out national interests for personal profit, while state intervention has been deemed necessary to protect the public interest, especially the poor, from private greed, and to undertake what poorly-capitalized private interests could not, until an enlightened, nationalist and far-sighted entrepreneurial community emerged.[95]

The reason for identifying regulation with the collectivist system of economic regulation is that it provides a theory to explain and evaluate regulation.[96] There is an assumption, albeit not validated, that legislators and those responsible for the design of regulation have a desire to pursue collective goals and from these assumptions the public interest theory of regulation was developed. On the flip side, a skeptical attitude to the assumed collectivist approach by the legislators or those responsible for the design of regulation and a recognition that regulation benefits particular groups in society (not always those groups that it was designed to benefit) led to an alternative theory, private interest theory of regulation. Scholars subscribed to this theory, analyzed the way in which the political and law making processes can be used by private interest groups to secure for themselves regulatory benefits.[97] The theories are explained below.

2.2.3.1 Public interest theory and relevance to Nigeria power sector

This theory is grounded on the construction that the economic welfare of a state is measured by the allocative efficiency of her resources when put to their most valuable uses like providing adequate information,[98] competition and absence of externalities.[99]

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94 Ogus A Regulation: legal form and economic theory (Oregon: Hart Publishing Oxford and Portland 2004)1 – 2.

95 Jomo KS & Mahmood MA "Privatization and Public Sector Reform: the Political Economy of State Intervention (with comments)" 1994 (33) the Pakistan Development Review 648.

96 Ogus A *Regulation:* legal form and economic theory (Oregon: Hart Publishing Oxford and Portland 2004)3.

97 Ogus A Regulation: legal form and economic theory (Oregon: Hart Publishing Oxford and Portland 2004)3 – 4.

98 Economists argued that competitive markets can only function properly if consumers are sufficiently well informed to evaluate competing products.

99 Allocative efficiency will result only if decision-making in the production process takes account of external costs and benefits. Such cost arises from the effect of production and not necessarily incidental or inherent in the process of production.

An efficient outcome occurs when resources, goods, and services are allocated to their highest expected valued uses as measured by individual willingness to pay, assuming that the most productive existing technology is used. Economists work with two concepts of economic efficiency namely Pareto efficiency and Kaldor-Hicks efficiency.[100] Hertog describes public interest as the best possible allocation of scarce resources for individual and collective goods while he also appreciated that market mechanisms can be utilized to achieve allocation of resources but the suboptimal performance of these market mechanisms leads to government regulation.[101]

Posnar posits that the theory holds that regulation is supplied in response to the demand of the public for the correction of inefficient or inequitable market practices but also quickly pointed out its deficiencies as we shall soon highlight hereinafter.[102] Croley's critical assessment of the public interest theory equally provides a supportive argument that regulatory outcomes ameliorate market failures and vindicates the citizenry's interest but also pointed out several variations of the theory to show its limitations.[103] The central focus of the public interest theory as a basis for regulation is allocative efficiency of resources and so when market mechanisms such as competition and freedom of contract are found wanting, it may lead to market failure.[104] The concept of market failure in socio-economic context provides the basis for government intervention in the public interest to correct the inefficiencies stated above either by regulations or by private law associated with the market system.

Market failure incidents justifying regulation includes, monopolies and natural monopolies, windfall profits, public goods, externalities, information inadequacies, continuity and availability of service, anticompetitive behaviours and predatory pricing, unequal bargaining power, scarcity and rationing, rationalization and coordination. Some of these incidents shall be briefly discussed to draw out their relevance to the development of regulatory mechanisms in the Nigeria electricity market.

a. Monopolies and Natural Monopolies

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100 Veljanovski, C. Economic Approaches to Regulation. In Baldwin R., Cave M., and Lodge M. The Oxford Handbook of Regulation Oxford (Oxford University Press 2010)19.

101 Hertog J.D. "General Theories of Regulation" https://majandus.ut.ee/sites/default/files/mtk/dokumendid/e35f555bc5922cc21262fabfac7de2fc.pdf (Date of Use: 29 October 2018) 225.

102 Posnar R.A. "Theories of Economic Regulation" 1974 (5) The Bell Journal of Economic and Management Science 335.

103 Croley SP "Theories of Regulation: Incorporating the Administrative Process" 1998 (98) Columbia Law Review 66.

104 Private law is used in the context of market system where collective action is not required.

Monopoly is described as a situation in which one seller produces for the entire industry or market. The typical response to monopoly is the use of competition (or antitrust) laws so as to create a business environment that is conducive to competition but where a natural monopoly exists, the use of competition law may be undesirable.[105] The remedy for the latter lies not in competition rather, the monopoly is allowed to prevail, and some form of regulation (economic) is necessary to control those consequences.[106]

A natural monopoly occurs when economies of scale available in the production process are so large that the relevant market can be served at the least cost by a single firm.[107] The emphasis on regulation as a direct control of natural monopoly is because competition is not a viable regulatory mechanism under conditions of natural monopoly. Hence, it is said that direct controls are necessary to ensure satisfactory performance, controls over profits, specific rates, quality of service, extensions and abandonments of service and plant, even permission whether to enter the business at all. This set of controls has been applied mainly to gas, water, and electric power companies, where it is known as *public utility regulation*, and to providers of public transportation and telecommunications, where it is known as *common carrier regulation*.[108]

The electricity industry provides an excellent example of government regulation based on the political economic idea that the industry is characterized by natural monopoly and that electricity served the public interest.[109] Historically, government responds to natural monopoly, which is considered as a market imperfection, with price control mechanism; government controls prices that can be charged by utilities and profit that could be earned. The situation was not very different in the evolution of electricity regulation in Nigeria, the Nigerian government regulated the pricing and profit of the government owned utility in the pre-reform era.

The Nigerian government position was founded on the assumption that electricity is a social service to be assessed by all whether they can pay or not,

105 Baldwin R et al Understanding Regulation (Oxford University Press 2012)16.
106 Ogus A Regulation: legal form and economic theory (Oregon: Hart Publishing Oxford and Portland 2004)30.
107 Baldwin R et al Understanding Regulation (Oxford University Press 2012)16.
108 Posner R.A. “Natural Monopoly and Its Regulation” 1969 (21) Stanford Law Review 548.
109 Tomain JP “the Past and Future of Electricity Regulation” 2002 University of Cincinnati College of Law Scholarship and Publications Faculty Articles and Other Publications 444.

a position that led to some of the problems that confronted the government owned utility.[110] However, while the central theory of the power market reform is that a market-based pricing regulatory mechanism should be preferred over this traditional pricing regulatory mechanism of the natural monopoly, Nigerian government, through its regulator, has continued to utilize this traditional pricing regulatory mechanism in the post reform era. This approach is somewhat peculiar giving that the structure of the electricity market has shifted from a vertically integrated (government-owned utility) to unbundled (privately owned and government-owned) regulated utilities.

The justification for the continued use of price regulatory mechanism for a natural monopoly whose structure has shifted from vertical integration to an unbundled utility is also rooted in the public interest theory. While natural monopoly makes regulation necessary for electric utility giving that it is cheaper for a single firm to supply the market, an unbundled utility such as the Distribution Companies in Nigeria in the post-privatization era still hold dominant positions in their protected areas of service and are capable of exercising monopoly power. From this perspective, the Regulator's post-privatization pricing mechanism which has deterred cost-reflective tariff may be justified but inconsistent with the privatization contracts that allowed for cost-reflective tariffs provided the firms are able to reduce losses.

A principal manifestation of such dominant market position is predatory pricing. This occurs when a firm prices below costs, in the hope of driving competitors from the market, achieving a degree of domination, and then using its position to recover the costs of predation and increase profits at the expense of consumers. The aim for regulators is to sustain competition and protect consumers from the ill-effects of market domination by outlawing predatory or other forms of anti-competitive behavior.[111] Government regulation is also used to control entry into the market, control pricing and profit while allowing utility to cover its expenses and earn returns on its investment and to also impose service obligations.

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110 MacArthur Foundation from Genesis to date understanding the history and evolution of the Nigeria electricity supply industry (Power Nextier Advisory, investment and services Vol. 1 issue 1 05 July 2017) 47

111 Baldwin R et al Understanding Regulation (Oxford University Press 2012) 19-20.

Price regulation of a natural monopoly such as an electric utility can be seen as a protection of electricity consumer from the dominant position of the utility (with no competition) that can set a rate beyond the reach of an average consumer and can also accommodate other interests other than public interest as the study shall show under the private interest group theory.

b. Public Goods

Another reason for market failure arises in relation to public goods. Public good is a commodity the benefit from which is shared by the public as a whole, or by some group within it. It combines two characteristics, first, consumption by one person does not leave less for others to consume; and, secondly, it is impossible or too costly for the supplier to exclude those who do not pay from the benefit.[112] For example, security and defense services may bring shared benefits and be generally desired. It may, however, be very costly for those paying for such services to prevent non-payers (free-riders) from enjoying the benefits of those services. As a result, the market may fail to encourage the production of such commodities, and regulation may be required often to overcome the free-rider problem by imposing taxes.[113] Politically, electricity is considered as a public good and so it is desirable on the ground of public policy, to regulate electric utility.[114]

c. Continuity and Availability of Service

In some circumstances, the market may not provide the socially desired levels of continuity and availability of service. Where cyclical (passenger air transport to a holiday island) waste may occur as firms go through the processes of closing and reopening operations. Regulation may be used to sustain services through troughs for example, by setting minimum prices at levels allowing the covering of fixed costs through lean periods. In the unregulated market, competition may lead to 'cream-skimming', the process in which the producer chooses to supply only the most profitable customers while services may be withdrawn from poorer customers or services may be geographical by dispersed groupings of customers. Regulation may be justified in order to

112 Ogus A Regulation: legal form and economic theory (Oregon: Hart Publishing Oxford and Portland 2004)33.

113 Baldwin R et al Understanding Regulation (Oxford University Press 2012)20.

114 Tomain JP "the Past and Future of Electricity Regulation" 2002 University of Cincinnati College of Law Scholarship and Publications Faculty Articles and Other Publications 446.

produce socially desirable results, even though the cross subsidizations applied may be criticized as inefficient and unfair.[115]

The execution of service level agreement/Performance Obligations between the Regulator and the Nigerian Government is designed to ensure availability and continuous service delivery, while regulatory mechanisms such as Load Allocation methodology and the Grid code are designed to ensure even distribution of power across the country. Without entry regulation, it is economically doubtful if suppliers of electricity (with capital intensive nature) will expand into rural or if they expand, they will charge reasonable prices given the incomes of the rural dwellers.[116]

d. Scarcity and Rationing

Acute and sudden shortages in the supply of commodities for which demand is inelastic, that is, for which individuals will not readily be able to find satisfactory alternatives, has often led to calls for regulation, typically in the form of rationing.[117] Regulatory rather than market mechanisms may be justified in order to allocate certain commodities when these are in short supply. In a petrol shortage, public interest objectives may take precedence over efficiency so that, instead of using pricing as an allocative instrument, the petrol is allocated with reference to democratically generated lists of priorities.[118] Because electricity generation is generally insufficient to meet demand in Nigeria, several regulatory mechanisms such as Generation Dispatch and Frequency Control Procedure, Grid code, Load Allocation mechanisms are designed by the Regulator to ensure that the insufficient production of electricity is properly rationed amongst the diverse consumers in the country.

In some situations, it is extremely expensive for individuals to negotiate private contracts so as to organize behavior or industries in an efficient manner, regulation may be justified as a means of rationalizing production processes (standardizing equipment) and in order to coordinate the market. Centralized regulation holds the advantage over individual private law arrangements, where

115 Baldwin R et al Understanding Regulation (Oxford University Press 2012) 19.
116 Joskow P.L. Regulation of Natural Monopolies in Handbook on Law and Economics (A. Mitchell Polinsky & Steven Shavell 2007) 45.
117 Ogus A Regulation: legal form and economic theory (Oregon: Hart Publishing Oxford and Portland 2004) 42 – 43.
118 Baldwin R et al Understanding Regulation (Oxford University Press 2012) 20 – 21.

information can be more efficiently communicated through public channels and economies of scale can be achieved by having one public agency responsible for upholding standards.[119]

2.2.3.2 Limitation of public interest theory

The public interest theory recognizes that natural monopoly and any other market imperfection must be controlled to achieve efficiency in terms of service delivery and reliability in the interest of the public. However, regulation may be inspired by a desire, which is quite distinct from efficiency goal, to achieve a 'fair' or 'just' distribution of resources.[120] There may be the need to aim for other objectives such as procedural fairness or redistribution, at the expense of economic efficiency. In this instance, where there is conflict between efficiency and equity, it may be impossible to establish the public interest as a basis for regulation.[121] Such conflicts has been argued by Hertog to exist in situations where regulators mandate universal service obligations for public utilities, cross-subsidies for certain consumer groups, the prohibition to use price discrimination, minimum wage legislation or rent control, generally, the protection of disadvantaged groups. In these situations, it is difficult to evaluate efficiency and dimensions of justice because evaluation standards are absent.[122]

The public interest theory also failed to accommodate the inherent constraints of a political decision-making process which comprises of various participants who may have their own objectives to advance. In such situation, it is difficult to see legislative actions as an instrument to advance economic welfare. Guasch and Hahn's argument that political problems with regulation leads to inefficient economic results supports this position. It was argued that since regulation redistribute resources and rents, politicians often use it to secure political gains rather than to correct market failures. Regulatory instruments such as quotas, licenses, and subsidies, may be used to transfer significant amounts of wealth from consumers to small groups of producers. An example of this was seen in the U.S. peanut market where a small group benefitted from regulation at the cost of a large group using the peanut-quota system that limited

119 Baldwin R et al Understanding Regulation (Oxford University Press 2012) 21.

120 Ogus A Regulation: legal form and economic theory (Oregon: Hart Publishing Oxford and Portland 2004) 46.

121 Hertog J.D. "Review of economic theories of regulation" http://www.uu.nl/rebo/economie/discussionpapers (Date of use: 22 June 2022) 20.

122 Hertog J.D. "Review of economic theories of regulation" http://www.uu.nl/rebo/economie/discussionpapers (Date of use: 22 June 2022) 20.

the number of farmers who can sell peanuts in the United States and thereby leading to a minimum selling price which was 50% higher than the world price.[123]

While it is easy to identify the market failure of the electricity industry in Nigeria in the pre-reform era (pre-1999) as the inefficiency of the state-owned utility enterprise (Nigeria Electric Power Authority), much of the argument or justification for a reform based on the efficiency goal to be driven by private sector participation has been defeated by the result in the post reform era (as shown in Chapter 4 of the study). The result somewhat begs the questions whether regulatory intervention of the state-owned enterprise by keeping public ownership or a shift to private participation will improve the performance of the sector. For example, the price regulation mechanism of the regulator in the post reform era in Nigeria has been criticized by Posnar as having a harmful effect considering that the determination of cost of service of the utilities is fraught with uncertainties. The regulator may overestimate the utility's revenue requirements, it may prevent the utility from fixing a level of prices that covers its costs, it may underestimate the cost of capital, it may improperly disallow a claimed item of expense and thereby impair the utility's ability to finance needed plant expansions. It was argued that these errors can distort the allocation of resources.[124]

However, starting in the 1950s and 1960s, economic analysis of regulated industries showed more and more evidence that government regulatory policies did not seem to operate with goals of efficiency in mind, nor did they seem concerned with goals of income distribution in the traditional public-interest sense of achieving a more equitable distribution of income. This led to the development of new schools of thought regarding motivations for public regulation, ones which attributed self-interested rationality to regulators and to all players in the regulatory game and which tried to explain existing regulation as a rational outcome of the economic and political processes undertaken in that period in the United States.[125]

2.2.3.3 Private interest group theory and relevance to Nigeria power sector

The theory extends the scope of regulation to a wide range of matters which are the subject of general or sectional interests, regardless of whether there is any element of

123 Guasch J.L and Hahn R.W. "The Costs and Benefits of Regulation: Some Implications for Developing Countries" https://elibrary.worldbank.org/doi/abs/10.1596/1813-9450-1773 (Date of use: 22 June 2022) 3 – 4.

124 Posnar R.A."Natural Monopoly and Its Regulation" 1969 (3) Stanford Law Review 604.

125 Keeler T.E. "Theories of Regulation and the Deregulation Movement" 1984 (4) Public Choice Carnegie Papers on Political Economy 103 – 104.

market failure or not since economist began to identify regulations that had little to do with correcting market failure. Indeed, in the US there was much talk of crisis as regulators were captured and favoured by the industry they regulated promoting producer interests than the consumers' interest.[126] The theory holds that government regulates at the behest of, and for the benefit of, the regulated industry rather than for the public and that government regulation enabled industry expansion and growth for the direct economic benefit of privately owned utilities.[127] From the Marxist's perspective, the theory also holds that economic regulation is not about public interest but a process by which interest groups seek to promote their (private) interests, and that regulation takes several distinct forms. The perspective postulates that capitalists control the institution of the society to influence a great deal of regulations that serve private interest.[128]

Taking a more restrictive approach, political scientist formulated the theory that regulatory agencies over time dominate the industries regulated and influence legislation. This theory's approach to regulation, stresses the extent to which regulatory developments are driven not by the pursuit of public interest but by the particularistic concerns of interest groups.[129] Stigler's proposition of the theory is that regulation is a product, like any other product, existing in a market place that can be acquired by business firms to serve their private interests and create barriers to entry for potential competitors.[130]

Ogus' explained the basis for this theory by challenging the acceptance of the public interest theory as the orthodoxy by lawyers and came to the conclusion that the regulatory systems either did not succeed in achieving their ostensible aim (normally the correction of market failure) or did so inefficiently which gave rise to misallocations in other sectors of the economy; or that the administrative costs of the corrective

126 Veljanovski, C. 2010 Economic Approaches to Regulation in Baldwin R., Cave M., and Lodge M. The Oxford Handbook of Regulation Oxford (Oxford University Press 2010) 24.

127 Tomain JP "the Past and Future of Electricity Regulation" 2002 University of Cincinnati College of Law Scholarship and Publications Faculty Articles and Other Publications 446.

128 Posner R.A. "Theories of Economic Regulation" 1974 (5) The Bell Journal of Economics and Management Science 341.

129 Baldwin R et al Understanding Regulation (Oxford University Press 2012) 43.

130 Carrigan C and Coglianese C. "Capturing Regulatory Reality: Stigler's The Theory of Economic Regulation" 2016 University of Pennsylvania Law School Penn Law: Legal Scholarship Repository Faculty Scholarship 1.

measures exceeded the social benefits which they generated. The regulatory failure of this period attracted the notion of 'capture' by the regulated.[131]

In the US for example, the growing evidence of regulatory capture led some economists to incorporate the political process into their analysis. At the core of these positive theories is the assumption that the participants in the regulatory process, politicians, bureaucrats, special interest groups, regulators are all subject to the same self-regarding goals as are assumed to exist in markets, but subject to different constraints.[132] Baldwin et al explained this assumption to be that actors are inherently self-regarding and orientated at maximizing their own (material) interest and that the theory assumes that all parties are as well informed as possible and learn from experience; and it also assumes that regulation is costless (hence overall efficiency will not be affected by levels of regulation).[133]

Stigler whose central hypothesis was that regulation was secured by politically effective interest groups, invariably producers or sections of the regulated industry, rather than consumers,[134] also suggested that as a rule, regulation is acquired by the industry and is designed and operated primarily for its benefit.[135]

The benefits of regulation for a branch of industry are obvious. The government can grant subsidies or ban the entry of competitors to the branch directly so that the level of prices rises. In the second place, the government can maintain minimum prices more easily than a cartel. In the third place, the government can suppress the use of substitutes and support complements. An example of the third approach is the subsidizing of airports for the benefits of airlines. A demand will therefore arise on the one hand for government regulation. The political decision-making process on the other hand makes it possible for branches of industry to exploit politics for its own ends. In the political decision-making process, interest groups will exercise political influence, as opposed to individuals. Individuals will not participate because forming an opinion about political questions is expensive in terms of time, energy and money, while the benefits in terms of political influence will be negligible. A representative

131 Ogus A Regulation: legal form and economic theory (Oregon: Hart Publishing Oxford and Portland 2004) 55- 57.

132 Veljanovski, C. Economic Approaches to Regulation in Baldwin R., Cave M., and Lodge M. The Oxford Handbook of Regulation Oxford: Oxford University Press 2010) 25.

133 Baldwin R et al Understanding Regulation (Oxford University Press 2012)43.

134 Veljanovski, C. Economic Approaches to Regulation in Baldwin R., Cave M., and Lodge M. The Oxford Handbook of regulation. Oxford: Oxford University Press 2010) 25.

135 Baldwin R et al Understanding Regulation (Oxford University Press 2012)43.

democracy would more readily honour the strongly felt preferences of majorities and minorities than the less passionately expressed preferences.[136]

While the public interest theory is used to explain the rationale for kick starting the reform of the Nigeria power sector, since concerns raised over the political influence of the investors that purchased the government assets have not been empirically established, the study's focus on different aspects of the privatization program and strategies adopted may be indicative of an effort to secure the investors' private interest over that of the consumers. For example, the establishment of Nigeria Electricity Management Company (NELMC) and Nigeria Bulk Electricity Trading Company (NBET) for the purposes of absorbing existing liabilities of the unbundled government assets before sale and to buy bulk power from the Generating Companies after sale respectively were designed to protect and secure investors' confidence. However, regulatory outcomes identified in the post-reform era of the electricity market in Nigeria do not suggest that the political decision making process leading to the sale of the firms/assets were politically motivated to suit the interest of the investors as shown in Chapter 4 of the study.

A critical aspect of the post-reform era is the regulatory decision to keep electricity tariff below cost reflective level. While it may be argued that such decision was made in the public interest, the outcome as seen in the financial crisis of the electricity market has further aggravated the inefficiency of the utilities. The alternative to the underlining theory as a way of explaining such decision is to associate same with the interest of the government in power not to lose its popularity amongst the electorates by allowing an increase in tariff with its attendant economic challenges. In any event, the assumption that the regulator has been captured was criticized by Peltzman, in extending Stigler's analysis, by postulating that regulators face both consumer and industry demands for regulation and showed formally that a rational regulator will respond not by entirely delivering what a monolithic industry wants to the exclusion of other but by seeking an outcome that optimizes political support from all groups interested in regulation.[137]

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136 Hertog J.D. "General Theories of Regulation" online: https://majandus.ut.ee/sites/default/files/mtk/dokumendid/e35f555bc5922cc21262fabfac7de2fc.pdf (Date of Use: 29 October 2018) 236 - 237.

137 Carrigan C. & Coglianese C. "Capturing Regulatory Reality: Stigler's Theory of Economic Regulation" (7 April 2016) online: https://scholarship.law.upenn.edu/cgi/viewcontent.cgi?article=2651&context=faculty_scholarship (Date of Use: 2 November 2018).

This theory gives a different perspective to understanding some post-privatization regulatory mechanisms adopted in the Nigeria electricity supply industry. While it is difficult to ascertain if when such mechanisms are to the benefit of a particular participant in the industry, then it will necessarily follow that there is regulatory capture, it is certainly inconceivable to attempt to make such justification or proposition in drawing conclusions. For example, the cost reflective tariff issue which is largely to the benefit of the consumer cannot be interpreted or extrapolated to mean that the consumer interest dominates the industry.[138]

2.2.3.4 Limitation of the private interest group theory

On the whole, the private interest group theory has been criticized on the ground that it is fraught with several weaknesses one of which is the theory that regulation is explained as an efficient mechanism to redistribute wealth to the more efficient interest groups. Regulation is always associated with redistribution of wealth. It involves costs and benefits for the different actors involved, such as the lobbying industries, consumer groups, bureaucrats, legislators, regulators, workers, taxpayers and more but by establishing who derives the benefits and who carries the cost, it has not been established that these costs and benefits actually drive regulation. There is also the argument that society concerned with the ability of interest groups to obtain favourable legislation, would establish institutions that promote the public interest. Many institutions and features of public policy, such as the independent judiciary or the constitutionally required payment of compensation in eminent domain cases, are more plausibly explained by a reference to a broad social interest in efficiency than by reference to the designs of narrow interest groups.[139]

One of the criticisms of Stigler's theory came from Posner who observed that in many cases, regulation strongly advantaged certain consumer groups. For instance, uniform prices were prescribed for such things as rail transport, the supply of gas, water and electricity, telecommunications, traffic, and mail distribution. In Nigeria, the post-privatization discussion about keeping tariff below cost reflective level supported by government subsidies is to the advantage of the consumers regardless of whether the costs of the services supplied differ considerably between consumer groups depending on their geographical spread among other factors. Other examples are the

138 The focus of Chapters 4 and 5 of the study.

139 Hertog J.D. "Review of Economic Theories of Regulation" (December 2010) online: https://www.uu.nl/sites/default/files/rebo_use_dp_2010_10-18.pdf (Date of use: 2 November, 2018) 29.

supply of drinking water to households, schools, and fire services, either free of charge or at a price lower than the marginal costs; free rail travel for government workers and military personnel; the supply of electricity to hospitals at less than marginal costs and so on. This phenomenon of internal or cross-subsidization does not fit in with Stigler's theory of regulation.[140]

Related to the above criticism is the fact that Stigler's theory also suffered from the assumption that regulatory officials are subject to only a narrow range of self-interested motivations, an assumption that makes generating predictions more tractable. It is sometimes suggested that government officials are motivated by more than their private gain, they may be called to public service by an underlying belief in the mission of an agency or a desire to pursue policies for the greater good. Public-interested regulators might even display outward behaviour that sometimes looks like capture. For example, if an agency observes through repeated interactions with certain firms that these businesses faithfully adhere to existing rules, it might sensibly choose to hold firms to lower levels of regulatory scrutiny relative to newcomers to the industry, focusing more attention on those with which they have less experience could be a sensible way for public-interested regulators to deploy scarce resources, but an unsophisticated political economic analysis might well associate such behaviour with industry influence.[141]

Another ground is that the interest group theory assumes that interest group determines the outcomes of elections, that legislators honour unimpaired the wishes of the interest groups and that legislators are able to control regulators but missed out some elements like: the motivation and behaviour of the various political actors, such as voters, congressmen, legislators, government workers and agencies; the interactions between the various actors in the regulation process; the mechanisms through which legislators and regulators serve the interests of the organized industries. The assumption in the theory is that the operation of the political process of legislation and the administrative process of regulation has hardly any independent

140 Hertog J.D. "General Theories of Regulation" online: https://majandus.ut.ee/sites/default/files/mtk/dokumendid/e35f555bc5922cc21262fabfac7de2fc.pdf (Date of use: 29 October 2018) 237 - 238.

141 Carrigan C. & Coglianese C. "Capturing Regulatory Reality: Stigler's Theory of Economic Regulation" (7 April 2016) online: https://scholarship.law.upenn.edu/cgi/viewcontent.cgi?article=2651&context=faculty_scholarship (Date of Use: 2 November 2018) 7 – 8.

influence on the pattern and form of regulation.[142] In fact, Stigler made little effort to distinguish between legislators and bureaucrats in his work. He glossed over the fact that legislators and bureaucrats in regulatory agencies face different institutional environments with different incentives with bureaucrats being affected by what legislators do.[143]

2.2.3.5 Institutional theory of regulation and relevance to Nigeria power sector

While the traditional approach to regulation analyzed the cost and effects of regulation from an efficiency perspective, it offers no explanation of the process by which these regulations are created and evolved. *Reynolds* stated the problem to be the general preference by economists to restrict their analysis to efficiency criteria, but by ignoring the equity choices made by individuals and society in the political processes, they are making a normative judgment to disregard some of the preferences of individuals and society. He posited that a theory of regulation should encompass more than just the neoclassical (traditional approach) concept of efficiency; it must consider the institutional framework of society, which includes, among other things, ethics and values.[144]

The institutional theory of regulation is the consideration of the political institutions of regulation, the interaction among these institutions, transaction costs, regulatory commitment and the maximization of utility principle. It presupposes that regulatory performance is dependent on the regulatory institutional structure, which can provide a credible commitment against government opportunism and the potential threats from third party opportunisms, and also reduce transaction cost.[145] Institutional theorists agree on the notion that institutional structure and arrangements, as well as social processes, significantly shape regulation. In other words, there are more driving regulatory developments than mere aggregations of individual preferences as against the interest group theory proposition.[146] Several components of the definitions were

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142 Hertog J.D. “Review of Economic Theories of Regulation” (December 2010) online: https://www.uu.nl/sites/default/files/rebo_use_dp_2010_10-18.pdf (Date of use: 2 November, 2018) 30.

143 Carrigan C. & Coglianese C. “Capturing Regulatory Reality: Stigler’s Theory of Economic Regulation” (7 April 2016) online: https://scholarship.law.upenn.edu/cgi/viewcontent.cgi?article=2651&context=faculty_scholarship (Date of Use: 2 November 2018) 7.

144 Reynolds L “Foundations of an Institutional Theory of Regulation” 1981 (15) Journal of Economic Issues 642 – 643.

145 Cetin T “Toward an institutional theory of regulation” 2011 SSRN Electronic Journal 8.

146 Baldwin R et al Understanding Regulation (Oxford University Press 2012) 53.

highlighted as the influence of organizational rule and social setting on regulation, principal-agent issues and problems of democratic control of implementation, institutional design as shaped by characteristics of political setting, institutional processes leading to self-destruction and regulatory authority diffused between and across public and private organizations.[147]

These institutional structures and arrangements differ in various jurisdictions and have impact on regulations. Rather than create a separate definition of the theory, Ogus focused on the extent to which the institutional arrangements can assist the implementation of the public interest goals of regulation, the extent to which they offer protection against the subversion of the law to meet the demands of private interest, how self-regulatory agency may be more suitable than a public independent agency on the ground of public interest and the accountability of regulators.[148]

The reason for the variation in institutional arrangement is based on circumstances that are specific to each country. Ogus gave the instance of the United Kingdom assent to the European Community, a system under which EC Law was to have supremacy, a situation which threw up the question of where the regulatory rule-making source should be. Ogus also argued that private interests may have an important impact on decisions about whether to regulate at Community or national level.[149] Other countries do not necessarily have such dichotomy in their arrangements.

Notwithstanding the disparity in institutional arrangements, Cetin used the doctrine of separation of powers between the legislature, executive and judiciary to explain regulation as the outcome of the interaction between these arms of power. The legislature is the principal player of regulation, which decides government policies regarding regulations, deregulation, privatisation and competition in the markets.[150] Using the British pattern, Ogus stated that regulatory policy is formulated by the government; legislative principles incorporating the policy are passed by the parliament;[151] to flesh out the principles, powers are conferred on a Minister to promulgate rules, generally by means of a statutory instrument; those rules are subject

147 Baldwin R et al Understanding Regulation (Oxford University Press 2012) 67

148 Ogus A Regulation: legal form and economic theory (Oregon: Hart Publishing Oxford and Portland 2004) 99.

149 Ogus A Regulation: legal form and economic theory (Oregon: Hart Publishing Oxford and Portland 2004)99 – 103.

150 Cetin T. "Toward an Institutional Theory of Regulation" 2011 SSRN Electronic Journal 12.

151 In Nigeria, the executive formulates the policies before such is incorporated in a legislative instrument by the legislature.

to enforcement by a specialized agency; the courts are responsible for the adjudication of disputes and the imposition of sanctions.[152]

Of course, Ogus was quick to add that there are vast differences between the various regimes, and that institutional structures change over time as the nature of regulation itself evolves. For instance, in Nigeria, the executive is saddled with the formulation of government policies; the legislature enacts laws on the basis of the government policies while the judiciary interprets the laws. Other government agencies including regulatory and enforcement agencies are directly under the control of the executive but all subject to the adjudicatory powers of the Judiciary.[153]

The impact of the variability of the institutional arrangements on regulation could be seen in transaction cost and regulatory commitments. Transaction costs are the costs of transacting in the market namely; search costs, bargaining costs and enforcement costs and in a regulatory process, they are the costs of operating a contractual process and of enforcing regulation. When there exist hostile, many unfamiliar parties, unique good or service, unreasonable behavior, numerous contingencies, high costs of monitoring and costly punishments within an institutional design, transaction cost is said to be positive and regulatory contracts become incomplete which leads to coordination problem. On the other hand, when the institutional design encourages coordination among institutions, the transaction costs of regulation will be low and regulation becomes efficient and adaptable.[154]

In addition to reducing transaction costs, an institutional design of regulation should ensure a credible regulatory commitment which is crucial for investment particularly for high fixed and sunk costs (electric utility). The credible commitment problem refers to any human exchange in which a promise regarding behaviour in the future is potentially open for renegotiation. For example, if a country seeks to attract private investors, then it needs to signal a good regulatory environment. If such an investment has high asset specificity (high fixed assets), then it is costly to exit from the business if the government reneges on promises regarding the regulatory approach that it will adopt.

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152 Ogus A Regulation: legal form and economic theory (Oregon: Hart Publishing Oxford and Portland 2004)104.

153 Constitution of the Federal Republic of Nigeria (as amended) of 1999.

154 Cetin T. “Toward an Institutional Theory of Regulation” 2011 SSRN Electronic Journal 9 – 10.

In other words, if there is a threat that government or regulators will turn interventionist or impose social or environmental standards, then private investors will reduce their willingness to invest. The credible commitment problem is about the likelihood that particular regulatory settlements will continue over time (especially in the light of changes in government). The institutional design literature suggests that the more potential a political system provides for unchecked political behavior, the greater the credible commitment problem, therefore, the more important it is to make regulatory devices irreversible or prohibitively expensive to reverse.[155]

2.2.3.6 Limitation of the institutional theory of regulation

Recognizing the impact an institutional design of regulation may have on reform of utility, the World bank in revising its role in supporting electric reform stated amongst other things; overall weak country institutions, lack of adequate legal framework, damaging discretionary interventions by governments, uncertain and variable policy frameworks and a closed command-and-control decision making process without adequate checks and balances.[156] The Bank in its policy document which is considered among the earliest articulations of the approach to power sector reform for developing countries[157] eventually suggested a range of country and regional situations and came up with a general set of recommendations grouped under five principles[158] including transparent regulation to encourage good institutional designs, as a condition to financial support.

However, post-privatization implementation challenges of the reform institutional design in the Nigeria power sector (Chapter 4 of the study) has shown that there cannot be an all-purpose or harmonized solution to institutional weakness for electricity reform without adapting to suit country specific situations. For example, the Independent Regulatory Agency structure provided by the reform design which is required to possess the expertise and technical knowledge that the legislature provided in the enabling law is not immune from interest group lobbying directly from the legislature regarding certain investment decision of the transmission segment of the power sector. This is essentially due to the inherent oversight function allowed by

155 Baldwin R et al Understanding Regulation (Oxford University Press 2012)56.

156 World Bank the World Bank's Role in the Electric Power Sector (World Bank Policy Paper World Bank Washington DC 1993) 33.

157 Gratwick KN and Eberhard "A Demise of the Standard Model for Power Sector Reform and the Emergence of Hybrid Power Markets" 2008 (36) Energy Policy 3951.

158 World Bank the World Bank's Role in the Electric Power Sector (World Bank Policy Paper World Bank Washington DC 1993) 14 – 18.

the political structure of the country. By virtue of the Nigerian Constitution, while the primary legislation gives the regulator it full rule-making powers and subject its control (in some cases) to the authority of the minister (if applicable), the legislator has still retains limited control over it when exercising its oversight function.[159]

Arising from the above, there is the need to explore a hybrid of these theories to support the reform process through sound regulatory mechanisms that are suitable and easily implementable in the Nigerian context.

2.2.3.7 Hybrid theory of regulation and relevance to Nigeria power sector

The diversity of the post-privatized issues in Nigeria more than underscores the need to view and consider options that draw from a variety of elements of theories of regulation crystallizing into a hybrid theory. The core elements of the three established theories of regulations, whose literatures inform the other, were drawn from to advance the fundamental knowledge of any regulatory mechanism that can address the issues of the privatized power market in Nigeria. This is so because, different elements of the three identified theories help the understanding of salient issues of the post-privatized market in a broader perspective that will shape the study's recommendations. It will equally serve as a pedestal for a more robust academic research on why certain power markets built on the efficiency model of the public interest theory declines after the reform exercise. Therefore, creating a hybrid of these theories will help put the issues and challenges of the Nigerian post-privatized power market in proper perspective.

The hybrid theory views regulation as a necessary impetus to guarantee efficiency that is otherwise absent in the market regardless of whose interest such regulation is made to serve, and also taking into consideration the peculiarity of the regulatory environment which is fundamental for critical investment and development. In other words, if efficiency is regarded as the ultimate goal, a pluralistic approach to regulation must be factored into the consideration of any intervention that may ensue. Such intervention must take into consideration certain elements namely; (i) phased efficiency goal, (ii) the benefits and interests of the drivers of the efficiency goal

[159] Section 88 of the 1999 Constitution of the Federal Republic of Nigeria provides that each House of National Assembly shall have power by resolution published in its journal or in the Official Gazette of the Government of the Federation to direct or cause to be directed an investigation into (a) any matter or thing with respect to which it has power to make laws; and (b) the conduct of affairs of any person, authority, ministry or government department charged, or intended to be charged, with the duty of or responsibility for (i) executing or administering laws enacted by the National Assembly, and (ii) disbursing or administering moneys appropriated or to be appropriated by the National Assembly.

(producer, government or consumer) (iii) reform of institutional arrangements to reduce transaction cost and increase credible commitment (iv) contextualized applicability.

Therefore, the hybrid theory of regulation seeks to explain the established guiding principles of regulation such as the efficiency goal, the interest of participants in regulatory process, and institutional arrangements in a regulatory environment with a view to making regulation more adaptive and plaint for any given regulatory environment.

2.2.3.8 Applicability of hybrid theory to Nigeria power sector reform

The core elements of this theory shall be discussed in the light of the current realities of the Nigeria power sector reform in order to create an appreciable understanding of their relevance to the study.

(a) A phased efficiency goal is critical for measuring the progress of any given reform as well as ensuring that infrastructural development is undertaken within the context of economic realities of each country. It is not just enough to seek a holistic improvement of utility and committing resources to bridge infrastructural deficits without a planned and organized development towards efficiency. A post-privatized study carried out by Siemens shows a misaligned capacity along the value chain, more energy is being generated with lesser wheeling and distribution capacity along the value chain. It is obvious that any increase in generation will be constrained by transmission capacity limitation (which includes reliability issues). Likewise, any increase in transmission capacity will be constrained by distribution capacity limitation.[160] An alternative would have been to commence a series of measured reform by which transmission and distribution capacity is increased before increasing generation capacity.

(b) The benefits and interests of the drivers of the efficiency goal (producer, government, or consumer) is an important factor in regulation. While it may be useful for secondary consideration, that any regulatory mechanism is not self-motivated and skewed in favour of any interest group, the primary aim ought to

160 Siemens “Electrification roadmap for Nigeria technical and commercial proposal” (7 May 2019) https://powerlibrary.nigeriaelectricityhub.com/index.php/2019/09/23/nigeria-electrification-roadmap-2019/ (Date of use: 16 April 2020) 8

be efficiency. In other words, post-privatization experience in the Nigerian power sector has shown that regulatory intervention that constantly seek to protect the consumer interest such as the tariff orders may be counter-productive for the market. The raging debate around cost-reflective tariff has been the focal point of the distribution companies' inability to improve on service delivery.

(c) The implementation of any regulatory mechanism within a reform is largely dependent on the interaction between the political institutions of the reform country. Factors such as quality of political institutions, government credibility, judicial sector reliability, contract enforcement and administrative competence can influence regulatory process and outcome in a reform sector. An example of how the political context of a country can influence regulatory outcome is seen in the political behavior of some members of the National Assembly (the legislative arm of the Federal Government responsible for law-making and oversight executive functions) in Nigeria. This section of the political class leverages on its' budgetary allocation powers to lobby the Transmission Company of Nigeria for execution of transmission expansion projects in areas that have little or no economic value for the Distribution companies' area of priority need for energy or with limited need for energy completely neglecting the technical efficiency of these projects for the power value chain.[161]

(d) Contextualizing the applicability of any theory is more likely to induce positive regulatory outcomes than adopting a monolithic approach to regulatory intervention. The poor reform outcomes in chapter 4 of the study are attributable to several factors which require an in-depth understanding of the reform environment. The hybrid theory explores the degree of government constraints in terms of economic, political, and socio-cultural strength as a limiting factor for infrastructural growth. For example, there may be need for a middle ground approach to tariff setting in the Nigeria power sector giving that the commercial suitability of a cost-reflective tariff may not bode well for any political administration for fear of backlash from electorates.

The economic reality of a reform country constitutes a fundamental aspect of how implementable government regulation can be particularly in the

[161] Transcript of interview with Nigeria Electricity Regulatory Commission, Market Rate and Competition unit NERC Office, Abuja (6 December 2019) 10 – 11.

implementation of regulatory mechanisms to stimulate reforms. Eberhard's used the hybrid and transitional regulatory models to incorporate varying degrees of regulatory discretions that best fit the local country context of regulation in terms of commitment, institutional and human resource capacity, to support the argument for contextualized applicability regardless of the appropriateness of any independent regulation.[162] Therefore, looking inward for more practical solution by critically assessing the regulatory environment and how best a regulation can fit with the local context should take a paramount place in the birth of any regulation.

Peltzman's hypothesis that regulation will tend to dampen swings in commodity prices, protecting consumers against severe price increases and producers against economic downturns; distribute public goods across various interest groups according to marginal utility, rather than awarding them to a single winning group, tends toward average cost prices, causing low-cost customers to subsidize high-cost customers,[163] supports the hybrid theory. This theory uses the overlapping aspects of the identified theories of regulation to understand the key regulatory and policy issues in the operation of the value chain of the Nigerian energy market and also provide other perspectives such as economic and political reality of a reform environment for ensuring positive outcome.

2.2.3.9 Limitation of the hybrid theory

Since external factors largely dictate the trajectory of utility reforms. These factors include source of investment fund, required expertise for utility management, country's credit rating and investment risk, transaction cost and credible commitment. When these factors constitute the primary consideration of regulatory intervention in utility reforms, the tendency is to deemphasize the peculiarity of the regulatory environment.

This is so because the fundamental requirement for any utility reform is the provision of finance and capital for projects as well as the skills for utility management. It presents a case of he who plays the piper calls the tune because the source of funds is usually external both for kick starting the reform and during the operation of the privatized market. Consequently, in seeking financial aid and the necessary

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162 Eberhard A Infrastructure Regulation in Developing Countries An Exploration of Hybrid and Transitional Models (Public-Private Infrastructure Advisory Facility working paper No.4 2007) 3.

163 Moot JS "Economic Theories of Regulation and Electricity Restructuring" 2004 Energy Law Journal ABI/INFORM Global 275.

proficiency for utility reform, the priority is given to the protection of investments instead of creating a social balance between the protection of investment and the relationship with the reform environment. The effect of the absence of this balance is seen in the failure of achieving the reform objectives such as competition, cost reflective tariff, private participation, loss of revenue and efficiency.

As a result of the absence of this balance, the nature of the reform challenges emerging in the privatized market cannot readily be explained by a hybrid theory of regulation for different reasons. While the hybrid theory of regulation may envisage the peculiarity of the reform environment, electricity privatized market must also be willing to take advantage of technological advancement or more practicable mode of electricity supply which are not available in the market. In addition, because the challenges are largely unanticipated, there must be a compromise of requisite tools and knowledge for dealing with them from an internal and external perspective.

2.2.4 Summary of theories

The above theories of regulation lay the foundation on which most regulations develop and evolve. The public interest theory provides a basis for state interventionist approach to sectors when there is a market failure with incidents such as natural monopolies, scarcity and rationing, information inadequacies. The whole idea is for government to intervene in the interest of the public for the purpose of efficiency. On the other hand, the interest group theory seeks to explain regulation as being driven by an interest group who will benefit largely by the regulation which is why it is called the Capture theory.

However, from the absence of explanation as to the process by which regulation are created and evolved, the institutionalist theory was developed from a procedural perspective to explain the elements that drive regulatory development and the institutional design of regulators. How these theories can explain the course of utility restructuring particularly the electricity reforms will be explored in chapters 4 and 5.

Nevertheless, neither of these theories alone explains government regulation of network industries. Regulation is a combination of mixed political and economic motives.[164] An example of a public interest legislation is the Telecommunications Act

[164] Tomain JP “the Past and Future of Electricity Regulation” 2002 University of Cincinnati College of Law Scholarship and Publications Faculty Articles and Other Publications 444 – 445.

of 1996,[165] which was enacted purportedly in the public interest, but in reality is a classic set of private industry interest group deals. Therefore, the establishment of a legal and regulatory framework or regulatory interventions ought to be determined largely by a country's specific legal tradition based on customs, culture, religion and politics.[166]

2.3 THE STATE INTERVENTION APPROACH TO UTILITY REFORM

2.3.1 Introduction

Regulation is viewed as a type of intervention which can be direct or indirect[167] depending on the implementation of standards to target behaviours or to the context in which the target behaviour is generated.[168] We had earlier explained how state intervention came to correct market imperfection and also listed and explained some incidents of market imperfection under the public interest theory. Our study is concerned with natural monopoly, the inefficient production and delivery of public goods as incidents of market imperfection which led to state intervention in the form of utility reform. For example, in the electricity market, one of the focus of regulation is to prevent anti-competitive abuses of market power that is, to balance the interests of suppliers with those of their captive customers.[169]

As stated previously in this study,[170] the concept of state intervention can be traced back to the British common law during the seventeenth century. The two cases cited to wit De Portibus Maris and Munn Vs Illinois serve to justify government intervention in property ownership, when private property was affected with the public interest, it ceased to be private property only and should submit to whatever constraints society might impose on it. The concept of state interventionism is described as a cradle of a

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165 A law passed by the United States Congress to let any communication business compete in any market against any other, deregulation of the converging broadcasting and telecommunications markets amongst others.

166 "Legal Context of Regulatory Reform" online: http://www.ictregulationtoolkit.org/toolkit/6.3 (Date of use: 14 November, 2018).

167 Direct government participation in markets involves government acting as a supplier by directly providing goods and services to the public and as collector and holder of public sector information while government may indirectly participate through taxes and subsidies by changing the costs of goods and services or through regulation and influence using statutory requirements, information and campaigns.

168 Koop C and Lodge M "What is regulation? An interdisciplinary concept analysis" 2017 (11) Regulation and Governance 98.

169 Ondoa H.A. and Nkouli AJBN "the Effects of Regulatory Agencies of Sub-Saharan Electricity Companies on Social Welfare" 2013 (39) the Journal of Energy and Development 74.

170 Paragraph 2.2.2 above.

modern economic law, an attempt of a state to eliminate market failure that appeared as a result of the economic crisis of 1930s and after the Second World War.[171]

The electricity industry provides an excellent case study of government regulation, like other network industries such as natural gas, telephone, railroad, and water. The electricity regulation was based on the central political economic idea that the industry had natural monopoly characteristics and that electricity served the public interest. Government regulation was justified as a way to stem the abuses of market power exercised by vertically integrated utilities.[172] The reasons advanced to justify government intervention include: public goods i.e. goods where nobody can be excluded from consumption (national defence); externalities e.g. pollution and natural monopolies and insufficient competition and so on.[173]

The basic argument to justify the existence and privileges of public utilities, government/private ownership or public regulation centres on the hypothesis that these services are at best supplied by monopolies which exploit all possible economies of scale in order to produce at minimal cost. Public regulation or public ownership seems necessary in order to arrive at efficient production while avoiding monopoly prices.[174]

In most countries, the state has always been responsible for the production of public or collective goods like defence services, public sanitation, parks and other services which are collectively consumed by the people. The argument is that the private market has no incentive to produce optimal quantities of such goods and services. No one can be excluded from the consumption of these public goods once produced. They also tend to be jointly consumed by many people simultaneously. Under these conditions, it is argued that market failure results necessitating state intervention for the production of public goods which is why even in most private enterprise-oriented

171 Jovanic T "the Concept of Regulation in Administrative and Economic Law and the Emergence of the Law of Market Regulation" (31 May 2010) online: http://www.regulation.upf.edu/dublin-10-papers/7C3.pdf (Date of use: 20 November 2018) 2.

172 Tomain JP "the Past and Future of Electricity Regulation" 2002 University of Cincinnati College of Law Scholarship and Publications Faculty Articles and Other Publications 443 – 444.

173 Wirl F "Economic Theories of (De-) Regulation: Lessons for the Power Industry" 1989 (7) Energy Exploration & Exploitation 239.

174 Wirl F "Economic Theories of (De-) Regulation: Lessons for the Power Industry" 1989 (7) Energy Exploration & Exploitation 239.

societies, government have always been active in the production and delivery of goods and services for collective use.[175]

State intervention in regulation could come in different forms like public ownership, price controls, command and control, incentive-based regimes, competition laws and franchise/contracts and so on. Again, it must be noted that whichever form of control mechanism a country adopts will depend largely on its specific circumstances. For instance, Yahaya argued that in the case of Least Developed Countries (LDCs), the extent of state intervention and its effectiveness is largely determined by the circumstances of the transition to independence and the relative strengths of the national, comprador, international and petty bourgeoisie, as well as those of the masses.[176]

By far the most effective control mechanism of natural monopoly by government is public ownership. Ogus having traced the history of public enterprises in Britain and the use of competition as a means of control stated that public ownership became the favoured alternative for different reasons one of which is the failure of the experiments regulatory institutions and municipal ownership of public utilities.[177]

Ogus later identified three principal forms of public ownership. Firstly, an enterprise can be placed under direct ministerial control as a government department (the Post Office in England until 1969). Secondly, it can be registered as a company under the Companies Act 1985 (subject to the ordinary principles of company law), with the state holding all, or a significant proportion of, the equity (e.g. British Nuclear Fuels Ltd). Thirdly, it can be constituted by legislation as a statutory public corporation, in which case its functions and powers are determined by the Parliament,[178] the National Electric Power Authority[179] established by a legislation of the Federal Republic of Nigeria is a case in point here.

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175 Paul S "Privatization and the Public Sector: Relevance and Limits" 1985 (20) Economic and Political Weekly M4.

176 Yahaya S "State Intervention Versus the Market: A Review of the Debate" 1991 (16) African Development/ Afrique et Developpement: The International Economy and Africa's Economic Recovery 71.

177 Ogus A Regulation: legal form and economic theory (Oregon: Hart Publishing Oxford and Portland 2004)255 – 256.

178 Ogus A Regulation: legal form and economic theory (Oregon: Hart Publishing Oxford and Portland 2004)271.

179 National Electric Power Authority is a statutory corporation established by law in Nigeria to be solely responsible for the generation, transmission and distribution of power in Nigeria prior to the reform era.

The rationale for state intervention in Africa are numerous and peculiar. At independence most African states inherited the notion that extensive government involvement in the economy and society was the natural order of affairs partly because most of the national elites at that time were accustomed to this governing system. Deep resentment for aliens who were in control of economic sectors sparked calls for controls and nationalisation. Government control was also used to gain access to international concessionary and commercial credit that would be denied to small local entrepreneurs, and to attempt to transfer technology absent in the local private sector and so on.[180]

There are issues and challenges associated with public ownership which led to a shift in policy. Before delving into these challenges, natural monopoly has been isolated as a concept in our study as one of the basis for government intervention through regulatory control mechanisms.

2.3.2 Natural monopoly

An important and related concept is monopoly. A firm is said to enjoy a monopoly when it is the only seller of a product or service having no close substitute. Most importantly, the concept of natural monopoly in economics is, an industry in which production and consumption are concomitant, and investment is necessarily so large in proportion to income that direct competition in all phases of pricing and production is not possible.[181]

Posnar states that the concept does not refer to the actual number of sellers in a market but to the relationship between demand and the technology of supply. If the entire demand within a relevant market can be satisfied at lowest cost by one firm rather than by two or more, the market is a natural monopoly, whatever the actual number of firms in it. If such a market contains more than one firm, either the firms will quickly shake down to one through mergers or failures, or production will continue to consume more resources than necessary. In the first case, competition is short-lived and in the second, it produces inefficient results. Competition is therefore not a viable regulatory mechanism under conditions of natural monopoly.[182] A clear example of a natural monopoly is the supply of electricity, water and cable television to households. It is considerably cheaper to have a single network of electric wires, water pipes, or

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180 Nellis JR Public Enterprises in Sub-Saharan Africa (World Bank Discussion Paper No. 1 Washington DC: World Bank November 1986)12 – 16.

181 Pegrum D.F. “Government Regulation of Industry (the Annals of the American Academy of Political and Social Science)” 1939 (206) Government Expansion in the Economic Sphere 87.

182 Posnar R.A. “Natural Monopoly and Its Regulation” 1969 (21) Stanford Law Review 548.

television cables providing these services to a given neighbourhood, rather than multiple networks for multiple firms.[183]

The central idea is that one firm can realize economies of scale throughout a range of production, continually lowering cost. A supporting justification is the idea that any capital investment made by a competing firm is duplicative and therefore wasteful. A specific service area needs only one set of electric telephone wires; the investment in any other set of wires is wasteful,[184]which can invariably lead to monopoly.

The electric light and power industry is one of the examples of this situation.[185] Politically, it was socially desirable to distribute electricity as a public good. Hence, the economic definition of, and the public policy arguments for, natural monopoly coalesced into a political justification for the regulation of public utilities, including electricity. Natural monopoly theory puts policy makers in something of a bind. On one hand, the utility's product is seen as desirable and is most cheaply delivered by one provider. On the other hand, a lone provider is a monopolist.[186] In the US, because state ownership was not likely,[187] the regulatory solution, ironically, was state controlled monopoly, the regulatory compact, as described in the following quotation from *Judge Kenneth Starr*:

> The utility business represents a compact of sorts; a monopoly on service in a particular geographical area (coupled with state-conferred rights of eminent domain or condemnation) is granted to the utility in exchange for a regime of intensive regulation, including price regulation, quite alien to the free market... Each party to the compact gets something in the bargain. As a general rule, utility investors are provided a level of stability in earnings and value less likely to be attained in the unregulated or moderately regulated sector: in turn, ratepayers are afforded universal, non-discriminatory service and protection

183 Adler D.M "Regulatory Theory in A Companion to Philosophy of Law and Legal Theory" (Blackwell Publishing Limited 2010) online: https://0-onlinelibrary-wiley-com.oasis.unisa.ac.za/doi/pdf/10.1002/9781444320114 (Date of Use: 16 October 2018).

184 Tomain J.P. "the Past and Future of Electricity Regulation" Spring 2002 (32) Environmental Law 445 – 446.

185 Pegrum D.F. "Government Regulation of Industry (the Annals of the American Academy of Political and Social Science)" 1939 (206) Government Expansion in the Economic Sphere 87.

186 Tomain J.P. "the Past and Future of Electricity Regulation" Spring 2002 (32) Environmental Law 446.

187 This is considered within the specific context of natural monopoly regulation in US and not as broad based assessment. There are other jurisdictions where public/state ownership was adopted and later jettisoned, like in Nigeria.

from monopolistic profits through political control over an economic enterprise."[188]

For an electric company, it has been argued, albeit economically, that once the huge fixed cost involved with power generation and power lines are paid, each additional unit of electricity costs very little. Having two electric companies split electricity production, each with its own power source and power lines, would lead to a near doubling of price, because of low marginal costs, high sunk costs and declining average costs and so arising from these economic vagaries, natural monopoly poses the difficult dilemma of how to organize these utilities so as to gain the advantages of production by a single firm, while minimizing all the vices resulting from non-competitive markets.[189]

Since competition is not a viable regulatory mechanism under conditions of natural monopoly, traditionally, countries around the world, assuming the inevitability of monopolization either regulated private enterprises or nationalized natural monopolies in order to deal with the market imperfection of a natural monopoly.[190] This they do, according to Posner by exercising direct control to ensure a satisfactory performance through control over profits, specific rates, quality of service, extensions and abandonments of service and plant, even permission to enter the business at all.[191] These set of controls have been applied mainly to gas, water, and electric power companies where it is known as "public utility regulation.[192]

The standard regulatory response to natural monopoly is to permit existence of a firm with monopoly power (and even to mandate one, by barring entry from other firms) but to regulate the monopolist's prices and terms of service.[193]

2.3.2.1 Price controls and entry regulation mechanism

188 Jersey Central Power & Light Co. v FERC, 810 F.2d 1168 (D.C. Cir. 1987) The concept of regulatory compact is best understood as a shorthanded way of describing the relationship between the regulated utility and government regulators.

189 Horn A. and Kim S.R. Regulation Policies Concerning Natural Monopolies in Developing and Transition Economies (United Nations Department of Economic and Social Affairs March 1999) 2.

190 Horn A. and Kim S.R. Regulation Policies Concerning Natural Monopolies in Developing and Transition Economies (United Nations Department of Economic and Social Affairs March 1999) 2.

191 Posnar R.A. "Natural Monopoly and its Regulation" 1969 (21) Stanford Law Review 548.

192 Posnar R.A. "Natural Monopoly and its Regulation" 1969 (21) Stanford Law Review 548.

193 Adler D.M "Regulatory Theory in A Companion to Philosophy of Law and Legal Theory" (Blackwell Publishing Limited 2010) online: https://0-onlinelibrary-wiley-com.oasis.unisa.ac.za/doi/pdf/10.1002/9781444320114 (Date of Use: 16 October 2018) 599.

Tracing the history of price regulation, Lewis points out that after the failure of enforced competition particularly given the fact that there are some industries in which competition is practically impossible, some States attempt at limiting prices did not work. State governments in the United States took another step. The legislatures established rates or prices to be charged by railroads. The constitutionality of these acts came before the Supreme Court in the Granger Cases[194] wherein the railroads resisted the rates on the ground of unlimited property rights. The Court upheld the constitutionality of the law.[195]

The US Supreme Court upheld the constitutionality of a statute of the State of Illinois setting the maximum price that elevators located in Chicago could charge for transfer and thirty days storage of grain in the case of Munn v Illinois.[196] The Court also held that the elevators[197] formed a "virtual monopoly" and implies that this supports the regulation. The reasoning in the case was, subsequently adopted by the Court itself in *Nebbia v New York* and it is now an accepted doctrine that all economic activity is subject to regulation because it is important as it is affected with a public interest. The Court recognised the public interest in a property and held that property lost its strictly private character and became clothed with public interest when used in a manner to make it of public consequence.[198]

Price control can take a variety of forms but according to Ogus, they principally fall into two categories namely fair rate of return (FRR) and historical method (HM). These two forms have their origin in the US and British system public utility regulation.[199] The fair rate of return method was developed by the American Regulatory Commissions and the courts to meet the general legislative requirement that the rates set by utilities should be just and reasonable.[200] The regulator allows the firm a price that it projects will yield revenues sufficient to enable the firm to earn a competitive or reasonable

194 Munn v Illinois 94 U.S. 113 (1876), Chicago, Burlington, & Quincy R.R. v. Iowa, 94 U.S. 155 (1877); Peik v Chicago & Nw. R.R., 94 U.S. 164 (1877); Chicago, Milwaukee, & St. Paul R.R. v Ackley, 94 U.S. 179 (1877). The decisions were all announced together and the opinions were all written by Chief Justice Waite.

195 Lewis D "Can Prices Be Regulated by Law? an Examination of Mr Arthur T. Hadley's Article, Legal Theories of Price Regulation" 1893 (41) the American Law Register and Review 10.

196 Kitch EW & Bowler CA "the Facts of Munn v Illinois" 1978 the Supreme Court Review 313.

197 Common carriers of grains on railroad. They were built on railroad and operated contracts with the railroads which governed their prices and conditions of service. They offered their service to the public at a fixed price, regularly published in the newspapers early each year.

198 Kitch EW & Bowler CA "the Facts of Munn v Illinois" 1978 the Supreme Court Review 341.

199 Ogus A Regulation: legal form and economic theory (Oregon: Hart Publishing Oxford and Portland 2004)295.

200 Ogus A Regulation: legal form and economic theory (Oregon: Hart Publishing Oxford and Portland 2004)307.

return on its capital investment.[201] The historical method limits price increases to what is reasonable, taking into account the extent to which suppliers can control their costs.[202]

Before the advent of allowing return on the capital invested formulae, the regulators between the 1800 and 1960 estimated fair rate by 'comparable earnings'. Under this approach, the regulator determines a set of companies deemed to have investment risks which are comparable to those of the utility in question and calculate the rate of return on average book equity for each of these comparable companies, determine the average rate of return on the sample of comparable companies and set service rates for the utility in question such that it will earn, under normal operating conditions, a rate of return equal to the average return earned by the comparable companies.[203]

On the other hand when British utilities were allowed to retain predominantly monopolistic power, new regulatory structures had to be put in place to curb the power, and the issue of devising principles for determining appropriate prices came to the fore[204] particularly arising from the failings of the rate of return which many argued is the worst sort of regulation for both shareholders and customers.

To address the failings of the rate of return, the price cap method, which is a variant of the historical method,[205] was developed by Professor Stephen Littlechild, well-known as 'RPI – X' formula. The formula caps a selected basket of the incumbent's prices for a period of four to five years. These prices can then increase annually by the Retail Price Index (RPI) minus the X factor, with the latter being set by the regulator in the light of the presumed movement of productivity and costs within the industry. Within this four-to-five-year period, the regulated company can then keep any extra profits generated by increased efficiency. And at the end of the review period, new

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201 Tollison R.D. "the Logic of Natural Monopoly Regulation" 1991 (17) Eastern Economic Journal 484.

202 Ogus A Regulation: legal form and economic theory (Oregon: Hart Publishing Oxford and Portland 2004)295.

203 Brigham E.F. and Shome D.K. "Estimating The Fair Rate of Return For A Subsidiary of A Public Utility Holding Company" (January 1982) online: https://bear.warrington.ufl.edu/centers/purc/docs//papers/8202_Brigham_Estimating_The_Fair.pdf) (Date of use: 16 October 2018).

204 Ogus A Regulation: legal form and economic theory (Oregon: Hart Publishing Oxford and Portland 2004)305.

205 Ogus A Regulation: legal form and economic theory (Oregon: Hart Publishing Oxford and Portland 2004)310.

price controls can be implemented which take account of the efficiency gains in the previous period.[206]

With some modification, the method was adopted to regulate the prices of all major utilities privatized in the 1980s. In most cases, price control in this form was intended to be a temporary stopgap, pending the opening up of the relevant markets to effective competition[207] (there was doubt as to when the competition will arrive in most markets). The point was well taken in Littlechild's argument that:

> Competition is indisputably the most effective means, perhaps the only effective means of protecting consumers against monopoly power. Regulation is essentially a means of preventing the worst excesses of monopoly; it is not a substitute for competition. It is a means of holding the fort until the competition arrives. Consequently, the main focus of attention has to be on securing the most promising conditions for competition to emerge, and protecting competition from abuse. It is important that regulation in general does not prejudice the achievement of this overall strategy."[208]

The approach to price regulation in Nigeria can be found in the Electric Power Sector Reform Act 2005 "the Act" whose provisions shall be considered in Chapter Three of the study. Section 76 of the Act allows the regulator to determine prices by one or more methodologies for regulating electricity prices it may adopt taking into consideration allowance for full costs of a licensee's business activities, a reasonable return on the capital invested, incentives for the continued improvement of technical efficiency, incentives for the continued improvement of quality of services, give to consumers economically efficient signals regarding costs that their consumption imposes on the licensee's business, avoid undue discrimination between consumers and consumers' categories and phase out or substantially reduce cross subsidies.[209]

In line with carrying out its responsibility under Section 76 of the Act, the regulator had consistently utilized the Multi Year Tariff Order in adjusting tariffs based on variables

206 Walden I Telecommunications Law and Regulation (Oxford University Press 2009) 59.
207 Ogus A Regulation: legal form and economic theory (Oregon: Hart Publishing Oxford and Portland 2004)310.
208 Walden I Telecommunications Law and Regulation (Oxford University Press 2009) 59.
209 Electric Power Sector Reform Act CAP A77 Laws of the Federation of Nigeria of 2005.

namely; the level of Aggregate Technical, Commercial and Collection (ATCC) loss, exchange rate, rate of inflation, generation capacity and gas price.[210]

2.3.2.2 Imposing service obligations

Issues associated with the reliability of service (e.g. outages of the electric power network) and various aspects of the quality of service (e.g. queues for obtaining connections to the telephone network) are significant policy issues in many regulated industries particularly with respect to natural monopoly who will most likely introduce bias in the selection of quality, the speed of adoption of innovations and investments in R&D.[211]

Ogus outlined various legal methods of formulating differentiated standards by which service obligations may be imposed. The first option is to incorporate the different standards into formal regulatory code (normally parliamentary legislation or statutory instrument) which governs the activity. The second option is for the regulatory code to contain a general principle, for example, that an activity must be conducted so as not to give rise to an unreasonable risk of injury, or to use the best available techniques not entailing excessive cost to prevent certain occurrences. The third option is to confer power on an agency to create formal differentiated standards for individual firms or groups of firms. The technique normally used is a system of permits: the legislation prohibits the activity unless the firm obtains from the agency a permit which contains conditions incorporating the appropriate differentiated standard.[212]

2.3.3 Policy change from public ownership of natural monopoly to private

The arguments on public or private ownership of public enterprises have precipitated different kinds of government policies regarding these enterprises providing utilities like water, gas, power, and telecommunication. Wirl argued that it follows from the Public Choice theory that vertical integration of production, transmission and distribution, public ownership and bureaucratic management in the power industry is hardly efficient hence the need for reorganization. He further stated that as against welfare maximization, things like intervention of politicians in investment planning (as a means to influence the business cycle) and in tariff setting (e.g. to avoid rate hikes

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210 Multi Year Tariff Order – 2.1 for the Period 1st January 2015 to 31st December 2018 (Order No. NERC/135).

211 Joskow PL “Regulation of Natural Monopolies” 2006 Handbook of Law and Economics 40.

212 Ogus A Regulation: legal form and economic theory (Oregon: Hart Publishing Oxford and Portland 2004)170.

prior to an election), cross subsidization (to please lobbies), inefficient production, and rent seeking have marred the economic efficiency of public enterprises in the power industry.[213]

The reverse argument is that instead of having a privately owned monopoly with profit-seeking shareholders, one could institute a publicly-owned enterprise with less concern about profits. This lack of profit-maximizing incentives in a public enterprise is sometimes thought to be beneficial, as it allows publicly responsible attention to non-financial goals and/or distributional goals. The institutional framework of public ownership would provide a way to impose public interest prices and standards.[214]

The argument for public enterprises above found support in the assumption that the State is peopled by altruistic, competent and far-sighted individuals who would mobilize and deploy scarce economic resources as well as conceptualize and implement policies to achieve sustained growth and general welfare improvements.[215] However, this argument seems to have buckled in view of the inefficient handling of these utilities particularly in developing countries and the changing global practice of the adoption of privatization of these utilities through reform.

The ownership structure of the utilities in natural monopoly markets varies in countries but the challenges encountered by them before and after reforms are similar. The United States has a long tradition of regulation rather than public ownership and so at some point a deregulation attempt was made. In the United Kingdom, it was one of the central tenets of the post-war consensus that the provision of the major utility services was best met through public ownership and a commitment to social goals but this approach did not bring about the desired industrial efficiency and so private ownership of these industries was presented as a panacea for improving performance.[216] This new approach dominated the Conservative Party policy and had its origin in a general discontent with the poor performance of the British economy.[217]

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213 Wirl F "Economic Theories of (De-) Regulation: Lessons for the Power Industry" 1989 (7) Energy Exploration & Exploitation 243.

214 Depoorter B.W.F. Regulation of Natural Monopoly (Center for Advanced Studies in Law and Economics University of Ghent, Faculty of Law 1999) 514.

215 Jomo KS "Privatisation and Public Sector Reform: the Political Economy of State Intervention (with comments)" 1994 (33) the Pakistan Development Review 648.

216 Yarrow G and Helm D "the Assessment: the Regulation of Utilities" 1988 (4) Oxford Review of Economic Policy, Regulation and Utilities II.

217 Ogus A Regulation: legal form and economic theory (Oregon: Hart Publishing Oxford and Portland 2004)288.

The economic arguments for privatization includes: competition stimulation, the irrelevance of the concept of natural monopoly or the contestable market theory, elimination of cross-subsidies which are held to be economically undesirable and the reduction of the public sector borrowing requirement.[218] While economic theory such as too much public expenditure and interference with the market serve as a rationale for privatization as a possible solution when the issue of imposing effective financial constraints on the nationalized industries proved to be more intractable, pragmatic and ideological factors also played an important role.[219]

The government urgently needed to reduce the public sector borrowing requirement and it was politically easier to do this by selling public assets, rather than by cutting public expenditure. The sale of public assets is believed to lead to wider share ownership, a goal which would advance not only the conservative vision of a property-owning democracy, but also, in so far as it applied to employees, a more generally held ideal of greater participation by the workforce in the decisions of industry.[220] It is worth mentioning that the British privatization programme was accompanied by extensive regulatory reforms that changed the form of regulating utilities rather than eliminating regulation after privatization.[221]

In the world over, a renewed faith in the market process induced governments to privatize most of its sectors including strategic ones such as steel, energy and telecommunications. It is said that the absence of a profit incentive under the institutional framework of public ownership had proven to be a high price to pay. In a public enterprise which lacks a group of residual profit-claiming shareholders, who emphasize fiscal goals and enforce efficient performance through management, economic efficiency is no longer guaranteed. When assets are publicly owned, the public manager has relatively weak incentives to reduce costs or to improve on quality or innovate because he only gets a fraction of the return as a non-owner.[222]

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218 Howard W.A. “Privatization and Management” Autumn 1989 (61) the Australian Quarterly 90 – 91.

219 Ogus A Regulation: legal form and economic theory (Oregon: Hart Publishing Oxford and Portland 2004)288.

220 Ogus A Regulation: legal form and economic theory (Oregon: Hart Publishing Oxford and Portland 2004)288.

221 Kodwani D.G. “Economic Regulation of Utility Industries” 2000 (35) Economic and Political Weekly 2658.

222 Depoorter B.W.F. Regulation of Natural Monopoly (Center for Advanced Studies in Law and Economics University of Ghent, Faculty of Law 1999) 514.

In private corporations, the shareholders' ability to sell their vote or to vote out management creates incentives for management to serve the interests of the owner. The diffuse, non-transferable shareholding that characterizes government ownership reduces these incentives. Those in control of the enterprise pay less attention to the taxpaying shareholders and are more likely to succumb to more concentrated interest groups, such as supplier, consumers, employees and so on.[223]

One of the flaws of the statutory monopoly is that it will become the primary source of information about industry possibilities. The monopoly will not suffer as a competitive firm would when it is wrong, because regulators either cannot appreciate its errors completely or will forgive them. Regulatory agencies, distanced from the industry, might have a hard time to reflect the complexity of the industry. As regulators cannot evaluate all decisions, inefficient technologies may be chosen for years.[224]

Whether any of the two policies will be consistent with public interest goals will depend on how each government is willing to pursue its public policy. It is worthy of note that just as economists have disagreed on the most appropriate method in achieving distributional goals or efficiency, which is evident in scholarly works, that disapprove of the rationale for regulating natural monopoly and equally disagree with the rationale for the switch from public to private ownership of public enterprises, the developing countries and transition economies have been the most affected by the resulting reforms based on some of these rationale.

2.3.4 Reform of public enterprises in developing economies

In addition to some of the reasons canvassed above which led to the inefficiency of the public enterprises, developing countries are faced with peculiar challenges of their own leading to varying sector reforms. Following the government initiated review of the early experience with state enterprises in Vietnam to assess the need for further reform; the *Communist Party of Vietnam* at *the Seventh Party Congress in 1991* stated what is symptomatic of the features of a State enterprise in a developing economy as follows:

> ...the weakest aspect of the state-run sector as a whole remains its inefficiency in business operations. A fairly large number of state-run industrial enterprises,

223 Depoorter B.W.F. Regulation of Natural Monopoly (Center for Advanced Studies in Law and Economics University of Ghent, Faculty of Law 1999) 514.

224 Depoorter B.W.F. Regulation of Natural Monopoly (Center for Advanced Studies in Law and Economics University of Ghent, Faculty of Law 1999) 514.

especially those under district management, are beset with difficulties. Many state-run trading enterprises have made losses: quite a few have been misused by private businessmen for illegal activities.[225]

Privatization in these countries stems from the internal conviction that public sector production has not worked out as anticipated; and the increasing reliance by these countries on IMF/World Bank structural adjustment loans, the externally imposed insistence that the public sector should play a reduced role.[226] Owing to budget constraints and tight financial considerations, developing economies sought more capital from international financial institutions.

The major thrust of the World Bank in the 1990s is the insistence that infrastructure services be provided largely through the private sector. The new capital investments in power and telecom should be through private capital and the existing capital base in the public sector should be rapidly privatized. This policy suggestion carries with it the condition that those who are willing to undertake a time bound programme of privatization are entitled to the loans.[227] This has largely explained why in developing economies, explicit regulation focuses on efficiency by increasing investment and capacity. In some cases, this has been done by harnessing private ownership and domestic or foreign private investment, in others, a workable financial framework is provided for the electricity industry to develop by loosening ties with government.[228]

To further underscore the policy switch, data available, albeit limited, suggests that government ownership has not worked out. State-owned Enterprises (SOE) are on the whole not very profitable. Bovet's study of 12 West African countries shows 62 percent net losses and 36 percent were operating at negative net worth.[229] Nellis and Kikeri note Susungi's study of 48 African parastatals. Only 12 reported a net profit margin of more than 4 percent. With admirable caution, Nellis and Kikeri generalize that too many public enterprises cost rather than make money, and too many operate at low levels of efficiency. In a more encompassing survey, Short found that although deficits

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225 Arkadie BV and Mallon R State Enterprises in Viet Nam – a Transition Tiger? (ANU Press 2004) 125.

226 Prager J "Is Privatization a Panacea for LDCs? Market Failure versus Public Sector Failure" 1992 (26) the Journal of Developing Areas 301.

227 Purkayastha P. "Infrastructure Sector and Withdrawal of the State" 1995 (30) Economic and Political Weekly 2114.

228 Cubbin J and Stern J "The Impact of Regulatory Governance and Privatization on Electricity Industry Generation Capacity in Developing Economies" 2006 (20) the World Bank Economic Review 118 – 119.

229 Nellis JR Public Enterprises in Sub-Saharan Africa (World Bank Discussion Paper No. 1 Washington DC: World Bank November 1986) 17.

of industrial nations' SOEs were smaller than those for SOEs in the developing world, net losses characterized parastatals worldwide.[230]

As stated earlier, since the 1980s British privatization programme, many network industries which have predominantly provided a vertically integrated, often public, monopoly utilities have been losing ground with the steady breakup of the activities traditionally regarded as natural monopolies (demonopolisation).[231] In the electricity industry, with the breakup of the generation, transmission and distribution components of the natural monopolies, instead of merely focusing on the challenges surrounding monopolization by regulating through pricing and entry, the current regulation policy focuses on the design of regulatory policy accompanying restructuring, privatization, and the expansion of competition into the area formerly occupied by the monopolies.[232]

The experiences of developing countries and LDCs with public enterprises show that the role of private sector was encouraged through different means. Divestiture, private provision of goods, contracting of services by government to private parties and deregulation are amongst the most widely discussed routes to privatization.[233] However, prior to the adoption of these instruments of privatization, it was once considered that the public enterprises providing utilities should be retained since they were regarded as strategic but with some form of rehabilitation, by creating an appropriate macro-economic policy environment in order to expand the role of markets, to expose them to the stimulus of competition, to clarify objectives and the relations between governments and enterprises, and to optimize managerial autonomy at the level of the firm.[234]

In accordance with this rehabilitation proposition, in some small low-income countries, the initial characteristic of their reform in the electricity industry involves public sector continued ownership of most power supply facilities and taking primary responsibility

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230 Prager J "Is Privatization a Panacea for LDCs? Market Failure versus Public Sector Failure" 1992 (26) the Journal of Developing Areas 301.

231 Kim SR and Horn A. "Regulation Policies Concerning Natural Monopolies in Developing and Transition Economies "DESA Discussion Paper No. 8 of United Nations Department of Economic and Social Affairs 1999" 1.

232 Kim SR and Horn A. Regulation Policies Concerning Natural Monopolies in Developing and Transition Economies (DESA Discussion Paper No. 8 of United Nations Department of Economic and Social Affairs 1999) 4.

233 Paul S "Privatization and the Public Sector: Relevance and Limits" 1985 (20) Economic and Political Weekly M-5.

234 Nellis JR Public Enterprises in Sub-Saharan Africa (World Bank Discussion Paper No. 1 Washington DC: World Bank November 1986) 50.

for financing sector development while in large middle-income countries, the public sector engaged in state ownership in sensitive generation sectors (hydro, nuclear), transmission, and nonviable distribution service areas.[235] The Nigeria experience with its transmission network component of its power sector is also a case in point, where the government has retained ownership, first under a concession to a foreign company and upon expiration, a reversionary to government.[236]

Notwithstanding the retention of state ownership proposal, most of these developing countries have achieved privatization through the divestiture of their SOEs. Proponents of divestiture in Africa argued that some of the public enterprises which ought not to have been created judging from their lack of comparative advantage, tinkering with internal reforms in these firms is inadequate. The more enduring solution is to sell to the private sector those which can be sold and for those which no buyer can be found, their assets should be liquidated. Another argument is that the state is a poor entrepreneur, even if the firms are covering their variable costs or even making some return on capital, the states are paying a high opportunity cost because the resources producing a modest return in the firms could produce a higher return elsewhere.[237]

Although privatization may not necessarily be a form of regulation,[238] but the whole idea of privatization is to increase the efficiency of the natural monopolies. The creation of competition in infrastructure is the underlying theoretical premise of the World Bank's case for privatization. It believes that infrastructure can be unbundled and large sectors within infrastructure brought under competitive regime.[239] However, large companies in developing and transition economies that were privatized were often sold as monopolies or near monopolies instead of creating greater competition in the concerned sectors before privatization. All that has been accomplished is substitution of one monopoly for another which begs the question on how privatization should be conducted.

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235 Eberhard A et al Strengthening sector reform and planning in Africa power infrastructure (World Bank: Washington 2008)5.

236 Amadi S "the Rule of Law Approach to Regulating Electricity Supply" online: https://dx.doi.org/10.4314/jsdlp.v8i2.2 (Date of use: 5 December 2018) 27.

237 Nellis JR Public Enterprises in Sub-Saharan Africa (World Bank Discussion Paper No. 1 Washington DC: World Bank November 1986) 42 – 43.

238 Ogus A Regulation: legal form and economic theory (Oregon: Hart Publishing Oxford and Portland 2004)287.

239 Purkayastha P. "Infrastructure Sector and Withdrawal of the State" 1995 (30) Economic and Political Weekly 2115.

2.3.5 Summary

The idea of government intervention in utility regulation is justified for several reasons principal among which is the need to prevent anti-competition and to ensure that there is even distribution of wealth. In its traditional approach, most utilities were publicly-owned while the switch from publicly-owned utility to private investors became necessary arising from the imperfection in the management of the utility by the government particularly in developing countries.

The main concern with utilities that are publicly-owned was their natural monopoly status resulting to lack of efficiency which government sought to control by introducing control mechanisms like price and entry control and quality of service. There are economic arguments as to whether such controls were necessary in the first place. However, the method of government ownership of natural monopolies seemed to have outlived its usefulness in developing countries judging by their performances and then came the need for reform, which was mostly done through privatization.

2.4 POWER SECTOR REFORM REGULATION IN DEVELOPING COUNTRIES

2.4.1 Introduction

While the arguments in support of the policy change of public ownership of SOEs to private ownership seem to be convincing, it is difficult to tell whether it was consistent with public interest goals or that it happened as a result of interest group capture given the encouragement to investors who happened to be the embodiment of venture capitalists. However, one critical aspect of the reform, regardless of the policy undertone is the role of institutions within the reformed economy which is brought to the fore by reason of the institutional theory of regulation.

2.4.2 Institutional approach to reform of public enterprises in developing countries

In any power market reform, the development of capabilities and institutions to regulate power markets is an important part of the reform. This development covers both regulatory governance (who does what under which laws, rules and procedures) and regulatory substance (how tariff levels and structures are established and approved, and mechanisms for coordination of tariffs and subsidies and the

establishment of quality of service standards).[240] It is suggested that the design of new regulatory structures should take account of the political, legal and constitutional arrangements under which they have to function. It should be consistent with country endowments (including constitutional checks and balances), technical expertise, auditing competence, and fiscal resources, as well as the economic characteristics of the power market.[241]

Eberhard acknowledged the trend that the widespread features of infrastructure reforms in developing countries and transition economies have been the establishment of new regulatory laws, institutions, contracts, regimes and processes which are designed to respond to natural monopolies and market failures associated with network industries.[242] Utility regulatory systems in developing countries have been shaped by two broad traditions namely; establishment of independent regulatory agencies within a legal system based on common law and regulatory contracts administered within a tradition of civil law and various provisions for contractual renegotiation or arbitration. However, the hybrids of these traditions which involve combining independent regulators with regulatory contracts are increasingly being explored and implemented.[243]

In Nigeria, the National Electric Power Policy, 2001 'NEPP" [244] set out the institutions responsible for the reform as well as their roles namely, the Federal Government, Ministry of Power and Steel, State Governments, Nigerian Electricity Regulatory Commission, Competing Generation Companies, a single Transmission Company, Special Purpose entity, On-grid Distribution Companies, Off-grid generation and distribution companies and Grid Connected auto generators.[245]

At the heart of the institutional arrangement for the reform is the establishment of the Nigerian Electricity Regulatory Commission an independent regulatory agency, a

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240 Besant-Jones J.E. Reforming Power Markets in Developing Countries: What Have We Learned? (World Bank Group Energy and Mining Sector Board Discussion Paper No 19 2006) 80.

241 Besant-Jones J.E. Reforming Power Markets in Developing Countries: What Have We Learned? (World Bank Group Energy and Mining Sector Board Discussion Paper No 19 2006) 80.

242 Eberhard A Infrastructure Regulation in Developing Countries An Exploration of Hybrid and Transitional Models (Public-Private Infrastructure Advisory Facility working paper No.4 2007) 3.

243 Eberhard A Infrastructure Regulation in Developing Countries An Exploration of Hybrid and Transitional Models (Public-Private Infrastructure Advisory Facility working paper No.4 2007) 3.

244 Paragraph 3.1 of National Electric Power Policy (2001) 9.

245 National Electric Power Policy (2001) 9.

concept that constitutes one of the most widespread regulatory models.[246] The establishment recognizes the concept that privatized electricity industry with competition over monopoly requires an effective regulatory agency that is independent of Government and of all the companies in the industry[247] but this has hardly been the case.

Apart from a general post-reform institutional failure, most independent regulatory bodies in developing countries have not been independent in the real sense of it. Some do not have authority to set tariffs; others may only recommend tariffs for approval by the Minister. In these instances, governments resist allowing tariffs to be set according to transparent processes and objective economic principles.[248]

Even in cases where separate regulatory institutions have been established with legal mandates for tariff-setting and other regulatory decisions, government can still exert pressures on regulators to modify or overturn decisions. Tariff-setting remains highly politicized and governments are sensitive to popular resentment against price increases.[249] Political expediency has undermined regulatory independence. While legislation may in theory empower regulators to set tariffs, government often finds other ways of influencing regulators. This is predominant in Sub-Saharan African countries including Nigeria.[250]

Estache and Wren-Lewis argued that the failure of regulation in many developing countries reflects in particular designers' underestimation of the importance of the institutional limitations and of the differences in capacities across countries. Some of the institutional issues found in the regulation of network industries are limited capacity in terms of funding, limited commitment to contract (various incidents of renegotiation),

246 Eberhard A Infrastructure Regulation in Developing Countries An Exploration of Hybrid and Transitional Models (Public-Private Infrastructure Advisory Facility working paper No.4 2007) 4.

247 National Electric Power Policy (2001) 11.

248 Eberhard A Infrastructure Regulation in Developing Countries An Exploration of Hybrid and Transitional Models (Public-Private Infrastructure Advisory Facility working paper No.4 2007) 4.

249 Eberhard A Infrastructure Regulation in Developing Countries An Exploration of Hybrid and Transitional Models (Public-Private Infrastructure Advisory Facility working paper No.4 2007) 4.

250 Ondoa H.A. and Nkouli AJB "The Effects of Regulatory Agencies of Sub-Saharan Electricity Companies on Social Welfare" Autumn 2013 and Spring 2014 (39) the Journal of Energy and Development 86.

limited accountability, and limited fiscal efficiency with significant effects on the industries in terms of efficiency, equity, financial and governance performance.[251]

Some of the solutions suggested for limited capacity is, first, to centralize regulatory function into a single multi-sectoral agency or to share expertise by contracting out parts of regulation to third parties although the latter may be expensive. Limited commitment can be reduced by tighter control of the behaviour of the executive over the regulator through separation of powers which increases the number of veto points for policy changes and hence reduces risk or splitting up of regulatory roles. Accountability may be increased by improving transparency which may be facilitated by frequent monitoring or auditing of the regulator or alternatively, the regulator may be elected by or made directly accountable to the legislature, which is likely to align its incentives closely with those consumers.[252]

Considering the specific socioeconomic situation of each country, it will be best to ascertain the peculiar institutional issue besetting its reform institutions before adopting any of the measures suggested or rather to consider a measure that best suits its circumstances. Scholarly suggestions for best fit regulatory design for local context are apt in this regard.[253]

2.4.3 Regulatory design in power sector reform

The emphasis is on a country to adopt a regulatory design that best suits her context. However, the regulatory design of the power sector reform in developing economies emanated from the pioneering reform experience in Chile and the position of the World Bank for infrastructure development in these economies. Most of these countries' reform policy for infrastructure[254] is a resonance of the Chile reform and World Bank's policy. The World Bank in its policy paper on electric power sector gave a history of its

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251 Estache A and Wren-Lewis L On the Theory and Evidence on Regulation of Network Industries in Developing Countries in Baldwin R Cave M and Lodge M the Oxford handbook of regulation (Oxford University Press Oxford 2012)372 and 376- 377.

252 Estache A and Wren-Lewis L On the Theory and Evidence on Regulation of Network Industries in Developing Countries in Baldwin R Cave M and Lodge M the Oxford handbook of regulation (Oxford University Press Oxford 2012)372 and 383- 384.

253 Eberhard A "Matching Regulatory Design to Country Circumstances The potential of hybrid and transitional models" 2007 Gridlines Note No. 23 3.

254 The Bank classified infrastructure as public utilities like power, telecommunications, piped water supply, sanitation and sewerage, solid waste collection and disposal and piped gas; public works. like roads and major dam and canal works for irrigation and drainage; other transport sectors like urban and interurban ban railways, urban transport, ports and waterways and airports.

position and recommendation for an effective institutional, regulatory and financial reform in developing economies.[255]

It emphasized that the power sector in most developing countries used to consist of a single national electric utility operating as a vertically integrated public monopoly.[256] The structure was partly based on the view that electricity is a strategic and publicly provided good and that people have a right to power at low prices.

However, it became imperative to restructure owing to a review of the Bank's lending for electric power which confirmed a decline in the sector's pricing, financial, technical and institutional performance mainly due to governmental failure to address the structural problems.[257] In addition, the macroeconomic difficulties of many of the developing countries severely reduced the availability of public resources to fund planned power sector investment programs and so it became imperative for the Bank to come up with a better approach for managing the power sector investment also considering the huge lending to publicly-owned infrastructure which stood at $75 billion in 1990.[258]

The Bank in its policy document which is considered among the earliest articulations of the approach to power sector reform for developing countries,[259] considered a range of country and regional situations and came up with a general set of recommendations grouped under five principles[260] namely, the establishment of transparent regulatory framework with independent power suppliers and no government interference, the bank's assistance in financing importation of services and human capital, commercialization and corporatization as necessary step for restructuring, lending is based on commitment to sector performance and encouragement of private investment based on bank's financial resources support programs.

In 1994, the World Bank further came out more strongly in its views of what policies it would like the developing countries to adopt in restructuring their infrastructure. In its

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255 World Bank the World Bank's Role in the Electric Power Sector (World Bank Policy Paper World Bank Washington DC 1993) 1 – 84.

256 World Bank the World Bank's Role in the Electric Power Sector (World Bank Policy Paper World Bank Washington DC 1993) 11.

257 World Bank the World Bank's Role in the Electric Power Sector (World Bank Policy Paper World Bank Washington DC 1993) 12.

258 World Bank the World Bank's Role in the Electric Power Sector (World Bank Policy Paper World Bank Washington DC 1993) 11 – 12.

259 Gratwick KN and Eberhard "A Demise of the Standard Model for Power Sector Reform and the Emergence of Hybrid Power Markets" 2008 (36) Energy Policy 3951.

260 World Bank the World Bank's Role in the Electric Power Sector (World Bank Policy Paper World Bank Washington DC 1993) 14 – 18.

Report,[261] emphasis was further placed on management of infrastructure like a business and not a bureaucracy, the introduction of competition, public-private partnerships in financing and the continuing role for the governments whether services are produced by public or private providers.

In the course of the decade, as power sector reforms was being enacted in developing countries, a series of reform steps evolved so much so that by 1999 according to Gratwick and Eberhard it had shaped up loosely as follows[262]:

i. Corporatization of utility. Transformation into separate legal entity different from ministry/government.

ii. Commercialization with the aim of cost-recovery in pricing, improvements in metering, and billing and collections.

iii. Passing of the requisite legislation to provide for the restructuring and a legal framework to allow the participation of private/foreign ownership in the sector.

iv. Creation of an independent regulator with sundry responsibilities but principally to ensure efficiency, transparency, fairness and prevent anticompetitive activity.

v. Introduction of Independent Power Producers (IPPs) to introduce private investment in generation, transmission and distribution.

vi. Restructuring by unbundling the incumbent (state-owned) utility in preparation for privatization of profitable assets and the introduction of competition.

vii. Divestiture of unbundled state-owned assets to private sector.

viii. Introduction of competition to wholesale and retail markets.

The above arrangement draws extensively from Littlechild's[263] textbook model also called 'standard model' and 'textbook architecture' by Joskow[264] for restructuring and competition. Littlechild describes the ten components of textbook model as

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261 World Bank "World Development Report 1994" online: http://documents.worldbank.org/curated/en/687361468340136928/pdf/13483.pdf. (Date of use: 17 October 2018).

262 Gratwick KN and Eberhard "A Demise of the Standard Model for Power Sector Reform and the Emergence of Hybrid Power Markets" 2008 (36) Energy Policy 3952.

263 Littlechild S Foreword: the Market versus Regulation in Sishansi FP and Pfaffenberger W Electricity Market Reform: An International Perspective (Elsevier Limited, Oxford 2006) xviii.

264 Joskow P.L. Introduction to Electricity Sector Liberalization: Lessons Learned from Cross-Country Studies in Sishansi FP and Pfaffenberger W Electricity Market Reform: An International Perspective (Elsevier Limited, Oxford 2006) 4 – 6.

privatization, vertical separation of competitive and regulated monopoly sectors, horizontal restructuring to create an adequate number of competing generators and suppliers, designation of an independent system operator, creation of voluntary energy and ancillary services markets and trading arrangements, application of regulatory rules to promote access to the transmission network, unbundling of retail tariffs, specification of arrangements for supplying customers, creation of independent regulatory agencies and provision of transition mechanisms that anticipate and respond to problems and support the transition rather than hinder it.

Littlechild further argued that where the textbook model has been largely followed it has been broadly successful with examples from UK, Argentina, the Nordic countries and Texas, and where it has not been followed, there have been problems and that in many of those problematic cases, competition has been less effective, prices to customers have been correspondingly higher, in other cases, prices have been artificially held below market levels, which has been the cause of different problems. The inability or unwillingness of governments to secure and defend market prices that cover reasonable costs has often precluded the full application of the model.[265]

While the diagnosis by Littlechild may be correct particularly as it relates to non-cost reflective prices in the power market in Nigeria, the cause of the problem may not be directly traceable to non-adherence to the textbook model given the fact that there have been variations of the model with considerably greater emphasis on the creation of competitive wholesale and retail markets[266] and the need to factor country-specific circumstances.

In fact, the World Bank had consistently urged on the designers of the reforms to develop methods suitable to the context of each country. The Bank in a review of its experience with private participation in the electricity sector, points out that there is no single blueprint suitable for all sector reforms and private sector development in electricity power sector; instead, there is an evolving menu of options for the combinations and sequences of reform steps that are driven by country-specific objectives and conditions.[267] How much of this consideration for country-specific

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265 Littlechild S Foreward:the Market versus Regulation in Sishansi FP and Pfaffenberger W Electricity Market Reform: An International Perspective (Elsevier Limited, Oxford 2006)xviii – xix.

266 Gratwick KN and Eberhard "A Demise of the Standard Model for Power Sector Reform and the Emergence of Hybrid Power Markets" 2008 (36) Energy Policy 3952.

267 Manibog F et al Power for Development. A Review of the World Bank Group's Experience with Private Participation in the Electricity Sector (the World Bank, International Finance Corporation and Multilateral Investment Guarantee Agency, Washington DC 2003) x.

circumstances went into the power sector reform design in Nigeria is the focus of Chapters 4 and 5 of the study.

Apart from UK which appears to be the primus inter pares in privatization programme, Chile holds the record as the pioneer of power sector reform. Her reform process predates the World Bank's restructuring agenda. The period between 1973 and 1990, the military government inspired free market policies in Chile leading to the reform of the electric supply industry which reversed the previous trend of increasing government's intervention in economic activities.[268] With series of enactments of reform laws in this period, Chile was able to reform its power sector with remarkable growth.[269]

The Chilean experience epitomizes a reform based on country-specific situation, judging from constant fine-tuning and continuous adjustments which respond to a learning process based on what had worked in the past and what had not, and it offers a useful insight for policy makers and regulators around the world.[270] A comparative analysis of the electric supply industry in Chile will be done in chapter 5 of the study.

2.4.4 Post-privatization regulation of power sector reform

The emphasis on post-privatization era is to understand that sector reform is a process. This is important because pressures for rapid results should not obscure the point that reforming power market is a long-term process that requires patience to achieve the desired results[271] like generating more power, improving the energy mix, improving quality for consumers, strengthening government's fiscal position, provision of access to electricity for the poor and so on.

Much of the arguments for justifying regulation generally are applicable to the need for regulation as a mechanism for stimulating power sector reform after privatization. Most of the developing countries have weak governance structures for power utilities and poor investment climates[272] and in addition, the privatization of the unbundled

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268 Ranieri R. Chile: Where It All Started in Sishansi FP and Pfaffenberger W Electricity Market Reform: An International Perspective (Elsevier Limited, Oxford 2006) 81 – 82.

269 Ranieri R. Chile: Where It All Started in Sishansi FP and Pfaffenberger W Electricity Market Reform: An International Perspective (Elsevier Limited, Oxford 2006) 86 – 87.

270 Ranieri R. Chile: Where It All Started in Sishansi FP and Pfaffenberger W Electricity Market Reform: An International Perspective (Elsevier Limited, Oxford 2006) 77.

271 Besant-Jones J.E. Reforming Power Markets in Developing Countries: What Have We Learned? (World Bank Energy and Mining Sector Board Discussion Paper No 19 2006) 4.

272 Besant-Jones J.E. Reforming Power Markets in Developing Countries: What Have We Learned? (World Bank Energy and Mining Sector Board Discussion Paper No 19 2006) 4.

government firms had not changed the monopoly status of these firms and so the market is generally still being confronted with efficiency and competition challenges.

It is argued that while some may be convinced that private ownership leads to greater productivity, there is also the view that an enterprise's efficiency is determined not so much by its public or private ownership[273] as by the regulatory structure and the degree of competition under which it operates. In this regard, China has demonstrated that an economy might achieve more effective growth by focusing first on competition, leaving privatization until later (discussed in Chapter five of the study).[274]

To ensure efficiency which is the goal in accordance with our public interest theory, there is the need to regulate the privatized markets through economic and social regulation which will facilitate and encourage effective competition where it is feasible and provide an effective substitute for competition where it is not possible[275] and to equally ensure things like quality of service and research and development.

A particularly vexed issue is price or tariff setting which have a direct impact on the consumers and of course the regulatory approach here is the rate of return and price cap methods which has already been discussed. However, economic regulation could also provide incentives to utilities for meeting the demand for public utility services, improving the efficiency in production and provision of such services, and satisfying the expectations of the suppliers of capital funds to the utilities.[276] In this regard the US FERC had already introduced incentive regulation by its policy statement on October 30, 1992.[277]

To ensure optimal regulatory mechanisms, first, all the objectives of the regulatory body should be clearly spelt out in the Act establishing it, known to the firms and the public. Secondly, any regulation of economic activity requires that the regulators have a good understanding of the sector so that members constituted are capable of taking an informed view, know the economics of the industry, the technology, the legal

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273 Kaelo G and Malema W "Privatization as a Vehicle for Economic Development: An Appraisal" 2013 (45) Botswana Notes and Records 91.

274 Horn A. and Kim S.R. Regulation Policies Concerning Natural Monopolies in Developing and Transition Economies (DESA Discussion Paper No. 89 of United Nations Department of Economic and Social Affairs March 1999) 7.

275 Kemal A.R. Why Regulate a Privatized Firm? "the Pakistan Development Review (Vol. 35 No. 4 Papers and Proceedings PART II Twelfth Annual General Meeting of the Pakistan Society of Development Economists Islamabad December 14 – 16 1996) 654.

276 Kodwani D.G. "Economic Regulation of Utility Industries" 2000 (35) Economic and Political Weekly 2659.

277 Terzic B "Incentive Regulation: Efficiency in Monopoly" 1994 (8) Natural Resources & Environment (The Future of Electric Power)26 – 28, 57 – 58.

intricacies and scope of competition.[278] Thirdly, the government at central or state levels should make sure that autonomy given to the regulatory authorities is enshrined in the legislation so that the regulatory body can hold the government at arm's length.[279]

2.4.5 Summary

All the regulatory designs above are important. However, countries should always ensure that whatever design adopted fits their socio-economic and country specific context taking into consideration her constitution, legal system and cultural background. Therefore, while the textbook model may well fit into some context, it should not be adopted as a one-size-fits-all approach to regulatory design. Rather, countries should tweak it to fit their situation.

In addition, in the absence of a competitive market after privatization, regulatory mechanisms should be deployed to ensure the much needed competition which ought to accompany privatization.

2.5 CONCLUSION

This chapter introduced the theories of regulation, the concepts of state/government intervention in utility and utility reform; it explained the related concept of natural monopoly and its regulatory control mechanism adopted by the State. Finally, it introduced power sector reform in developing countries, the institutional approach to reform, the regulatory designs in reform era, and the rationale for post-privatization regulation of the power sector reform.

The analysis of the three theories of regulation identified, shows the relevance of public interest goal of regulation, that regulation may not necessarily serve the interest of the public in some cases where there is a capture by an interest group and the relevance of considering regulation from the perspective of the institutions which make up the regulatory regime of legal systems and their roles as it affects regulatory development. All of these were necessary in explaining the basis and the context of the regulation in the electric industry and regulation of a power sector reform.

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278 Kodwani D.G. "Economic Regulation of Utility Industries" 2000 (35) Economic and Political Weekly 2659.

279 Kodwani D.G. "Economic Regulation of Utility Industries" 2000 (35) Economic and Political Weekly 2659.

With regards to the concept of state/government intervention, the relevance of this is to draw the difference between a free and a regulated market when an incidence of market failure like natural monopoly occurs. Market failure is the traditional and most profound reason for justifying state intervention even though there are counter arguments in this regard. Where there is a natural monopoly, the inevitability of anti-competition arises and the need for government to respond by adopting any of the regulatory mechanisms discussed.

By reason of the nature of utility like water, electricity, gas, and telecommunications which were considered strategic, they were publicly owned but in the course of time, there began a policy shift to private ownership to foster efficiency. This policy change was equally adopted by the developing countries for various reasons but ultimately to ensure that their public enterprises are restructured to better serve its people.

Finally, the regulatory design in power sector reform in developing countries was explained as the offshoot of the UK, Chile experience, the World Bank recommendation and the need to always modify the said recommendation to suit country specific context. While we explained the institutional approach to the reform of public enterprises in developing countries which should necessarily form the basis of adopting any regulatory design given the fact that institutions are weak in developing countries, post-privatization regulation was also justified on the ground that competition should accompany privatization for it to be successful and effective.

The next chapter will introduce the history of the Nigeria power sector, regulatory regime of the pre-privatization era as well as the issues and challenges which led to the reform of the power sector.

CHAPTER 3

ELECTRICITY GENERATION IN NIGERIA: HISTORY, REGULATORY REGIME AND THE REFORM

2.4 INTRODUCTION

The power sector industry in any economy provides the production and delivery of electricity in sufficient quantities to areas that need electricity, through a grid connection. The grid usually distributes electrical energy to customers.[280]Electricity which is being provided by the power sector industry has been recognized as a form of energy and described as a set of phenomena associated with the presence and motion of electric charge, although initially considered a phenomenon separate from magnetism. Since the development of Maxwell's equations, both are recognized as part of a single phenomenon. Some of the common phenomena related to electricity include lightning, static electricity, electric heating, electric discharges and so on.[281] Finn is of the view that early investigators were uncertain until well into the nineteenth century about how many forms of electricity had been discovered and whether they were in truth the same. Hence, the different forms were defined in terms of their methods of production like frictional, galvanic (physiological), voltaic (chemical), electromagnetic and thermoelectric.[282]

In the course of history, electrical phenomenon have been studied, although progress in theoretical understanding remained slow until the seventeenth and eighteenth centuries, even then practical applications for electricity were few not until the late nineteenth century that electrical engineers were able to put it to industrial and residential use which transformed industry and society and became a driving force for the industrial revolution.

The late 19th century experienced a remarkable progress in electrical engineering through such people as Otto Blathy, Thomas Edison, Galileo Ferraris, Nikola Tesla, William Thomson, Ernst Werner Siemens, and Joseph Swan. Electricity turned from a scientific curiosity into an essential tool for modern life, becoming a driving force of the second industrial revolution.[283] Of note are, Otho Blathy who became the co-inventor

280 U.S. Department of Energy Federal Energy Management Program Office of Energy Efficiency and Renewable Energy "A primer on electric utilities, deregulation and restructuring of U.S. electricity markets" (May 2002) online https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-13906.pdf (Date of use: 6 April 2019) 4.1.

281 Lyons T.A. A Treatise on Electromagnetic Phenomena and on the Compass and its Deviations Aboard Ship. Mathematical, Theoretical and Practical (J. Wiley & Sons New York 1901).

282 Finn History of Electrical Technology: The State of the Art (The University of Chicago Press 1976) 31 – 35.

283 Haradhan M "The Second industrial revolution has brought modern social and economic developments" 2020 (6) Journal of Social Sciences and Humanities 1 - 14.

of the modern electric transformer,[284] tension regulator,[285]AC watt-hour meter motor capacitor for the single-phase (AC) electric motor, the turbo generator[286] and the high-efficiency turbo generator and Thomas Edison known as America's greatest inventor, he developed many devices like light bulb, the object of which is to produce electric lamps giving light by incandescence. The lamps were described to had high resistance, so as to allow the practical subdivision of the electric light, the invention consists in a light giving body of carbon wire or sheets coiled or arranged in such manner as to offer great resistance to the passage of the electric current and at the same time present but a slight surface from which radiation can take place.[287]

More significant than the number of Edison's patent was the widespread impact of his inventions like electric light and power utilities, he developed a system of electric-power generation and distribution to homes, businesses and factories, a crucial development in the modern industrialized world. Upon developing a commercially viable electric light bulb, Edison developed an electric utility to compete with the existing gas light utilities; he patented a system for electricity distribution.[288]

Notably in the 20th century electricity development is the work of Albert Einstein who applied his idea in order to construct a theory of photo-electricity. In Einstein's paper of 1905 he asserted that when a metal surface is illumined by radiation, the radiation consists of parcels of energy, when one of such parcel or photon falls on the metal, it may be absorbed and liberate a photo-electron. This implies that no photo-electrons will be generated unless the frequency of the light exceeds a certain threshold. Einstein's theory was verified experimental in 1912- 1916. The Photoelectric effect is also employed in photocells such as can be found in solar panels and this is frequently used to make electricity commercially. He reconciled Maxwell's equation for electricity and magnetism with the laws of mechanics by introducing major changes to

284 Guarnieri M. "Who Invented the Transformer?" 2013 7 (4) IEEE Industrial Electronics Magazine 56–59.

285 "Biography of Otto Titusz Blathy" (28 September 2010) online: https://en-academic.com/dic.nsf/enwiki/152870 (Date of use: 10 February 2018).

286 Prabook "Otto Titusz Blathy" online: https://prabook.com/web/otto.blathy/2118277 (Date of use: 10 February 2018).

287 The Science News-Letter "Classic Inventions: Edison's Electric Lamp" 1929 Society for Science & the Public 85 – 86.

288 Britannica "Thomas Edison" (14 October 2021) online: https://www.britannica.com/biography/Thomas-Edison/Menlo-Park (Date of use: 5 November 2021).

mechanics close to the speed of light, resulting from an analysis based on empirical evidence that the speed of light is independent of the motion of the observer.[289]

The above exposé reveals the impact of electricity evolution on industrialization. While the details of the history of electricity is complex[290], a generally acceptable view is how it is has come to shape all facets of human development.

3.1.1 Sources of Electricity

In the modern age, the known sources of electricity are namely; wind, biomass, solar, natural gas, hydroelectricity, coal, and nuclear. The kinetic energy of the wind can be harnessed with turbines but the potential drawback to wind power is that; it relies on a naturally variable resource though renewable, it cannot be turned on and off according to demand and can only be generated in windy areas. Solar energy can be converted directly to electricity by photovoltaic cells (PVs) which produce an electric current when struck by sunlight because the solar energy supply is inexhaustible, its potential for electricity generation is limited only by the efficiency at which it can be captured and the amount of surface area devoted to it. Another drawback to Photovoltaic cell is that they only generate electricity when the sun is shining and therefore requires some sort of energy storage or back-up system at a small scale while at larger scales, studies and field experiences have shown that integrated intermittent Photovoltaic generated electricity into electric grid provides few technical difficulties even when considering much higher levels of solar power usage.[291]

Unlike combustion of fossil fuels, the operation of solar cells causes no emissions of greenhouse gases or acidifying gases to the atmosphere neither does it generate radioactive waste, as does nuclear power generation, although the adverse environmental effects caused by the operation of solar cells are small, production and sometimes disposal do have an environmental impact.[292]Biomass as a source of electricity is a broad term that generally encompasses the various forms of organic matter from plants and animals, including agricultural and forestry residues, mill residues, urban wood waste such as yard trimmings and construction and demolition

289 Whittaker E “Albert Einstein Biographical Memoirs of Fellows of the Royal Society” 1955 (1) Royal Society 40, 48-50.

290 Finn B S History of Electrical Technology: The State of the Art (The University of Chicago Press 1976 (67)) 34.

291 Ewg “Green Energy Guide” (8 November 2000) online: https://www.ewg.org/research/green-energy-guide/sources-electricity#.W3GWPHnyHIU (Date of use: 13 August 2018).

292 Tillman A “Environmental Assessment of Photovoltaic Technologies” 1995 (6) Energy & Environment 43 – 61.

debris, and “energy” crops grown for use in biomass-based facilities. It is a renewable resource that can be replenished relatively quickly on a sustainable basis. While some amount of waste biomass is already being used for energy production, a significant amount remains as an available untapped resource.[293]

Natural gas is also a source of electricity, it is derived from buried organic matter formed millions of years ago subjected to very high temperatures and pressures. Although the formation process continues, the rate is negligible compared to the rate of human extraction, making natural gas a non-renewable resource. Once extracted and refined, the gas is burned to create steam, which then turns turbines to produce electricity.[294]Electric power generation offers the greatest potential for gas, the combination of new technology (combined cycle gas turbines) and an environmentally acceptable fuel make gas a prime candidate at the right price, the rate of growth in this regard could increase rapidly if the latent antagonism towards nuclear power acquires more political muscle.[295]By 2040, it is projected that natural gas will be 26% of the world’s primary energy consumption.[296]

The kinetic energy of flowing water can also be used to spin turbines which produce hydroelectricity; it is renewable, can produce electricity on-demand and generates electricity with few emissions.[297] It is the largest single renewable electricity source providing 16% of world electricity at competitive prices. Much of the projected growth in renewable generation is expected to result from the completion of large hydroelectric facilities in developing countries, particularly in developing Asia, China, India and other developing Asian countries who are constructing or planning new, large-scale hydroelectric facilities.[298]

Coal together with oil and natural gas are classified as types of fossil fuel. It is a hard, black substance found close to the earth’s surface or mined from the deep in the

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293 Uhland AM “Improving Regulations for Biomass-Based Electrical Generating Facilities” 2008 (23) Natural Resources & Environment 15-18.

294 Ewg “Green Energy Guide” (8 November 2000) online: https://www.ewg.org/research/green-energy-guide/sources-electricity#.W3GWPHnyHIU (Date of use: 13 August 2018).

295 Clegg M “the Long Term Perspective” 1989 (7) Sage Publication, Energy Exploration & Exploitation 15 – 36.

296 John A Dutton e-education institute “Current and Future Energy Sources of the World” (The World’s energy supply sources for the years 1990 to 2018) online: https://www.e-education.psu.edu/egee102/node/1929 (Date of use 13 August 2018).

297 Ewg “Green Energy Guide” (8 November 2000) online: https://www.ewg.org/research/green-energy-guide/sources-electricity#.W3GWPHnyHIU (Date of use: 13 August 2018).

298 John A Dutton e-education institute “Current and Future Energy Sources of the World” (The World’s energy supply sources for the years 1990 to 2018) online: https://www.e-education.psu.edu/egee102/node/1929 (Date of use 13 August 2018).

ground.[299]It is said to be the world's slowest growing energy source, rising by an average 0.6% per year, from 153 quadrillion Btu in 2012 to 180 quadrillion Btu in 2040. The top three coal-consuming countries are China, the United States and India, which together account for more than 70% of world coal use. It remains a vital fuel for the world's electricity markets and is expected to continue to dominate energy markets in developing Asia.[300]

Nuclear energy as a source of electricity harnesses the power contained within the nuclei of atoms. Consequently, risks and impacts involved are unique. The nuclear fuel cycle begins with the mining of uranium ore (a non-renewable resource), releasing radon (radioactive gas) and creating large amounts of radioactive waste rock (tailings). The uranium is then processed in a highly energy-intensive process and fabricated into fuel rods. Nuclear power plants produce energy through either fission reactions (when an atom of a radioactive element such as uranium or plutonium collides with a neutron, splitting the element apart) or fusion reactions (where two elements collide at high speed, forming one or more heavier elements). In both cases, a large amount of heat is released which is used to create steam to turn turbines and generate electrical energy.

The power generation in Nigeria is primarily sourced from water and gas while solar innovation is still at a developing stage and largely used to complement grid power from power generated from thermal and hydro plants. The regulation of this power is built on contractual arrangement with power producers (private and government-owned) subject to regulatory control for grid distribution around the country.

3.1.2 Harnessing the Sources of Electricity

Industrial revolution has played a key role in harnessing the above sources of electricity in practically all the spheres of human endeavours. This suggests that inherent in electricity utility is the idea that public interest plays a dominant role in power generation and utilization in the development of any society. When coal burning steam engine was invented, the human race began to see who could create and build bigger, better, and faster machines. The machines were used to provide transportation

[299] Science Clarified "the Development of energy" online: http://www.scienceclarified.com/scitech/Energy-Alternatives/The-Development-of-Energy.html (Date of use 13 August 2018).

[300] John A Dutton e-education institute "Current and Future Energy Sources of the World" (The World's energy supply sources for the years 1990 to 2018) online: https://www.e-education.psu.edu/egee102/node/1929 (Date of use 13 August 2018).

and to do work formerly done by people and animals. Coal continued to be used in great quantities until the twentieth century when the invention of the internal combustion engine and the automobile, used oil and gas instead of coal. Oil and gas also came into use in other areas, such as for manufacturing and power production, and remain in high use today.[301]

Electric power is considered as a key element of the industrial revolution both of the 19th and 20th centuries (first and second industrial revolutions). These revolutions, together with the transformation of the chemical industry and the internal combustion engine, redefined the whole set of technological opportunities available to industrializing societies. It is fair to say that the 20th century was in large measure, a protracted working out of the trajectories of economic opportunities established by scientific breakthroughs in electric power amongst others, with the uniquely-important internal combustion engine.[302]

Before advances in technology opened up new realms for power generation, coal power generation had already being firmly established with several improvements on its efficiency.[303] Subsequently, General Electric (GE), engineers who participated in the development of jet engines put their know-how into designing a gas turbine for industrial and utility service. Following the development of a gas turbine-electric locomotive in 1948, GE installed its first commercial gas turbine for power generation; a 3.5MW heavy-duty unit at the Belle Isle Station owned by Oklahoma Gas & Electric in July 1949. A large heavy duty turbine technology rapidly improved thereafter.[304]

The advancement in the world understanding of atomic principles through scientists like Albert Einstein and Otto Hahn, made scientists turn their attention to developing a self-sustaining chain reaction. The first reactor to produce electricity from nuclear energy was Experimental Breeder Reactor I, on December 20, 1951 in Idaho, the Soviet Union designed her own and began generating electricity in 1954. The UK,

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301 Science Clarified "the Development of energy" online: http://www.scienceclarified.com/scitech/Energy-Alternatives/The-Development-of-Energy.html (Date of use 13 August 2018).

302 Rosenberg N The Role of Electricity in Industrial Development (The Energy Journal Vol. 19, No. 2 1998) 8 -9.

303 Powermag "History of power: the evolution of the electric generation industry" (20 December 2020) online: https://www.powermag.com/history-of-power-the-evolution-of-the-electric-generation-industry/?pagenum=1 (Date of use 13 August 2018).

304 Powermag "History of power: the evolution of the electric generation industry" (20 December 2020) online: https://www.powermag.com/history-of-power-the-evolution-of-the-electric-generation-industry/?pagenum=2 (Date of use 13 August 2018).

Germany, Japan, France and other countries soon followed so much so that the industry grew rapidly in the 1960s and 1970s.[305]

What became modern renewable energy generation got its start in the late 1800s. Hydropower was first to transition to a commercial electricity source. In 1880, Michigan's Grand Rapids Electric Light and Power Co. generated direct current electricity using hydropower at the Wolverine Chair Company, a belt-driven dynamo powered by a water turbine at the factory lit 16 arc street lamps. By 1888, roughly 200 electric companies relied on hydropower for at least some of their electricity generation. Internationally, Switzerland was at the forefront of pumped storage, opening the world's first of such plant in 1909. Pumped storage was integrated into the U.S. energy mix in 1930.[306] The windmill power generation also gained popularity at about the same time with hydropower. An inventor, Charles Brush in 1888 constructed a 60-foot wind turbine in his backyard, the windmill's wheel was 56 feet in diameter and had 144 blades, a shaft inside the tower turned pulleys and belts which spun a 12-KW dynamo that was connected to batteries in Brush's basement, the technology also spread throughout the world.[307]

In the 1950s, silicon solar cell was produced commercially. According to the U.S. Department of Energy (DOE), the first solar cell capable of converting enough of the sun's energy into power to run every day electrical equipment was created by Bells Laboratories. By the 1970s, the efficiency of solar cells had increased and they began to be used to power navigations warning lights and horns on many offshore gas and oil rigs, lighthouses, and railroad crossing signals, domestic solar applications began to be viewed as sensible alternatives in remote locations where grid-connected options were not affordable. The 1980s saw significant progress in the development of more efficient, more powerful solar projects like the first Photovoltaic (PV) megawatt-scale power station developed by ARCO Solar. The DOE also began operating Solar One,

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305 Powermag "History of power: the evolution of the electric generation industry" (20 December 2020) online: https://www.powermag.com/history-of-power-the-evolution-of-the-electric-generation-industry/?pagenum=3 (Date of use 13 August 2018).

306 Powermag "History of power: the evolution of the electric generation industry" (20 December 2020) online:https://www.powermag.com/history-of-power-the-evolution-of-the-electric-generation-industry/?pagenum=4 (Date of use 13 August 2018).

307 Powermag "History of power: the evolution of the electric generation industry" (20 December 2020) online:https://www.powermag.com/history-of-power-the-evolution-of-the-electric-generation-industry/?pagenum=4 (Date of use 13 August 2018).

a 10-MW central-receiver demonstration project, and by the mid-2000s, residential solar power systems were available for sale in home improvement stores.[308]

In Nigeria, technological advancement and regulatory development in power generation was encouraged by the peculiarity of the environment. The investment in hydroelectricity was based on the potential offered by the Rivers in the Northern part of the country while continuous investment in gas is based on the natural resource available in the Southern part of the country.

3.2 HISTORY OF ELECTRICITY GENERATION IN AFRICA

3.2.1 A Summary of the development

In the wake of the developments of the second industrial revolution, Africa was not left alone, between the European discovery of incandescent light in 1600 and the opening of the first American hydroelectric power plant in 1882, European countries staked claims for African territory. In 1885, the same year Ottawa, Canada, became the first city in North America to sign a contract for electric lights on all of its streets; a Belgian suggested the hydroelectric potential of the lower Congo River and Africa was divided up at the Conference of Berlin.[309] As in Europe and North America, African electrification began with isolated, small-scale generators supplying farms/plantations, industries and transit systems with power, and municipalities with lighting. Most had steam-driven turbines, these small scales thermal plants were typically fuelled by gas in North Africa, wood in East and Central Africa, and coal in Southern Africa; diesel engines fuelled with imported oil were widely used in West Africa. Run-of-the river (non-storage) hydroelectric systems arrived not long after their international commercial development.[310]

3.2.2 History of Electricity Generation in the Colonial Era in Nigeria: Electricity Supply Structure

In 1896, when Nigeria was a British Colony, an electricity generating plant containing two 30 KW generator sets was built in Lagos by the Public Works Department of the

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308 Powermag “History of power: the evolution of the electric generation industry” (20 December 2020) online:https://www.powermag.com/history-of-power-the-evolution-of-the-electric-generation-industry/?pagenum=5 (Date of use 13 August 2018).

309 The Berlin Conference of 1884-85, also known as the Congo Conference or West Africa Conference regulated European colonization and trade in Africa during the new imperialism period and coincided with Germany’s sudden emergence as an imperial power.

310 Showers K.B. “Electrifying Africa: An Environmental History with Policy Implications” 2011 (93) Geografiska Annaler. Series B Human Geography 195.

Government of Southern Nigeria to light Government House and the immediate vicinity from 6pm to 11pm. The two generating sets had a total capacity of 60KW but with a populace too poor to afford domestic consumption, production remained very low up until after the Second World War. In addition to the production of government and native authority (local government) generating plants, a number of the larger industries produced their own electricity. In the Delta port of Sapele, the large African Timber and Plywood Company operated a power plant for its own mills and supplied the town of Sapele using wood waste as fuel. On the Jos Plateau in Northern Nigeria, the tin mining industry taking advantage of the rainfall and slope conditions of the Plateau edge established Kwal in 1923, a simple run-of-the-river hydroelectric station of 2 megawatts installed capacity.[311]

The large and concentrated industrial demand of this Plateau area led to further developments and the creation of the Nigerian Electricity Supply Company (NESCO). This private company built a hydroelectric system at Kurra Falls, South East of Jos, (now in Plateau State, Nigeria). In 1929, it took over the Kwal station and by 1939 was producing more electricity than the whole of the rest of Nigeria. The vast bulk of the output was consumed by the tin industry at its mining sites and in its concentrating plant. Jos and neighbouring plateau settlements were also supplied. Capital costs were minimized by a careful choice of sites where a substantial head of water was available on the precipitous scarp edge of the Plateau.[312] It was said that during this period, electricity in Nigeria was generated partly by oil and partly by coal, and that it was only on the high Plateau, where the tin minefield is situated, that electricity was generated by water which produced about 230 megawatts and was considered a large supply for an African country in Nigeria's position at the time.[313]

In 1946, the Nigerian Government Electricity Undertaking was established under the jurisdiction of the Public Works Department (PWD) to take over the responsibility for electricity supply in Lagos State leaving other parts of the country out of the jurisdiction of the undertaking.[314] The first step at consolidating the electricity supply industry was taken in *Ordinance 15 of 1950* which set up the Electricity Corporation of Nigeria (E.C.N.). In 1951, the Corporation took over all government plants in operation or under construction and in the following year, the Native Authority stations but

311 Simpson E.S. "Electricity production in Nigeria" 1969 (45) Economic Geography 241.
312 Simpson E.S. "Electricity production in Nigeria" 1969 (45) Economic Geography 241.
313 Niven R "Modern Nigeria" 1969 (118) Journal of the Royal Society of Arts 36.
314 Oni A The Nigerian Electric Power Sector (CI-Plus ISBN: 978-0-9919745-0-4 2013) 3.

N.E.S.C.O. hydro plant and the Sapele African Timber and Plywood Company generator were left in private hands[315] from which the Corporation bought supplies for other consumers. Therefore, by 1952, E.C.N controlled all electricity production outside Sapele and the Plateau and the private generation of electricity was prohibited in areas where E.C.N. could provide a supply.[316]

At the end of the Corporation's first full year of activity, Nigeria's installed generating capacity totaled 46,029 KW, excluding the Southern Cameroons and Sapele plant, almost 90% was located in five centers namely, Northern, Eastern, Western region, Lagos and Nigeria. In Lagos, the capital of the Federation and its major port and commercial center had no less than a third of the nation's capacity using seaborne coal from Enugu mines shipped via Port Harcourt, and imported oil to power its steam and diesel plants. On the Jos Plateau, the N.E.S.C.O. installations represented 30.4% of the country's capacity, the tin industry accounting for 91.5% of the demand. The three remaining major centers of production were very much smaller, Ibadan had 9.8%, Kano had 7.6% and Enugu had 6.5% of the total installed generating capacity.[317]

With such a scale of operation, interconnected grids of transmission lines were not in use and in most locations, regardless of relative costs of fuel, the only suitable units for such limited production were diesel-engine. Among the major plants, costs were lowest in Enugu followed by Lagos, Ibadan and Kano where costs, after the long rail haul of coal were over double those at Enugu. In the small remote installations scattered throughout the country, high fuel transport costs and scale of operation made for very high operating costs. Arising from the situation, the only E.C.N. undertaking not operating at a loss was that in Lagos, equally attendant with production were erratic supply and voltage fluctuations which were unfavourable to a growth in demand and many industrial establishments in supply areas would have generated their own electricity had they been free to do so.[318]

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315 Some writers' narratives state that E.C.N. took over the assets of NESCO and other power generation projects.

316 Simpson E.S. "Electricity production in Nigeria" 1969 (45) Economic Geography 241.

317 Simpson E.S. "Electricity production in Nigeria" 1969 (45) Economic Geography 241 – 242.

318 Simpson E.S. Electricity production in Nigeria "Economic Geography Vol 45 No. 3 1969" 242-243.

However, despite the attendant production and supply cost issues, beginning from 1953, there was a marked increase in the demand for electricity[319] at a rate 50% higher than that estimated by the International Bank for Reconstruction and Development.[320] Equally, the simplicity of the early pattern of production gave way to a more complex situation. These changes were as a result of three sets of factors namely, the increasing scale of operations, the widening choice of fuel and methods of generation and the evolution of regional government. Consequently, the E.C.N. proceeded with the policy recommended by the International Bank which is to re-equip and enlarge the generating plant in the major load centers.[321]A new coal field steam turbine station was begun in Lagos at Ijora[322], and a similar plant erected at Oji River between Enugu and Onitsha.[323].

It is important to note that power generation in this era was mostly decentralized and inspired by industries particularly in the Southern and Northern part of the country. This make up for a simple power production arrangement but soon gave way for consolidation arising from increasing scale of operation of the power producer, widening choice of fuel and methods of generation and the evolution of regional government in the country. However, here lies the disparity between what could have been the situation but for the pursuit of a centralization approach by government, to power generation and distribution. The conclusion of the study will seek to identify how useful a decentralized approach (which is not alien to the system) used be encouraged to in solving the intractable problems of Nigerian electricity sector.

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319 Awosope C.A. Nigeria Electricity Industry: Issues, Challenges and Solutions (Lecture delivered at the Covenant University 38th Public lecture, Public Lecture Series Vol.3, No. 2 2014) 7.

320 At the request of the British and Nigeria Governments, the representatives of the Bank went to Nigeria in May 1953 and examined the desirability of sending a mission to carry out a survey of the economic problems of the country and to help in the preparation of a development program, this is contained in the Bank's eight annual report of 1952 – 1953. http://documents.worldbank.org/curated/en/295971468739772254/pdf/multi-page.pdf (Date of use: 31 August, 2018).

321 This policy forms part of the recommendations of the general survey mission of the Bank to Nigeria in 1953 based on the mission's field studies, it was presented to the Government of Nigeria in September, 1954.

322 The Ijora B hydroelectric power station, Lagos, was established with a capacity of 2MW in 1956; 30MW was added in the year 1961 another 30MW in 1962 and 36.5MW in 1966.

323 Some writers suggested that some projects were carried out in Kano and Ibadan power stations to improve availability and quality of power delivery (transmission) however, the consideration for an extended interconnection by E.C.N. for a transmission network connecting the major load centers at Lagos and Ibadan in one common circuit and of eventually embracing other western towns was considered unrealistic by the International Bank for Reconstruction and Development at the time.

3.2.3 Electricity Generation in the Post-Independence Era: Towards a centralized Electricity Supply Structure

On the back of a successful hydro-electric operation on the Jos Plateau by NESCO, E.C.N. began a search (surveys and studies were carried out between 1953 and 1961) for suitable hydro-electric sites at which generation costs would be low enough to reduce the high costs of electricity produced from low-quality Nigerian coal and imported oil. The constitutional revisions of 1954 and 1959 which gave greater autonomy to the three constituent regions of the Federation of Nigeria also played a part. One outcome was the desire to promote regional economic growth to correct the economic imbalance which had resulted from the historical development of the country. In conjunction with E.C.N., the Northern Government commissioned an inquiry into the hydro-electric potential of the Kaduna River, a tributary of the Niger rising on the Jos Plateau where the river passes through the Shiroro Gorge.[324]

In 1958, the Federal Government and E.C.N authorized a study of the hydro-electric potential of the Niger to be carried out jointly by Netherlands Engineering Consultants (N.E.D.E.C.O.) and a British firm of engineering consultants, Balfour, Beaty & Co.[325] NEDECO considered all aspects of development such as power, river transport, flood control and irrigation of the Niger and Benue while Balfour, Beatty & Co. Limited studied the hydro-electric potential of the Niger.[326] Their findings indicated that the Niger in the vicinity of Jebba as offering the most favourable conditions. Also, the dramatic appearance of two new major energy resources (oil and gas) in Nigeria about the same time[327] required the Niger investigation to include a comparative cost-analysis of hydro-electricity on the Niger and thermal electricity produced from the otherwise under-utilized natural gas.[328]

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324 Simpson E.S. “Electricity production in Nigeria” 1969 (45) Economic Geography 244-245.

325 At an earlier date in 1953, the Federal Government had engaged N.E.D.E.C.O. (Netherlands Engineering Consultants), to investigate the character of the Benue and Niger Rivers primarily concerned with navigational improvements, the NEDECO survey assembled a great amount of detailed information on the two rivers but a more specific hydro-electricity enquiry was needed.

326 Wagland P.J. “Kainji and the Niger Dams Project” 1969 (54) Geographical Association 459.

327 Although the decision to investigate the hyrdro-electricity potential of the country was taken before the discovery of oil in commercial quantities in Nigeria, the first commercial oil field was discovered and proved between 1956 and 1958 and the first oil shipped from Port Harcourt in the latter year by which time two further oil fields had been located, with the oil, natural gas was produced in quantity and flared off.

328 Showers K.B. “Electrifying Africa: An Environmental History with Policy Implications” 2011 (93) Geografiska Annaler. Series B, Human Geography 200.

The investigation examined many possible dam sites between Jebba and Bussa and eventually recommended a triple dam project scheme which was approved in 1959 namely; Kurwasa (66 miles upstream of Jebba), Jebba and Shiroro. Kurwasa was later replaced by Kainji four miles downstream where geological conditions were more favourable for dam construction.[329] The scheme is a long-term development in three phases, Kainji Dam by 1968, eventually producing 960 MW; Jebba Dam (500 MW) by 1982 and Shiroro Gorge scheme (480 MW) by 1986.[330] The proposals were accepted in all their essential by the Federal Government and the Niger Dams Act was passed in September, 1962, and a preparatory site work commenced in March, 1964. The kainji power house was designed to meet electricity demand until 1982 when Jebba project should be completed followed by Shiroro in 1986.[331]

By the enactment of the Niger Dam Act, the Niger Dam Authority (NDA) was established to oversee the development and management of hydro power stations, the NDA was equally mandated to develop the hydro power potentials of the country and was responsible for the construction and maintenance of hydro dams and other works on River Niger, generating electricity by harnessing the power of water, improving navigation and promoting fish brines and irrigation. Whilst the ECN was mainly responsible for distribution and sales of electricity, the NDA was to build and operate power generating stations and transmission lines. The energy produced by the NDA was sold to the ECN for distribution and sales at utility voltages.[332]

It was argued that the impact of a program the size of the Niger Dams project upon the evolution of the electricity industry is considerable given the fact that at that time the only transmission networks in existence or planned were purely local, and so the creation of a nationwide network of 330 KV was necessary to increase transmission capabilities, enable interconnection of power stations and electricity grids which was largely driven by industrial and mining demand. The necessity to create this nationwide network of 330KV to enable interconnection became more pronounced as the demand for electricity in Nigeria expanded requiring a large investment program by E.C.N. and the Niger Dams Authority, to meet both short and long term goals. For example, in major load centers notably Lagos, Kano, Ibadan and Port Harcourt area, electricity demand increased to an extent that a large amount of new plants were installed to

329 Simpson E.S. “Electricity production in Nigeria” 1969 (45) Economic Geography 245 & 246.
330 Wagland P.J. “Kainji and the Niger Dams Project” 1969 (54) Geographical Association 459.
331 Simpson E.S. “Electricity production in Nigeria” 1969 (45) Economic Geography 245 – 247.
332 Oni A The Nigerian Electric Power Sector (CI-Plus ISBN: 978-0-9919745-0-4 2013) 4 – 5.

cover the period until Kainji electricity was available in 1968. Between April, 1964 and April, 1966, no less than 98.6 MW of new capacity was brought into service (an increase of 43%), of this, 69MW was gas turbine[333] and the rest diesel generators and with their low capital cost, speed of construction and low running costs (thermal stations) they make use of the country's oil and gas resource.[334]

According to the Electricity Corporation of Nigeria Annual Report of 1965 – 66, in order to meet electricity demand in major load centers and by interconnection of these stations by Transmission Systems, the E.C.N. embarked upon a construction program of two integrated networks, a 132 KV system[335] (with lower voltage offshoots) utilizing and pooling the thermal and diesel-generated power of the existing stations to achieve economies and meet demand until Kainji power became available and the 330 KV lines of the National Grid to carry the electricity generated at the Niger Dams.[336]

By 1969, substantial interconnection was achieved in Western Nigeria on the 132 KV circuit between Lagos, Ibadan, and Oshogbo; in the East on the Port Harcourt, Afam, and Onitsha line; and in the North on Kano, Kaduna and Zaria. With the completion of the 330 KV National Grid, these three areas were to form an integrated network conceived on a national scale. The bulk of the power was to come from the hydro stations at Kainji, Jebba and Shiroro and the power transmitted by the 330 KV grid will be tapped at a number of points where the voltage will be stepped down to 132 KV for further distribution. These developments represented a considerable departure from the pattern of electricity production at that time, local production was replaced by national production and the National Grid is its physical expression.[337] As at 1973, only five of the then 19 state capitals were connected to the national transmission grid system. However, today, practically all the state capitals are being served from the national grid[338] which was made up of about 5,523.8 km of 330 KV lines and 6,801.49 km of 132 KV lines.[339]

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333 Afam, Ughelli and Ijora gas turbine and thermal plants.

334 Simpson E.S." Electricity production in Nigeria" 1969 (45) Economic Geography 247, 250 & 251.

335 There are some reports that the first 132KV was constructed in the year 1962 linking the Ijora power station to the Ibadan power station .

336 Simpson E.S. "Electricity production in Nigeria" 1969 (45) Economic Geography 253.

337 Simpson E.S. "Electricity production in Nigeria" 1969 (45) Economic Geography 254-255.

338 Jesuovie et al "Power Supply and National Development, 1980 – 2012: The Nigeria Experience" 2014 (4) International Journal of Humanities and Social Science 146.

339 Ajao KR et al "Electricity Transmission Losses in Nigeria Power Sector: A smart Grid Approach" 2016 (4) Journal of Science, Technology and Education 49.

In 1972, the military government of Nigeria, following the recommendation of an appointed firm merged the powers of the ECN and NDA to form National Electric Power Authority (NEPA), pursuant to the now defunct Decree No. 24 of 1972..[340] The primary reasons for merging the organizations were that it would result in the vesting of the production and distribution of electricity power supply throughout the country in one organization which would assume responsibility for the financial obligations; and also more effective utilization of the human, financial and other resources available to the electricity supply industry throughout the country.[341] Essentially, the merger of the powers of the NDA and ECN to form NEPA, effectively made NEPA a vertically integrated utility company.

Between 1972 and 1991, as the electricity industry continued to grow, the following generating plants were completed to add to the national grid:

a. The Sapele Power Station phases 1 and 2 were completed between 1978 – 1981 with a combined capacity of 135 MW.[342]
b. Afam phase IV was completed in 1982 with a generating capacity of 75MW.[343]
c. Jebba Power Station was completed in 1985 with a generating capacity of 540MW.[344]
d. Between 1985 and 1986, Egbin Thermal Power Station was completed with a generating capacity of 1320MW.[345]
e. Shiroro Power Station was completed in 1990 with a generating capacity of 600MW.[346]
f. The Ughelli Power Station was built in four phases. Phase 2 was completed in 1975 with a generation capacity of 25 MW; phase 3 was completed in 1978 with

340 Oni A the Nigerian Electric Power Sector (CI-Plus ISBN: 978-0-9919745-0-4 2013) 5.
341 Okoro O.I et al "Power sector reforms in Nigeria: Opportunities and challenges" 2007 (18) Journal of Energy in Southern Africa 52.
342 New Energy Research Project (NERP) "Sapele Power Station privatised" online: http://nerp.abv.ng/index.php/power-plants/sapele-power-station-privatized/ (Date of use 31 August 2018).
343 New Energy Research Project (NERP) "Afam IV - V Power Station (FGN)" online: http://nerp.abv.ng/index.php/power-plants/afam-iv-v-power-station-fgn/ (Date of use 31 August 2018).
344 New Energy Research Project (NERP) "Jebba Power Station" online: http://nerp.abv.ng/index.php/power-plants/jebba-power-station/ (Date of use 31 August 2018).
345 New Energy Research Project (NERP) "Egbin thermal Power Station" online: http://nerp.abv.ng/index.php/power-plants/egbin-thermal-power-station/ (Date of use 31 August 2018).
346 New Energy Research Project (NERP) "Shiroro Power Station" online: http://nerp.abv.ng/index.php/power-plants/shiroro-power-station/ (Date of use 31 August 2018).

a generating capacity of 25 MW while phase 4 was completed in 1990 with a generating capacity of 100 MW.[347]

However, as the network continued to grow under NEPA, between 1978 and 1983, the Federal Government of Nigeria sponsored two panels of enquiry to fashion out models for restructuring NEPA into an independent unit or toward privatizing it out of monolithic nature which led to the establishment of the electrification boards whose work is to take power supply to the rural areas and new cities.[348] This was said to have led to the massive rollout of power infrastructure around the country[349] apparently leading to the completion of some of the power plants stated above.

By the mid-1980s, increased rural-urban migration and rapid urbanization of more cities in Nigeria significantly impacted power supply in the country. NEPA was unable to meet the increasing demand for electricity. During this period, electricity was also considered to be a social service to be provided to all, whether they are able to pay for it or not, this was the prevailing thought across most of the developing world. In response, the Federal Government of Nigeria (FGN) made various unsuccessful attempts at remodeling and restructuring the sector[350] one of which was the proposed commercialization of NEPA in 1988, supported by an upward review in tariffs.[351] The 90s was characterized with electricity decline primarily due to the inability of the Nigerian power sector to keep up with economic evolution and technological innovation. The existing power plants particularly the hydroelectric power plants experienced decline in their capacity factors as the agencies in charge failed to maintain or upgrade their equipment. Despite significant increase in population,

347 New Energy Research Project (NERP) "Ughelli Power Station" online: http://nerp.abv.ng/index.php/power-plants/transcorp-ughelli-power-station/ (Date of use 31 August 2018).

348 Awosope C.A. Nigeria Electricity Industry: Issues, Challenges and Solutions (Lecture delivered at the Covenant University 38th Public lecture, Public Lecture Series Vol.3, No. 2 2014) 7.

349 MacArthur Foundation From Genesis to date understanding the history and evolution of the Nigeria electricity supply industry (Power Nextier Advisory, investment and services Vol. 1 issue 1 05 July 2017) 47.

350 MacArthur Foundation From Genesis to date understanding the history and evolution of the Nigeria electricity supply industry (Power Nextier Advisory, investment and services Vol. 1 issue 1 05 July 2017) 47This day "From Genesis to Date A publication of Nextier Power" 2017-07-05 47.

351 Babatunde M.A. & Shuaibu M.I. "the Demand for Residential Electricity in Nigeria: A Bound Testing Approach" 2009 Research gate 3.

economic activities and household income, the Nigeria's electricity industry saw insignificant investments in new capacity during this period.[352]

3.3 REGULATORY REGIME OF THE POWER SECTOR INDUSTRY IN NIGERIA

3.3.1 Pre-reform Era

At the early stage of the electricity industry in Nigeria, its administration was a loose arrangement under the jurisdiction of the Public Works Department (PWD) of the colonial government, which was responsible for electricity supply in Lagos. Although there was an amalgamation of the Northern and Southern protectorates in 1914 to form Nigeria, the Clifford Constitution of 1922 isolated the Northern protectorate so much so that as the electricity industry evolved, the following events occurred:

a. By the formation of the Nigerian Electricity Supply Company (NESCO) in 1929, it operated as a utility company with the construction of hydroelectric power in the Plateau which was outside the jurisdiction of the PWD. It was a private company and by 1939, with the combined effect of the hydro-electric system it built at Kurra in 1929 and the management of Kwal Station,[353] it produced more electricity than the whole of the rest of Nigeria. NESCO had a concession from the Government of Nigeria to supply power for the mining operations in the Bauchi Plateau area; it was also required to supply ECN (in later years) with bulk power for distribution in the three contiguous towns of Jos, Bukuru and Vom. The concession was to expire in the year 2001.[354] With special permission from the Ministry of Mines and Power, NESCO could also supply local private consumers who are not located near ECN's lines.[355]

b. Even in 1946, when the Nigerian Government Electricity Undertaking was established under the jurisdiction of the PWD to take over the responsibility of

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352 MacArthur Foundation From Genesis to date understanding the history and evolution of the Nigeria electricity supply industry (Power Nextier Advisory, investment and services Vol. 1 issue 1 05 July 2017) 47.

353 On the Jos Plateau, in Northern Nigeria, the tin-mining industry, as its operations became increasingly mechanized, gave rise to a demand for electricity. The relatively remote, inland situation of the Plateau meant high transport costs for both coal and oil so the mining companies, taking advantage of the rainfall and slope conditions of the Plateau edge, established at Kwal, 1923, a simple run-of-river hydro-electric station of 2 megawatts installed capacity.

354 International Bank for Reconstruction and Development International Development Association African Department "Economic Growth of Nigeria: Problems and Prospects (Economic and Political Weekly 1965)20.

355 Simpson E.S. "Electricity production in Nigeria" 1969 (45) Economic Geography 241.

electricity supply in Lagos, the extension of its power the same year was only limited to Warri and Port-Harcourt which were still in the Southern protectorate.

c. There were Native Authorities in other towns that provided licenses to produce electricity. Basically, prior to 1951, electricity in Nigeria was generated and distributed by thirteen (13) undertakings owned by the Government and four (4) Native Authority facilities at Ibadan, Abeokuta, Kano and Katsina.[356]

However, upon the replacement of the Clifford Constitution by the Richard Constitution of 1947, the Richard Constitution principally emphasized the promotion of unity of Nigeria and to provide adequately for the diverse elements that made up the country to secure greater participation of Nigerians in its affairs. The Constitution divided Nigeria into three regions with no legislative powers. With the Constitution in place, the Electricity Corporation of Nigeria (ECN) Ordinance No.15 of 1950 was passed by the colonial government's legislative council to coordinate the distribution of electricity, integrate electric power development and generally make the electricity supply industry efficient.

The ECN operated under the jurisdiction of Ministry of Mines and Power and was controlled by a Board consisting of a Chairman and eleven to sixteen members. Board members are appointed by the Minister of Mines and Power for terms of three years. The Board is responsible for the broad management policies involving such matters as new employees, salaries, and expenditures in excess of £25,000. The Chief Executive officer is the General Manager and is responsible for the general administration of the corporation. He has the right to be present at all Board meetings and authorizes expenditures not in excess of £25,000. This officer is appointed by the Board with the approval of the Minister of Mines and Power. On April 1, 1951, the vesting date of the corporation, it took over the thirteen (13) Government-owned stations having a total installed capacity of 25.2 MW and on April 1, 1952, it absorbed the facilities of the four Native Authorities[357] but left NESCO hydro plant and the Sapele

356 International Bank for Reconstruction and Development International Development Association African Department "Economic Growth of Nigeria: Problems and Prospects (Economic and Political Weekly 1965)1.

357 International Bank for Reconstruction and Development International Development Association African Department "Economic Growth of Nigeria: Problems and Prospects (Economic and Political Weekly 1965) 1-2.

Africa Timber & Plywood Company's[358] generator in private hands from which it bought supplies for other consumers.[359]

The synergy between the Northern government, Federal Government and ECN brought about largely as a result of the Constitutional revision of 1954, led to the commissioning of the study of the hydro-electric potentials of Rivers Niger and Benue as discussed earlier. The acceptance of the proposals contained in the Niger Dam Report by the Federal Government of Nigeria led to the passing of the Niger Dams Act in 1962.

The Act established the Niger Dams Authority ("NDA") which was created to oversee the development and management of the proposed hydro power stations.[360] One of its primary purposes was to establish an agency to carry out the construction, maintenance and operation of Kanji Dam and ancillary works, for the generation of power, improvement of navigation, flood control, pisciculture and irrigation.[361] The Act (subsequently repealed by NEPA Act) further provides that the NDA shall supply, in bulk, power to ECN and shall also acquire and maintain ECN's generating stations and such other works belonging to or controlled by ECN as may be agreed by the two entities.[362] The NDA is to investigate, plan and submit to the Prime Minister other schemes for the development of the Niger River and its tributaries.[363] The NDA's powers are limited by the authority of the Prime Minister.[364] The NDA was made up of five (5) members appointed by the Prime Minister.[365]

The ECN and NDA supplied electricity to the entire country up to 1972 through their combined hydroelectric and thermal stations with the national grid connection for

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358 A.T. & P. Co. generator is one of the generating plants owned by the larger industries that produced electricity using wood waste as fuel, operated for its own mills and supplied the town of Sapele.

359 Simpson E.S. "Electricity production in Nigeria" 1969 (45) Economic Geography 241.

360 Please see the Preamble to Niger Dams Act (No. 23) A95 Laws of the Federation of Nigeria of 1962.

361 Section 2 subsections a & b of the Niger Dams Act (No. 23) A95 Laws of the Federation of Nigeria of 1962.

362 Section 2 subsection c of the Niger Dams Act (No. 23) A95 Laws of the Federation of Nigeria of 1962.

363 International Bank for Reconstruction and Development International Development Association African Department "Economic Growth of Nigeria: Problems and Prospects (Economic and Political Weekly 1965)13.

364 Section 3 subsection 3 of the Niger Dams Act (No. 23) A95 Laws of the Federation of Nigeria of 1962.

365 Section 1 subsection 1 of the Niger Dams Act (No. 23) A95 Laws of the Federation of Nigeria of 1962.

effective distribution.[366] The promulgation of National Electric Power Authority Decree No. 24 of June 1972 “the Decree” by the military government merged the operations of the ECN and the NDA and vested the monopoly of power generation, transmission, and distribution on one entity. The Decree established the National Electric Power Authority “NEPA” to develop and maintain an efficient, co-ordinated and economical system of electricity supply for all parts of the Federation by generating or acquiring the supply of electricity, providing bulk supply of electricity for distribution within or outside Nigeria and providing the supply of electricity for consumers in Nigeria.[367] It vested NEPA with all the properties, rights, liabilities, and obligations which were previously those of ECN and NDA

There were two amendments to Decree No. 24 in 1977[368] and 1979[369] merely to alter the composition/membership of the board as provided under Part 1 Schedule 1 of the Decree. By 1990, the military government in Nigeria enacted the National Electric Power Authority Act[370] “the Act” to replace the NEPA Decree. The Act was more or less a re-enactment of the Decree which re-established NEPA and vested it with the same power conferred on it by the Decree. An interesting aspect of the Decree and the Act relating to the discharge of the duties of NEPA is the power to generate, transmit, transform, distribute, and sell electricity either in bulk or to individual consumers in any part of Nigeria, but for this purpose, it was made subject to all the rights, powers, obligations and duties conferred or imposed by the Electricity Act on a licensee.[371] This qualifying provision immediately raises the question of who a licensee was and what rights, powers, obligations and duties are conferred on it by the Electricity Act.

The Electricity Act Cap 106[372] is a re-enactment of the Electricity Ordinance 21 of 1929 and Electricity Act Cap 120 Laws of Nigeria 1957 which was in operation when the Decree was promulgated. It provides for the regulation and control of electrical

366 Olukoju A “Never Expect Power Always’: Electricity Consumers’ Response to Monopoly, Corruption and Inefficient Services in Nigeria” 2004 African Affairs Royal African Society 53.
367 Section 1 subsection 1(a) &(b) of National Electric Power Authority Decree No. 24 Laws of the Federal Republic of Nigeria of 1972.
368 Section 1 of National Electric Power Authority (Amendment) Decree No. 35 Laws of the Federal Republic of Nigeria of 1977.
369 Section 1 of National Electric Power Authority (Amendment) Decree No. 64 Laws of the Federal Republic of Nigeria of 1979.
370 National Electric Power Authority CAP 256 Laws of the Federation of Nigeria of 1990.
371 Section 7 subsection 2(a) of the National Electric Power Authority CAP 256 Laws of the Federation of Nigeria of 1990.
372 Electricity Act CAP 106 Laws of the Federation of Nigeria of 1990.

installations and of the generation, supply and use of electrical energy.[373] The Electricity Act and the regulations made pursuant to it were applicable to any undertaking engaged in the manufacture, distribution or supply of electricity established by the Government of a State or any of its agencies and to any person or authority. It prohibits any undertaking or persons to use, work, operate or permit to be used, worked or operate any plant, apparatus or works designed for the supply or use of electricity except in accordance with the terms of a license issued by the Minister under the Electricity Act expressly authorizing such use or supply.[374] The NEPA Act itself defines an authorized undertaking as any person or body of persons, empowered by the Minister to generate, transmit, distribute, supply or sell electricity within any area.[375]

In effect, the Minister under the Electricity Act and the Regulations made under it can permit any undertaking or person to use, work or operate or permit to be used any apparatus or works designed for the supply or use of electrical energy by issuing a licence specifying rights, powers, obligations, duties, terms and conditions, exemption, qualification and so on, of the undertaking/licensee,[376]subject to giving NEPA a notice of application for such license.[377] The NEPA Act equally recognized the power conferred on the Minister by providing that NEPA shall maintain the continuity of supply of electricity as required by the Electricity Act and the regulations made under it, provided that it shall also have the right to suspend the supply if necessary for the purpose of carrying out inspection, tests, or repairs.[378] Notwithstanding the license of any undertaking, NEPA may distribute or supply electricity in bulk to any person whether or not such person is within an area covered by a license issued under the Electricity Act.[379]

It is important to note that the above laws were enacted/promulgated as Federal laws which create the impression that electricity generation, transmission and distribution in Nigeria was, at all-time material to the enactment of these laws, within the purview

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373 The Preamble to the Electricity Act CAP 106 Laws of the Federation of Nigeria of 1990.

374 Sections 2 & 3 of the Electricity Act CAP 106 Laws of the Federation of Nigeria of 1990.

375 Section 44 subsection 2 of the National Electric Power Authority CAP 256 Laws of the Federation of Nigeria of 1990.

376 Please see the Subsidiary legislations made under the Electricity Act CAP 106 Laws of the Federation of Nigeria of 1990 .

377 Section 35 of the National Electric Power Authority Decree No. 24 Laws of the Federation of Nigeria of 1972.

378 Section 12 subsection 1 of the National Electric Power Authority CAP 256 Laws of the Federation of Nigeria of 1990.

379 Section 11 subsection 1 of the National Electric Power Authority CAP 256 Laws of the Federation of Nigeria of 1990

of the Exclusive Legislative List[380] of the Federal Government of Nigeria to the exclusion of any other government at the state or local level. When the ECN Ordinance was passed, the Richard Constitution of 1946 was in operation. It established a legislative council that legislated for the whole country while the regional houses of assembly in existence had no power to legislate.[381] The 1963 Constitution in operation at the time the NDA Act was enacted created a Concurrent Legislative List,[382] which had 'water and power' listed as one of the items on the list, but it is not clear whether the regional or state government enacted any law in this regard.

The constitutional situation however changed by the usurpation of power by the military in Nigeria in January, 1966 with the promulgation of the key constitutional instrument of the military regime in Nigeria.[383] It amongst other things suspended those parts of the 1963 Constitution relating to the establishment and powers of the legislature. It empowered the Federal Military Government to legislate by Decree signed by the Head of the Government and the Military Governor of a Region is empowered to legislate by an Edict signed by him but not on items in the Exclusive List and only with the permission of the Federal Military Government on items in the Concurrent List.[384]This was the Nigerian regime of electricity governance when the National Electric Power Authority Decree No. 24 0f 1972 was promulgated by the Federal Military Government under General Yakubu Gowon's administration.

There was already a shift from the loose arrangement to centralized approach to power supply in the country prior to the military takeover of government. It was eventually made possible by the military government through its less complex mode of enacting and implementing laws (promulgation of decrees and edicts as against deliberation by legislative houses). The rationale for this arrangement lies in the attempt to crystallize a unified government and to ensure even development between the Northern and Southern parts of the country by policymakers. This approach under

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380 The items specified on the list in the Constitution are the areas reserved for the central/federal government to legislate upon. This means that only the central or federal government can legislate on the subjects.

381 Djetlawyer "History of Nigerian Constitutional development" online: https://djetlawyer.com/history-nigerian-constitutional-development/ (Date of use: 1 October 2018).

382 The items specified on the list in the Constitution are the areas shared jointly by both the central and regional or state governments. This means that in the event of conflict of law passed by both governments, the law passed by the Federal government will override that of the regional or state governments.

383 Constitution (Suspension and Modification) Decree No. 1 of 1966.

384 Keay E.A. "Legal and Constitutional Changes in Nigeria under the Military Government" 1966 (10) Journal of African Law 94.

the military was utilized to redesign the regulatory regime of power supply and to execute power projects in the generation, transmission and distribution segments of the sector particularly for the period between 1966 – 1993 (although the initial tempo could not be sustained as a result of poor management). While the objective of the underpinning Constitutions and Decrees resonates with an efficiency goal of the public interest theory of regulation considering the need to integrate power supply for the even development of the country, subsequent events in the Nigeria power sector will show that it is doubtful that this objective is achievable using an integrated power supply system considering the diverse nature of the inherent challenges with the geographical size of the country.

The Nigeria Constitution of 1979, which ushered in a democratically elected government, made the Federal and State legislative power with respect to power supply more elaborate.[385]The implication of the provisions of the items listed on the Concurrent Legislative List of the 1979 Constitution was that State Governments in Nigeria could set up electric power stations to generate, transmit and distribute power to areas not covered by the national grid.[386] They could equally set up Authority to manage such power stations. The effect of this provision is to limit the legislative power of the States to only areas not covered by the national grid, a negation of the constitutional provisions[387] by the Federal Government which centralized the powers to make regulations connected to electricity. More importantly, centralizing the regulation of power runs contrary to the federal system of government in operation Nigeria and it is surprising that the State Governments made no effort to reverse the situation created by this constitutional provision[388] as some of them did by litigating against the Federal Government with respect to another provision relating to the revenue sharing formula accruable to the State Governments from oil revenue.[389]The provisions of the items on the Concurrent Legislative list relating to regulation of

385 Item 13, 14 & 15 of the First Schedule to the Constitution of the Federal Republic of Nigeria of 1979.

386 The national grid is the transmission network in Nigeria, an asset of the Federal Government, which spread across the country, it consist of high voltage substations with a total transmission wheeling capacity of 7,500MW and over 20,000km of transmission lines. It is currently being managed by Nigerian Electricity System Operator under the Transmission Company of Nigeria.

387 Oke Y. "Manitoba Hydro and Electricity Undertakings in Developing Countries: The Case of Nigeria" 2012 – 2013 (37) 36 Manitoba Law Journal 52.

388 A few are beginning to show interest by enacting enabling laws in their states and executing power projects

389 The cases of Attorney General of the Federation v Attorney General Abia State and 35 others (2002)6 NWLR (PT 764)542 and Attorney General Ogun State and 4 others v Attorney General of the Federation (2002)18 NWLR 232.

electricity supply were repeated in the 1999 Constitution (as amended) of the Federal Republic of Nigeria.[390]

Aside from the NEPA Act, the Electricity Act and the Regulations made pursuant thereto, a number of statutes also made ancillary provisions in the regulatory regime during the pre-privatization era. These Statutes are: the *Energy Commission of Nigeria Decree 62 of 1979* "the ECN Decree",[391] *Utilities Charges Commission Decree No. 104 of 1992*[392]and the *Environmental Impact Assessment Decree No. 86 of 1992* "EIA Decree".[393]

The ECN Decree established a body called the Energy Commission of Nigeria vested with the responsibility for the strategic planning and co-ordination of national policies in the field of energy in all its ramifications.[394] Like the ECN Act, the Utilities Charges Commission Act established the Utilities Charges Commission vested with the power to regulate tariffs, amongst other things, charged by public utilities such as NEPA.[395] The applicability of this Act to the privatized assets of NEPA in the post privatization era is not clear as the Act itself was made applicable to public utilities and not to private institutions. The EIA Decree prescribes that mandatory environmental impact assessments should be undertaken in respect of any project that may likely have environmental effects before a decision is taken to undertake the project.[396]

The legislative framework for the electricity supply industry in Nigeria remained the same until 1998 when the military government amended the NEPA Act[397] and the Electricity Act[398] purportedly to liberalize power supply by stripping NEPA of its monopolistic status in order to pave way for other licensees for the manufacture, distribution or supply of electricity (Section 35 of the NEPA Act and Section 3

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390 This Constitution was enacted in 1999 and had since been altered three times but the items on the legislative lists remain the same.

391 Now Energy Commission of Nigeria Act Cap E 10, Laws of the Federation of Nigeria (LFN) of 2004.

392 Now the Utilities Charges Commission Act, Cap U17, Laws of the Federation of Nigeria (LFN) of 2004.

393 Now Environmental Impact Assessment Act, E12, Laws of the Federation of Nigeria (LFN) of 2004.

394 Sections 1 and 4 of the Energy Commission of Nigeria Decree 62 of 1979.

395 Section 6 of the Utilities Charges Commission Act, Cap U17, Laws of the Federation of Nigeria (LFN) of 2004 (still in operation).

396 Section 1 of the Environmental Impact Assessment Decree No. 82 of 1992.

397 Amended by National Electric Power Authority (Amendment) Decree No. 29 of 1998 which was later codified as National Electric Power Authority Act Cap. N33 Laws of the Federation of Nigeria (LFN) of 2004.

398 Amended by the Electricity (Amendment) Decree No. 28 of 1999 which was later codified as Electricity Act Cap E7 Laws of the Federation of Nigeria (LFN) of 2004.

subsections 2, 3 and 4 of the Electricity Act).[399] However, apart from Sections 35 subsection 2 of the NEPA (amendment) Decree of 1998 and Section 3 subsections 3 and 4 of the Electricity (Amendment) Decree of 1998 which give equal rights and obligations to the licensee and NEPA, there is not much difference achieved by the amendment above because the power to issue license by the Minister, with terms and conditions to licensee existed under the laws prior to the amendments.

Notwithstanding the lack of clarity, the amendments as well as the Commercialization and Privatization Decree of 1998 set the tone for the liberalization of the electricity sector in Nigeria which formally commenced by the formulation of the National Electric Power Policy in 2001.

3.3.2 Issues and Challenges of the Pre-Privatization Era and Rationale for Reform

Prior to the reform era of the electricity sector in Nigeria, the sector suffered various challenges largely created by long years of neglect in infrastructural growth to meet the increasing rate of electricity demands particularly in the urban centers. Some of these problems are: poor maintenance of power plants, electricity infrastructure vandalism, absence of adequate spare parts to repair or replace damaged and obsolete equipment, weak and obsolete transmission and distribution infrastructure, poor revenue collection, grossly inadequate metering and inept electricity billing, corrupt practices of NEPA staff and consumers, low level and poor management of water in hydro dams and shortfall in gas supply to thermal power stations, poor payment of power generators for gas supplied, self-generation of electricity from off-grid diesel generators, lack of existing legal framework for the public private participation in the sector due to monopoly of NEPA and so on.[400]

According to the Bureau of Public Enterprises[401], as at 1999, the Nigerian electric power sector had reached the lowest point in its 100 years history. It further stated that only 19 units of the country's 79 generating units were operational, average daily generation was 1,750 MW, no new electric power infrastructure was built between

399 Oke Y. "Manitoba Hydro and Electricity Undertakings in Developing Countries: The Case of Nigeria 2012 – 2013 (37) 36 Manitoba Law Journal 42.

400 Azinge "Communiqué at the Round table on Power Infrastructure, Investment and Transformation Agenda" http://www.nials-nigeria.org/round_tables/communique_on_power.pdf (Date of use: 1 October 2018).

401 The Bureau of Public Enterprises is charged with the overall responsibility of implementing the FGN policies on privatisation and commercialization.

1991-1999, the most recent plant in 1999 was completed in 1990 and the last transmission line was built in 1987, an estimated 90 million people were without access to grid electricity. Accurate and reliable estimates of industry losses were unavailable but were believed to be in excess of 50%,[402] high technical and non-technical losses (estimated at 45 – 50%), low generation, distribution and transmission capacity, large number of employees (over 47, 000 in the industry), poor maintenance culture, frequent power outages, lack of commercial orientation, not commercially viable and no audited financial statements.[403]Most of the issues mentioned above were directly traceable to NEPA as a result of the monopoly status it enjoyed during this era.

It was argued that the rationale for the reform of the sector rested on five primary factors in addition to the challenges which confronted the electricity supply industry. First, the rapidly growing electricity demand in Nigeria which warranted a commensurate increase in the capacity of the electricity supply system. Secondly, the capital intensiveness of the industry and the increasing difficulty for the Nigerian Government to continue financing NEPA. Thirdly, the security of power supply in terms of quality, reliability, and continuity. Fourthly, access by all classes of consumers regardless of location within the country. Lastly, is the concern for Nigeria's overall economic and industrial growth and development.[404]

Since the projection for Nigeria energy mix to meet her electricity demand was tangentially considered in the Niger Dam report, the consultants engaged by the Government of Nigeria for the study for the Dams estimated that the triple dams' project will meet all likely electricity demands until 1990. Beyond 1990, gas and oil was projected for further expansion of electricity generation, which would enable the full potential of the hydro schemes, with their high capital costs to be achieved. However, by 1990 to 2001, when the FGN kick-started the privatization process, there was

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402 This was the reason for the introduction of Aggregate Technical, Commercial and Collection (ATC&C) by the BPE into the privatisation bidding exercise. ATC&C was used as a basis for the determination of successful bidders of the 10 Power Holding Company Nigeria successor Distribution Companies, in addition to their financial submissions, bidders were evaluated based on their ability to project realistic reduction in losses in the distribution network, usually categorised as technical and commercial losses. https://aesidotcom.wordpress.com/2014/03/14/the-atcc-loss-parameter/ (Date of use:1 October 2018).

403 Dikki B. E. "Update – Privatisation Issues (A presentation at the 1st National Council on Power Conference, NACOP the Presidency Bureau of Public Enterprises, 11 August, 2014) 3 & 9.

404 Arowolo O "Nigerian power sector reform: why distribution requires a clear strategy" 2005 IEL&TR 163.

already a huge infrastructure gap. Adoghe et al[405] argued that lack of adequate funding and managerial strategies resulted in the steady decline in the performance of NEPA which was illustrated in the statistics showing the generated and peak demand from 1983 to 2003. For example, in 1993, the electricity generated was 14,617 GWH while the peak maximum demand was 20,411 (this is shown in Table 1).

There were already indications of market failure between 1981 and 1985, when the power demand growth rate was over 10% which made it difficult for the installed capacity to cope with the load requirement of residential, commercial and industrial consumers. The country leadership then did not see any need to invest in the power sector in spite of the growth trend. One of the resulting effects of this challenge was load shedding[406] which affected domestic life as well as the commercial and manufacturing activities of the industrial sector of the economy. For logistic and financial reasons, electricity plants, transmission tie-lines and distribution networks were not adequately maintained. In few cases, where maintenance was attempted, scheduled maintenance became very expensive with minimal possibility of cost recovery. Thus, actual average Mega Watt power availability oftentimes was less than half of the installed capacity.[407]

However, proponents that were of the view that NEPA was under-funded during this era contended that private sector participation would have injected substantial capital and competition into the sector, a claim that completely ignored the fact that substantial sums of money were allocated to NEPA and its revenue profile by the FGN during this period. The scale of outright embezzlement of funds and financial mismanagement was such that the organization would always have been under-funded in any event. It should also be noted that many consumers including government agencies, owe NEPA huge sums of money and by 1999, the debts had accumulated to a total of N4 billion which seriously compounded the financial situation of NEPA.[408]

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405 Adoghe A.U. et al "Power Sector Reforms-Effects on Electric Power Supply Reliability and Stability in Nigeria" 2009 (3) International Journal of Electrical and Power Engineering 37.

406 Load shedding is a deliberate cut back on electric power supply by the utility company or shut-down of electric power in a part or parts of a power distribution system, generally to prevent the failure of the entire system when the demand strains the capacity of the system. https://steemit.com/nigeria/@jhaysnsonofbenz/electric-power-load-shedding-and-nigerian-cause-and-implication (Date of use: 1 October 2018).

407 Adoghe A.U. et al "Power Sector Reforms-Effects on Electric Power Supply Reliability and Stability in Nigeria" 2009 (3) International Journal of Electrical and Power Engineering 37 – 38.

408 Olukoju A. "Never Expect Power Always: Electricity Consumers' Response to Monopoly Corruption and Inefficient Services in Nigeria" 2004 (103) African Affairs 55.

Another perspective, as earlier noted, is that NEPA also operated as a social service arising from government's perception in the 80s that electricity supply was a natural monopoly and that it required government's investment and regulation to be provided to all whether they are able to pay for it or not. This equally had an adverse effect on the revenue of NEPA.[409] It was claimed that at a time when it costs N1.20 to generate a kilowatt of electricity, NEPA was made to charge a tariff of a mere 23 kobo per kilowatt, thus incurring a 500 percent deficit on tariffs alone. Vandalization of NEPA equipment like electric poles, high tension cables, and transformers, arising from theft, thunderstorms, bush fires and motor accidents contributed to NEPA's problems during this era. Its inadequate metering and poor electricity billing system made worse by some unscrupulous consumers who connive with NEPA officials or electricians (artisans) to tamper with the meters to make them stop working all contributed to NEPA's poor revenue.[410]

The issues and challenges in this era were so numerous with a common debilitating effect on the entire country that they manifested in extreme shortage and non-reliable electricity supply and of course constrained national economic growth and development. Although, this is not limited to Nigeria in the Sub-Saharan region, by 1999, when Nigeria regained democracy, the reform of the electricity sector had become inevitable due to the abysmal supply system but whether this reform and the regulations that followed are adequate mechanisms for a solution to the crisis will be the subject of discourse within the thesis.

3.3.3 The Reform and post privatization era

The promulgation of the Public Enterprises (Privatization and Commercialization) Decree No. 28 in 1999 was a follow up to the effort of the Babangida[411] regime's Commercialization and Privatization Decree No. 25, 1988 which sought to commercialize some government-owned firms. Decree No. 28 was later codified as Public Enterprises (Privatization and Commercialization) Act, CAP P38 Laws of the Federation of Nigeria (LFN) 2004 "the Act". Just like its predecessor, the Act made provisions for the privatization and commercialization of the Federal Government

409 MacArthur Foundation from Genesis to date understanding the history and evolution of the Nigeria electricity supply industry (Power Nextier Advisory, investment and services Vol. 1 issue 1 05 July 2017) 47.

410 Olukoju A. "Never Expect Power Always: Electricity Consumers Response to Monopoly Corruption and Inefficient Services in Nigeria" 2004 (103) 55 – 59.

411 General Ibrahim Badamosi Babangida was the military head of state of the Federal Republic of Nigeria from 1985 – 1993.

enterprises and other enterprises in which it has equity interests. It remains the principal statute governing privatization in Nigeria.[412]

Considering the fact that the reform introduced by the 1988 Decree did not achieve the desired result and that the country's power plants with total installed capacity of 6,000MW as at 1998 were operating below 60% of their installed capacity,[413] the Act was supposed to be the much needed impetus the power sector required to drive any meaningful reform. It provides the platform upon which the reform of the power sector began in Nigeria. Section 1 provides a list of enterprises to be partially privatized in the First Schedule of the Act, the National Electric Power Authority "NEPA" tops the list. It enables a strategic investor to have a maximum of 40% participation, while 40% and 20% are allowed for the Federal Government and Nigerian citizens respectively.[414]

Section 9 of the Act established the National Council on Privatization "NCP" headed by the Vice President of Nigeria. The powers of the body include the determination of the political, economic and social objectives of privatization of public enterprises, approve policies on privatization, approve guidelines and criteria for valuation of public enterprises, approve legal and regulatory framework for the public enterprises for privatization amongst others. Section 12 of the Act established the Bureau of Public Enterprises "BPE", whose functions include the implementation of the Council's policy on privatization and commercialization, preparation of the public enterprises approved by the Council for Privatization and Commercialization, advise the council on capital restructuring of firms for privatization and on further public enterprises for commercialization, oversee the actual sale of shares of public enterprises amongst others. These two institutions were the fulcrum elements of the privatization phase of the power sector in Nigeria.

In line with its powers, the NCP set up the Electric Power Sector Implementation Committee "EPIC" to undertake a comprehensive study of the electric power industry. Its membership consisted of staff from the Ministry of Power and Steel, NEPA, BPE,

412 "The Legal and Institutional Frameworks of Privatisation in Nigeria: A Discourse" online: http://www.nigerianlawguru.com/articles/company%20law/THE%20LEGAL%20AND%20INSTITUTIONAL%20FRAMEWORKS%20OF%20PRIVATISATION%20IN%20NIGERIA,%20A%20DISCOURSE.pdf (Date of use: 23 April 2019).

413 Gatugel Z and Abbasoglu S "An Overview of Power Sector Laws, Policies and Reforms in Nigeria" 2014 (04) Asian Transactions on Engineering 7.

414 Section 6 of the Public Enterprises (Privatization and Commercialization) Act CAP P38 Laws of the Federation of Nigeria (LFN) of 2004.

Ministry of Petroleum Resources, Ministry of Finance, the Energy Commission of Nigeria, the organized private sector and other relevant professional body. The EPIC's key objective was to prepare a power policy blueprint that would define government's new direction for the electric power sector.[415] The EPIC drafted the National Electric Power Policy (NEPP) in 2001, a precursor to the Electric Power Sector Reform Act (the "EPSR Act") which was later enacted in 2005.[416]

3.3.3.1 The National Electric Power Policy

The NEPP was approved by the Federal Executive Council in 2001 and it contains seventeen (17) chapters which deal with various aspects of the proposed electricity market in Nigeria.[417] The introductory chapter re-emphasized the need for the reform.[418] Chapter 2 states the policy objective which is to primarily ensure that the electricity supply industry meets the needs of the citizens in the 21st Century in a commercially efficient manner for the purpose of achieving Nigeria's growth and development goals. This was said to require fundamental reforms, short to medium term and long-term objectives dealing with attracting private investments, developing transparent and effective regulatory framework, ensuring that electricity supply is made more reliable amongst other things.[419]

Chapters 3, 4 and 5 of NEPP was based on the reform framework designed by the World Bank in its project appraisal document[420] for financial assistance to Nigeria for the reform as well as the principles of the Bank five (5) recommended principles for power sector reform in developing countries.[421] Chapter 3 of NEPP deals with policy and regulatory institutions to support the reforms. The institutions are namely; the Federal Government and States Governments, Ministry of Power and Steel, Nigerian Electricity Regulatory Commission (NERC), Competing Generation Companies, a Single Transmission Company, a special purpose entity, On-grid distribution

415 Oni A *The Nigerian electric power sector* (CI-Plus 2013)18.

416 Banwo and Ighodalo "The Nigerian Power Sector Reforms: Overcoming Post-Privatisation Challenges" online: https://www.banwo-ighodalo.com/assets/grey-matter/1c9335c3bfcc05ceff009c17beed5f7d.pdf page 2 (Date of use: 24 April 2019).

417 National Electric Power Policy (2001).

418 National Electric Power Policy (2001) 1 – 4.

419 National Electric Power Policy (2001) 6 – 7.

420 The World Bank "Project Appraisal Document on a Proposed Credit in the amount of SDR 90.2 Million (US$114.29 Million Equivalent) to the Federal Republic of Nigeria for a privatisation Support project (21 May 2001) online: http://documents.worldbank.org/curated/en/191771468759310071/text/multi0page.txt (Date of use: 2 April 2020).

421 Please see Chapter 2 pages 77 - 78

companies, Off-grid generation and distribution companies, and Grid connected auto generators. Their functions were clearly spelt out to update the role of the government and to establish an effective regulatory framework, based on an independent regulatory agency.[422]

Chapter 4 deals with the structure of the electricity market including licensing of operators, transition arrangements, trading arrangements, Independent Power Plants (IPP) contracts, tariff changes, government guarantee of Power Purchase Agreements (PPA) for IPPs, , competition in the medium term, proposed post privatization trading structure for bulk power amongst competing generating companies, transmission, dispatch and system planning, distribution and sales of power by distribution companies which will sell power in their franchise areas, and off-grid systems.[423]

The framework for the restructuring and privatization of the power sector as well as the structure of the power market post-privatization is in chapter 5 of the NEPP particularly with respect to the strategy for the unbundling of NEPA. These involve the creation of 100% state-owned holding company and subsidiary generation and distribution companies, the incorporation of subsidiary companies vested with their assets and liabilities by 2002, privatizing the subsidiary companies leaving a transmission and dispatch company plus a residual 100% state-owned holding company by 2003, development of trading arrangements among these companies which will evolve into bulk power market, employing the Rehabilitate Operate and Transfer (ROT) scheme and similar schemes as early privatization options, with transfers going back to the BPE and not NEPA and commissioning of a restructuring study to provide the details of the transition from the current structure to the privatization of the subsidiary companies.[424]

The intention of the Government in the privatization programme/exercise is that management and ownership control in unbundled generation and distribution companies shall be transferred to the private sector with substantial participation by strategic investors with the experience and resources in the electricity industry. The Government may retain minority non-controlling interest in the short run, in which case

422 National Electric Power Policy (2001) 8 – 13.
423 National Electric Power Policy (2001) 14 – 27.
424 National Electric Power Policy (2001) 27 – 31.

the Government's shares should be under the control of the relevant government agency.[425]

The NEPP equally made provision for economic regulation. NERC, the independent regulator is imbued with the responsibility of establishing tariff regulation rules and in determining the tariff regulation regime, NERC was required to be guided by the following principles namely; reflection of cost required by operators to provide the services in question including reasonable rate of return, transparency to both operators and customers, accommodation of sufficient revenues to compensate for investment and affordability to the potential customers, promotion of demand side management, and the prohibition of cross-subsidies.[426] Any tariff adjustment must equally ensure that tariffs cover operating cost and the full cost on new investment and in the long run, to move to fully cost-reflective prices by customer groups.[427]

Chapter 7 of the NEPP states the rule of the electrification policy geared towards providing rural electrification options like grid and off-grid, mini-grid, non-thermal, renewable amongst other things. To achieve this, an independent Rural Electrification Fund was proposed to be set up and operated by a Rural Electrification Agency.[428] No specific rule or standard was set out in Chapter 8 with respect to obligations to connect, supply and quality standards but the Regulator was proposed to have the power to issue, monitor, enforce, update and improve codes of practice for obligations to serve, connect and quality standards as supply condition improves .[429] Chapter 9 recognizes that the regional disparity in access to electricity was as a result of poor access to reliable supply of natural gas and so any expansion in the electricity industry must consider the expansion of the natural gas pipeline network since natural gas represents the major likely fuel for the future electricity generation on a comparative basis with hydro generation.[430]

The Government's principle on finance and funding in Chapters 10 and 13 is based on liberalization of the sector to attract private sector participation, incentives such as taxes and import duties waivers, fiscal incentives for local manufacture of electrical equipment, and of pioneer status were proposed to generally encourage local

425 National Electric Power Policy (2001) 30.
426 National Electric Power Policy (2001) 33 – 34.
427 National Electric Power Policy (2001) 35.
428 National Electric Power Policy (2001) 38 – 40.
429 National Electric Power Policy (2001) 41 – 42.
430 National Electric Power Policy (2001) 43 – 44.

production of electrical hardware and software[431] The NEPP provides for continuous training of personnel in the electricity industry to keep up with rapid technological changes through the establishment of a National Electricity Institute (NEI), the encouragement of companies to train indigenous personnel and support the NEI and encouragement of teaching institutions to offer courses in electrical engineering and management.[432]

The NEPP emphasizes in Chapter 14 the need to protect life and property as well as the promotion of national security for economic development. The provision of electricity services for emergency and distress situations, and to ensure that laws relating to electricity offences are kept under constant review and enforced were proposed as strategies in achieving this policy. International cooperation was also considered as critical in the fostering of efficient development of regional and international electricity markets and networks in Chapter 15.[433] According to the EPIC, as at 2001 when the NEPP was drafted, NEPA had nine (9) power stations in Nigeria with a total installed capacity of 5,906 MW (Shown in table 2) with a total of 2,470MW as the maximum load recorded.[434]

The policy is a direct response to the market failure of the electricity sector in Nigeria; it primarily seeks to foster efficiency of the electricity supply system through a major reform of the structure of the industry and market. The reform introduces privatization by attracting necessary financial and strategic investments from private sector, it proposes a guarantee for government subsidy when tariff is lower than the cost of purchase of energy by the distribution sector and in long term, the introduction of competition, when there is in existence stable market conditions ranging from absence of generation deficiency, rehabilitation of the grid and distribution network, payment discipline to supply quality and standards.

The policy envisages three phases of market development with designed trading arrangements in the value chain. First, the transition period when a Special Purpose Entity (SPE) established by the government with energy purchasing obligations will sign Power Purchase Agreements (PPA) with generation companies and sell power to the distribution companies.[435] It is to be noted that the policy makes provision for

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431 National Electric Power Policy (2001) 45 & 48.
432 National Electric Power Policy (2001) 46 – 47.
433 National Electric Power Policy (2001) 49 – 51.
434 National Electric Power Policy (2001) 2.
435 This is based on the expectation that the NEPA would have been unbundled into four functional areas, namely generation, transmission/System Operator, SPE and distribution.

government subsidies during the transition period based on the expectation that tariff shall be adjusted in a gradual manner subject to increase in power supply and shall remain as long as tariff remains lower than the cost of purchase of energy from the generating companies.[436]

Secondly, the introduction of competition in the medium phase of market development requires bilateral contracts between generation companies and distribution companies where they will able to trade power and capacity based on contracts exchanges and sales. The policy recommends a single transmission company to handle electricity transport on an open access basis on power lines (grid) of not less than 132KV and manage system operation and dispatch. It is prohibited from buying and selling electricity or owning electricity generation and distribution businesses. Electricity generation of more than 20MW is required to be centrally dispatched through the transmission company in Nigeria. The distribution companies are to be connected to the grid and will distribute and sell power in their franchise areas on power lines below 132 KV. It is also to be noted that they are expected to retain monopoly sales franchise to their customers (large and small) and that the policy envisages a number of off-grid small distribution and sales companies with their own generation or other power sources.

Thirdly, the long-run competition phase as envisaged by the policy is when all expected market conditions have been attained. Absence of generation deficit, rehabilitated transmission and distribution network, payment discipline in the value chain of electricity supply, tariff covers the full economic costs of supply, supply quality and standards are met.

However, the above trading arrangements envisaged by the policy have been the primary challenge of the operational market in the post-privatization period. The progression from the transition period to the next phase has been an uphill task, in the absence of the required conditions, the Regulator by proclamation declared a new phase in the market development which has hampered the efficiency of the supply chain. The initial subsidy recommendation by government was delayed, tariff continued to remain below cost reflective levels, payment indiscipline by the distribution companies to the SPE (NBET), by the SPE (NBET) to the generation companies, and the generation companies to the gas suppliers became all pervasive.

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436 National Electric Power Policy (2001) 17.

These issues have remained intractable and the bane in the post-privatization market has extensively discussed in chapter four of the study.

Considering the abysmal failure of the government management of NEPA and the electricity industry in the pre-privatization era, it is debatable if there was any other option available for government intervention for the purpose of reforming the electricity market particularly when privatization was widely accepted and recommended by key international financial institutions. The policy recommendations were extremely desirable and attractive in theory as it was also expected that regulatory mechanisms such as the Multi Year Tariff Order put in place for tariff adjustment in the privatized market and management of the privatized market will be properly implemented by the government. While the key government institutions identified in chapter 3 of the policy are the enforcement and implementation instruments of the policy recommendations, the enactment of the Electricity Act establishes the framework for the transition from government owned assets to private companies, the Regulator and its functions in the operational market as well as other relevant market supporting mechanisms.

From the objective of the policy to its recommendations, the public interest theory of regulation is demonstrable in the desire to ensure that technical and commercial efficiency of power supply was targeted and that the needs of the consumers are equally a primary goal of the government. The various identified incidents of market failure in the pre-privatization market, the nature of the power utility, the monopoly and incompetence of public enterprise (NEPA), the enormity of the required financial investment more than ensure that policy should be public interest driven. More importantly, is the question of how well the policymakers considered a more nuanced approach to the policy recommendations. A consideration in consonance with the hybrid theory of regulation with its inherent elements would have been more useful for reform regulation in a pluralized society like Nigeria.

For example, prohibitive recommendations in the policy such as centrally dispatching power not less than 20MW, the monopoly sales of the distribution companies (exclusionary), have been limiting the growth of the electricity sector in terms of the poor dispatch of available on-grid energy and poor distribution network. In reality, power production ought to be liberalized with emphasis on utilizing available and unused power under the various existing PPAs. Also, the sustainability of the monopoly of the distribution companies over their consumers both served and un-served consumers is doubtful as their financial capacity for quality, standard,

improvement and expansion of network continues to decline in the post-privatized market.

Notwithstanding the above, a good example of the policy recommendation in tandem with the phased efficiency and contextualized applicability elements of the hybrid theory is the aspect of the policy dealing with the recommendation for a number of off-grid small distribution and sales companies with their own generation or power sources and immunity from the clear business separation of the on-grid system (generation, transmission and distribution/sales). The utilitarian value of this approach lies in it decentralized strategy for power supply that will be extremely useful if combined with the liberalization of power production and distribution of the on-grid system.

3.3.3.2 *Legal and Regulatory frameworks of the reform and the market: pre and post-privatization*

a. IPPs and NIPPs

Notwithstanding the efforts of the Federal Government of Nigeria in the approval of the NEPP in 2001,[437] other efforts were geared towards generating powers through Independent Power Plants.[438] IPPs are defined as power projects set up as special purpose projects companies with a significant proportion of private equity and/or debt, and long-term Power Purchase Agreements (PPAs) with the national utility or other large customers.[439] These IPPs formed a significant part of the electricity mix and market in Nigeria and so it is important to identify their legal and regulatory framework to illustrate how they were incorporated into the reform policy of the Government[440] since some of them came on stream prior to the enactment of the Electricity Reform Act.[441]

After the passage of NEPA (amendment) Decree of 1998 and the Electricity (Amendment) Decree of 1998, allowing private participation in the sector, the Federal Government executed the contract for the first IPP in 1999 by the signing of a Power

437 Okojie C Decentralization and Public Service Delivery in Nigeria (Nigeria Strategy Support Program (NSSP) Background Paper No. NSSP 004 2009) 20.

439 Eberhard A and Gratwick Light inside: the experience of independent power projects in Nigeria (The Infrastructure Consortium for Africa Le Consortium pour les infrastructures en Afrique, 2012) 4.

440 NERC "Construction of IPPS Predates NERC" (02 June 2015) online: https://www.nercng.org/index.php/media-library/press-releases/281-construction-of-ipps-predates-nerc (Date of use: 25 April, 2019).

441 Electricity Power Sector Reform Act, Laws of the Federation of Nigeria of 2005.

Purchase Agreement between Lagos State Government, the Federal Ministry of Power & Steel and NEPA, known as the Enron/AES IPP. Public pressures occasioned a change in the original plan for the land-based 560 MW plant to be shelved and an increase of the initial plant capacity from 90 MW to 270 MW and switching from liquid fuel to natural gas with a final investment cost of US$240 million.[442]

In 2001, the FGN executed another Power Purchase Agreement on a Build Own Operate (BOO) structure, through a consortium consisting of Nigerian National Petroleum Corporation (60%), Nigerian Agip Oil Company (20%), and Phillips Oil Company (20%) for the construction of a 480 MW combined cycle gas turbine[443] along with the requisite gas infrastructure, known as the Okpai IPP. It was to be built in two phases with 300 MW CCGT installed, which would then be upgraded with an additional 150 MW CCGT.

Similarly in 2001, the Federal Government undertook the Afam VI project which involved a brownfield and Greenfield investment namely; the refurbishment of the existing 270 MW (Afam V) under as Acquire Operate Own (AOO) contract and the addition of 624 MW (Afam VI) under Build Operate Own (BOO) arrangement. Shell Development Corporation (SPDC) was selected as the Joint Venture operator of the consortium composed of NNPC (55%), Shell (30%), Elf (Total) (10%) and Agip (5%). As opposed to a sovereign guarantee or oil revenue, it was backed by the Ministry of Finance Letter of Credit smarting from an improved credit rating status of the country which changed in January 2006. The final investment cost was said to be US$540 million all equity financed.[444]

The above stated IPPs were private sector driven and managed by the private sector prior to the privatization process.[445] However, by the recommendation of the EPIC,[446] the FGN directly initiated the National Integrated Power Project (NIPP) in 2004 which was conceived as a fast-track government funded initiative to stabilize Nigeria's

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442 Eberhard A and Gratwick Light inside: the experience of independent power projects in Nigeria (The Infrastructure Consortium for Africa Le Consortium pour les infrastructures en Afrique, 2012) 10.

443 This was prompted by persistent power shortages and the gas flaring reduction policy of 2001.

444 Eberhard A and Gratwick Light inside: the experience of independent power projects in Nigeria "The Infrastructure Consortium for Africa Le Consortium pour les infrastructures en Afrique, 2012" 12 – 13.

445 NERC "Power Generation of Nigeria" online: https://www.nercng.org/index.php/home/nesi/403-generation (Date of use: 25 April 2019).

446 Banwo and Ighodalo The Nigerian Power Sector Legal/Regulatory Framework-Key Financing Considerations (Presented at the IFLR Africa Forum, the Waldorf Hotel, London, May 14 2013) 7.

electricity supply industry concurrently with the private-sector led structure of the reform continue to grow.[447] In August 2005, the National Council of State and the National Assembly approved an initial funding for NIPP from the excess crude savings account (ECSA) which statutorily belongs to the Federal, State and Local Governments. The Federal Government therefore incorporated the Niger Delta Power Holding Company Limited (NDPHC) as a limited liability company to serve as the legal vehicle to hold the NIPP assets using private-sector orientated best business practices.[448] There are ten (10) NIPPs with a combined capacity of 5,455 MW which were scheduled for completion at 2014.[449]

The NIPPS projects are namely; Alaoji (1,074MW) in Abia State, Benin, Ihovbor (451MW) in Edo State, Calabar (563MW) in Cross River State, Egbema (338 MW) in Imo State, Gbarain (225 MW) in Bayelsa State, Geregu (434 MW) in Kogi State, Olorunsogo (754 MW) in Ogun State, Omotosho (451 MW) in Ondo State, Omoku (225 MW) in Rivers State, and Ogorode (508 MW) in Sapele.[450] Apart from the generation aspect of the NIPP, the Project is equally designed to include associated transmission infrastructure, gas infrastructure and nationwide distribution projects.[451] The NIPP was scheduled to be managed under Operation and Maintenance (O & M) contracts to be prepared by NDPHC and thereafter, to be privatized upon completion.[452]

The Government plans to sell off 80% of the assets to fund a second phase of building more NIPP. However, while some of the assets (5) have been listed by BPE for sale, the current and valuable debate is how useful such sale will be, considering the less than encouraging result of the previous privatization of NEPA.[453]

b. Electric Power Sector Reform Act (the “Electricity Reform Act” of the “Act”)

447 NDPHC “History” online: http://ndphc.net/ndphc-company-history (Date of use: 26 April 2019).

448 NDPHC “History” online: http://ndphc.net/ndphc-company-history (Date of use: 26 April 2019).

449 Onochie U, et al “The Nigeria Electric Power Sector (Opportunities and Challenges)” 2015 (2) Journal of Multidisciplinary Engineering Science and Technology 498.

450 NERC “Power Generation of Nigeria” online: https://www.nercng.org/index.php/home/nesi/403-generation (Date of use: 25 April 2019).

451 NDPHC “Distribution” online: http://ndphc.net/distribution (Date of use: 26 April 2019).

452 The presidency of the Federal Republic of Nigeria Roadmap for power sector reform (August 2010) 8.

453 The Punch “NIPPs: FG must avoid 2013 privatisation blunder” (21 July 2022) online: https://punchng.com/nipps-fg-must-avoid-2013-privatisation-blunder/ (Date of use: 1 August 2022).

This Act represents the central focus of the NEPP. It is the mechanism by which the liberalisation of the power sector, unbundling of the government firm (NEPA), private participation and amongst other things, came on-stream. The preamble to the Act captures the essence of the provisions, it states as follows:

> *An Act to provide for the formation of companies to take over the functions, assets, liabilities and staff of the National Electric Power Authority, to develop competitive electricity markets, to establish the Nigeria Electricity Regulatory Commission, to provide for the licensing and regulation of the generation, transmission, distribution and supply of electricity, to enforce such matters as performance standards, consumers rights and obligations, to provide for the determination of tariffs and to provide for related matters.*[454]

c. Responsibilities of the NCP for the formation of initial holding companies, successor companies and transfer of assets and liabilities

Sections 1 – 24 of the Act highlight the responsibilities of the NCP. The NCP is required to not later than six months after the coming into effect of the Act to incorporate a company under the Companies and Allied Matters Act[455] which shall be limited by shares as the initial holding company for the assets and liabilities of NEPA. The shares created are to be held by the FGN's Ministry of Finance and the BPE on behalf of the FGN. The assets of NEPA were subsequently transferred to the holding companies in line with the provision of the Act. The NCP is also required to incorporate additional companies, as successor companies to assume the assets and liabilities of the initial holding company with functions relating to generation, transmission, trading and distribution and bulk supply and resale of electricity. The holding company is equally required to transfer its employees, assets, liabilities, rights and obligations to a successor company.[456]

In line with the above provisions of the Act, Power Holding Company of Nigeria (PHCN) was established as the initial holding company with limited liability on 5th of May, 2005 and by November of the same year, it was unbundled into 18 successor companies consisting of six (6) generation companies (Gencos), a transmission company (Transmission Company of Nigeria) and eleven (11) distribution

454 Electric Power Sector Reform Act of 2005.
455 Companies and Allied Matters Act of 2004.
456 The Electric Power Sector Reform (Transfer of Assets, Employees, Liabilities, Rights and Obligations) Order No. 1of 2006.

companies.[457] The transfer of PHCN assets and liabilities were done by NCP through the issuance of the Electric Power Sector Reform (Transfer of Assets, Employees, Liabilities, Rights and Obligations) Order No. 1 of 2006.

The six (6) generation companies (Gencos) are Afam Power Plc (i-v) with a generating capacity of 987.2 MW, Egbin Power Plc with a generating capacity of 1,320 MW, Kainji/Jebba Hydro electric Plc with a generating capacity of 1,330 MW, Sapele Power Plc with a generating capacity of 1,020, Shiroro Hydro Electric Plc with a generating capacity of 600 MW and Ughelli Power Plc with a generating capacity of 942 MW. The eleven (11) distribution companies are Abuja, Benin, Eko, Enugu, Ibadan, Ikeja, Jos, Kaduna, Kano, Port Harcourt and Yola.

These companies were required to be issued interim licenses by NERC which shall be valid for a period not exceeding one year.[458] They are also required to not later than six (6) months of receipt of the interim license to apply for a substantive licence.[459] Following the transfer of PHCN's assets to the successor companies, NERC issued interim licenses in July 2006 to the eighteen (18) successor companies and each one of them later on its application was granted substantive license.[460]

The NCP pursuant to its power to incorporate such number of additional companies from the initial holding company under Section 8 of the Act, issued *Supplementary Regulations to Part 1 of the Electricity Reform Act on the Transfer of Assets, Employees, Liabilities, Rights and Obligations of the Power Holding Company of Nigeria Plc. S.I. 46 of 2010 ("Supplementary Regulations").*[461] The Supplementary Regulations make provisions for the incorporation of additional successor companies and also empower NCP to issue further Orders for the transfer of assets and liabilities to any additionally created successor companies.

In furtherance of the Supplementary Regulations, the NCP issued the Electric Power Sector Reform Act, Transfer of Assets, Employees, Liabilities, Rights and Obligations of the Power Holding Company of Nigeria Plc. S.I. 47 of 2010 ("Supplemental Transfer Order") requiring the PHCN to within one year of the commencement of the Order,

457 Power Sector Recovery Implementation Program online: hhtp://pwh.gov.ng/download/14991674947496.pdf (Date of use: 30 April 2019) 11.

458 Section 23(1) of the Electric Power Sector Reform Act (Laws of the Federation of Nigeria) of 2005.

459 Section 23(2) of the Electric Power Sector Reform Act (Laws of the Federation of Nigeria) of 2005.

460 Oni A the Nigerian electric power sector (CI-Plus 2013) 29.

461 Oni A the Nigerian electric power sector (CI-Plus 2013) 29.

transfer specified assets, employees, rights, liabilities and obligations to two newly created successor companies namely the National Electricity Liability Management Company Ltd (NELMCO) and the National Bulk Electricity Trading PLC (NBET).[462]

NELMCO was established as a special purpose vehicle as one of the key institutions of the privatization structure of the Nigeria power sector to assume and administer the stranded liabilities of PHCN pursuant to the provisions of the Act. It is to provide investors' confidence that investment in PHCN successor companies (Gencos and Discos) will be free of encumbrances from possible future litigations arising from the huge legacy debts (Power Purchase Agreement existing obligations), staff pensions, suppliers and third party liabilities.[463]

On the other hand, the NBET was also established for the transition phase of the privatized market, it was set up to buy bulk power from the generating companies including the IPPs, NIPPs and new IPPs through power purchase agreements and to sell the bulk power to the Discos and eligible customers by way of vesting contracts. This scheme is designed to boost investors' confidence and to encourage participation in the privatisation process particularly as the Federal Government and the World Bank are to guarantee the payment obligation of NBET to the Gencos so that the Gencos will be assured that the power purchased from them is paid for as at when due.[464]

d. The *Development of a framework for a competitive market for pre-privatization and post-privatization stages*

Following the issuance of interim licenses by NERC to the successor companies, Sections 25 and 26 of the Act designed a competitive market for the pre and post-privatization stages (Shown in Tables 3 and 4). The framework by which the successor companies engaged in generation (including IPPs), transmission/system operation, distribution, trading licenses and eligible customers are to operate is clearly laid out.

Section 26(2) requires the Minister to recommend to the President for approval of market rules, to be developed by the system operator. Pursuant to this Section, the **Market Rules**[465] (the "Rules") was developed by the system operator to cater for the operation of the national grid by the system operator and for the establishment and

462 Oni A the Nigerian electric power sector (CI-Plus 2013)29 – 30.
463 NELMCO "Background" online: http://nelmco.gov.ng/about-nelmco/background/ (Date of use: 8 May 2019).
464 Oni A the Nigerian electric power sector (CI-Plus 2013) 83.
465 Market Rules for the Nigerian Electricity Supply Industry of 2014.

governance of markets related to electricity and ancillary services.[466] Similar to the recommendation in the Policy, the Rules envisages a market development towards competitive market that will evolve through the following stages:

i. Pre-Transitional stage during which the following events will occur:

   a. Physical unbundling and future privatization of PHCN

   b. Establishment of performance incentives for distribution and generation activities

   c. Implementation and testing of the Grid Code

   d. Development and implementation of the initial Market Procedures

ii. Transitional stage which involves the following:

   a. The consummation of all electricity trading arrangements through contracts

   b. No centrally administered balancing mechanism for the stage

   c. Market operator to develop a market procedure for the management of inadequate supply and shortage conditions.

iii. Medium Term Market will involve the following:

   a. The balancing market will be a spot market, allowing efficient opportunity trading (daily trading at prevailing market price)[467]

   b. Several distributors, each with a monopoly over retail sales to customers within its franchise region

   c. Each distributor may enter into bilateral contracts for purchase and or sale of energy

   d. Open entry to the Wholesale Electricity market and subject to technical and environmental obligations, and within the energy policy defined by

466 Section 23(1) of the Electric Power Sector Reform Act (Laws of the Federation of Nigeria) of 2005.

467 KPMG "A Guide to the Nigerian Power Sector" (December 2013) online: https://www.nigeriaelectricityhub.com/download/a-guide-to-the-nigerian-power-sector-kpmg-2013/ (Date of use: 8 May 2019) 14.

the Government, investors can decide the timing, location and type of new Generation capacity to construct

e. Flexibility in electricity trading arrangements through the implementation of a balancing market.

Because the necessary conditions precedent for the Transition stage were not fully met after the unbundling and subsequent privatization,[468] an additional stage, Interim Market Period, was introduced. To govern this period NERC enacted the Rules For the Interim Period Between the Completion of Privatization and the Start of the Transitional Electricity market (TEM) 2013 whose objective amongst others, is to establish a framework to govern trading arrangements during the Interim Period when Power Purchase Agreements (PPAs) between the privatized PHCN successor generation companies and NBET and Vesting Contracts between NBET and the PHCN successor companies will not be effective.[469]

The provisions of the Rules are extensive covering operating and market procedures, unforeseen conditions, the roles of system and market operators, working groups, performance standards, audits, eligibility, admission, withdrawal and termination of participants, billing and payment, computation of charges and payment, payment procedure, payment error, dispute resolution, enforcement amongst other things. It is equally made to be applicable to all licenses issued by NERC; all licenses shall be deemed to contain a provision that the licensee complies with the Rules to the extent applicable to the licensee.[470]

The Rules also complement and supplement the Grid Code (the 'Code'). The Grid Code contains the day-to-day operating procedures and principles governing the development, maintenance and operation of an effective, well-coordinated and economic Transmission System for the electricity sector in Nigeria. The Code is designed to facilitate an efficient production and supply of electricity for all Users of the Transmission System and TCN itself, without any act of discrimination between

468 NERC "Nigerian Electricity Market" online: https://www.nercng.org/index.php/home/operators/ltmr/405-nigerian-electricity-market (Date of use: 11 June 2019).

469 Paragraph 6 of the Rules for the Interim Period between Completion of Privatisation and the Start of the Transitional Electricity Market (TEM) (December 2013).

470 Paragraph 1.4.1 of Market Rules for the Nigerian Electricity Supply Industry of 2014.

Users or class of Users and to facilitate competition in the generation and supply of electricity in the country.[471]

The Code is to be read in conjunction with the market Rules, Metering Code, Distribution Code and other documents relating to other operational aspects of the industry.[472] It is applicable to TCN and Users of the Transmission System. TCN is assigned the responsibility of implementing the Code.[473]The provisions of the Code are made subject to the Act. It provides that wherever there is any inconsistency with the provisions of the Act, the Act shall take precedence over it.[474]

The Code equally provides for a Transmission System expansion planning for the connection of new Load/Generation to the Transmission System to cater for the impact of these connections so that they can be handled by the existing Transmission System and if not, to identify the need for the required expansion.[475] It also contains connection conditions which specify the minimum technical, design and certain operational criteria to be complied with by Users connected to, or seeking connection to the Transmission Network.[476]

e. *The Nigerian Electricity Regulatory Commission*

By Section 31 of the Act, an independent regulator, the Nigerian Electricity Regulatory Commission "NERC", was established as a body corporate with perpetual succession which can sue or be sued in its corporate name and perform all acts that bodies corporate may by law perform.[477] In October, 2005, the pioneer Commission was inaugurated[478] with clearly defined objectives and functions such as the creation, promotion and preservation of efficient industry and market structures, maximization of access to electricity services, adequate supply of electricity, ensuring fair prices to consumers and guarantee earnings to the licensees, promote competition and private sector participation, establish or approve operating Codes, establish consumer rights, license and regulate the sector.

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471 Paragraph 1.3.1 – 1.3.2 of the Grid Code for Electricity Industry of Nigeria of 2014.
472 Paragraph 1.3.3 of the Grid Code For Electricity Industry of Nigeria of 2014.
473 Paragraph 1.4.1 of the Grid Code For Electricity Industry of Nigeria of 2014.
474 Paragraph 2.7.1 of the Grid Code For Electricity Industry of Nigeria of 2014.
475 Paragraph 5.2.1 of the Grid Code For Electricity Industry of Nigeria of 2014.
476 Paragraph 9.1.1 of the Grid Code For Electricity Industry of Nigeria of 2014.
477 The Companies and Allied Matter Act Laws of the Federation of Nigeria 2004 is the law regulating the acts of a body corporate in Nigeria.
478 NERC "Our history" online: https://www.nercng.org/index.php/about/history (Date of use: 26 June 2019).

The Minister[479] is empowered to issue general policy directions to NERC on matters concerning electricity, overall system planning and coordination which NERC is required to take into consideration in discharging its functions provided that such directions are not in conflict with the Act or the Constitution of the Federal Republic of Nigeria.[480] The Act provides for the composition of the board and members' professional qualification, remuneration etc.

NERC may hold public hearing on any matter which it is required under the Act or any other law to conduct or permitted to take action and that may be of significant interest to the general public. Any person having an interest in such matter will be notified of the questions at issue and allowed to make representations. In the event of any matter arising which will require the consideration of professional or technical question, NERC may consult such persons as may be qualified to advise on such issue. It may also refer question of law arising from an order or decision or at the request of any person directly affected by such order, to the High Court.

Section 50 of the Act provides for review process of the decision, order or refusal of NERC by anybody aggrieved in certain instances like a decision of the Commission not to issue license, any term or condition of a license issued to him, or a refusal by the Commission to specify a term or condition in a license, a refusal by the Commission to renew a license, any amendment of a license or a refusal by the Commission to amend a license, the cancellation of a license, the grant or refusal by the Commission to grant any approval or authority in terms of this Act, the outcome of any arbitration or mediation by the Commission of a dispute between licensees, a decision of the Commission with respect to prices or tariffs and any other decision of the regulator.

The Commission has been carrying out its responsibilities, one of which is to issue Orders such as the Multi Year Tariff Order.

f. *Licenses and Tariffs*

Licenses

479 The Minister of Power and Steel, or any other Minister to whom the President may from time to time assign administrative functions in respect of the Act.

480 In June 2019, the Minister issued some far reaching policy directives and timelines to NERC, TCN and NBET bordering on diverse issues of the market and guidance on how to carry out their statutory responsibilities.

Section 62 of the Act prohibits any person from constructing, owning or operating an undertaking which engages in electricity generation, electricity transmission, system operation, electricity distribution or trading in electricity without a license issued by NERC or deemed to have been issued by NERC. However, the Act provides an exemption in subsection 2 of Section 62 which allows an undertaking for generating electricity not exceeding 1 megawatt (MW) in aggregate at a site or an undertaking for the distribution of electricity with a capacity not exceeding 100 Kilowatts (KW) in aggregate at site or such other capacity as NERC may determine from time to time to operate without license.

It is important to state that the undertakings referred to in subsection 2 do not operate without regulation, they are required to obtain permit. NERC pursuant to its power to make regulations under Section 96 of the Act made the Nigerian Electricity Regulatory Commission Regulation for Mini-Grids in 2016.[481] This Regulation is primarily designed for the registration, grant of permit and operation of mini-grids. The Regulation defined Mini-Grid as any electricity supply system with its own power generation capacity, supplying electricity to more than one customer and which can operate in isolation from or be connected to a Distribution Licensee's network.[482]

The Regulation further divided Mini-Grids into isolated Mini-Grid and Interconnected Mini-Grid which are generating between 0KW and 1MW of generation capacity. By Sections 7 and 8 of the Regulation, NERC may grant a permit to isolated Mini-Grids larger than 100KW of Distributed power and up to 1MW of generation capacity and isolated Mini-Grids up to 100 KW of distributed power if the conditions required by NERC are satisfied by the Developer while the interconnected Mini-Grid developer will need the approval of NERC of a tripartite agreement signed between it, the Distribution Licensee and the Connected Community.[483]

Another undertaking exempted from operating with a license is a captive generation undertaking[484] which is defined by NERC Regulations for the granting of permits for Captive Power Generation as generation of electricity exceeding 1MW for the purpose of consumption by the generator, and which is consumed by the generator itself and

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481 Nigerian Electricity Regulatory Commission Mini-Grid Regulation (Regulation No.: NER/-R-110/17) of 2016.

482 Section 3 of Nigerian Electricity Regulatory Commission Mini-Grid Regulation (Regulation No.: NER/-R-110/17) of 2016.

483 Section 3 of Nigerian Electricity Regulatory Commission Mini-Grid Regulation (Regulation No.: NER/-R-110/17) of 2016.

484 Section 62(1)(a) of the Electric Power Sector Reform Act (Laws of the Federation of Nigeria) of 2005.

not sold to a third-party.[485] The Regulation equally requires any such undertaking to obtain permit.[486]

The Act makes it an offence liable on conviction to a fine not exceeding N500,000 (Five Hundred Thousand Naira) or to imprisonment for a period not exceeding two years or both to contravene the provision of Section 62(1) on the requirement of obtaining a license.[487] Sections 64 – 68 of the Act contemplate five (5) types of licenses which are identified as Generation license, Transmission license, System Operation license, Distribution license and Trading license.

Section 76 of the Act requires all generation, trading, transmission, distribution and system operation of which licenses are required under the Act to be subject to tariff regulation by NERC. It equally provides for tariff methodology's parameters namely; recovery of full costs of an efficiently operating licensee's business activities including return on the capital invested in the business, providing incentives for the continued improvement of the technical and economic efficiency with which services are provided, providing incentives for the continued improvement of quality of services, giving to consumers economically efficient signals regarding the costs that their consumption imposes on the licensee's business, avoiding undue discrimination between consumers and consumer categories, phasing out or substantially reduce cross subsidies, and taking into account any subsidy provided by the Power Consumer Assistance Fund whether direct or by way of favourable financing terms or in any other manner.

Notwithstanding the above considerations, NERC still reserves the power to establish tariff methodologies that reflect the terms and conditions of a contract between licensees or between a licensee and one or more eligible customers and may equally differentiate among consumers on the basis of differences in total electricity consumption, the time periods in which electricity is consumed, load factors, power factors, voltage levels, location within the country and other such criteria as may affect the cost of providing a service and may allow a lifeline tariff for some consumers.[488]

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485 Section 2(1) Nigerian Electricity Regulatory Commission (Permits for Captive Power Generation) (Regulation No:NERC-R-0108) Regulations of 2008.

486 Section 2(1) Nigerian Electricity Regulatory Commission (Permits for Captive Power Generation) (Regulation No:NERC-R-0108) Regulations of 2008.

487 Section 62(5) of the Electric Power Sector Reform Act (Laws of the Federation of Nigeria) of 2005.

488 Section 76(4) & (5) of the Electric Power Sector Reform Act (Laws of the Federation of Nigeria) of 2005.

The Act equally laid down procedure by which tariff methodology is prepared while representations from license applicants, other licensees, consumers, eligible customers, consumer associations, associations of eligible customers and such other persons are entertained. NERC is required to obtain evidence, information or advice from any person whom it considers possesses expert knowledge relevant for its consideration.[489]

g. Acquisition of Land and Access Rights

Any licensee who requires any land in connection with its obligations under its license may apply to NERC for a declaration that the land is required for the purposes of generation, transmission or distribution of electricity.[490] Before making such declaration, NERC may call for further information by inviting and considering submissions from the Commissioner of Lands of the State where the proposed land is situate and also taking representations from the holder of such land.[491] NERC is required to ensure the protection of the physical environment in making its declaration.

h. *Consumer Protection and Licensee Performance Standards*

Section 80 of the Act requires NERC in consultation with the licensees to develop customer service standards, customer complaint handling standards and procedures, Codes of practice for the provision of assistance to special needs customers, such as the blind or disabled, the elderly or severely ill, procedures for dealing with, and assisting where necessary, customers who have difficulty in paying bills, procedures for applying for electricity service, procedures for disconnecting non-paying customers or for those breach of other terms and conditions of an applicable tariff or contract; and the information to be provided to consumers and the manner of its dissemination. The licensees are to adhere to these standards and procedures by NERC.[492]

i. *Competition and Market Power*

The NERC is expected to exercise its power to monitor the Nigerian electricity supply industry to ensure additional competition and to make a report on it on a yearly basis

489 Section 76(7) of the Electric Power Sector Reform Act (Laws of the Federation of Nigeria) of 2005.

490 Section 77(1) of the Electric Power Sector Reform Act (Laws of the Federation of Nigeria) of 2005.

491 Section 77(2) of the Electric Power Sector Reform Act (Laws of the Federation of Nigeria) of 2005.

492 Section 80(2) of the Electric Power Sector Reform Act (Laws of the Federation of Nigeria) of 2005.

to the Minister until a time the Minister will make a declaration under Section 24(3). The report shall consider whether any of the regulated services in the industry ought to be exempted from tariff regulation.[493] However, NERC may restrict the introduction of competition to specific geographical areas or to certain licensees or customers on a temporary or permanent basis.[494]

j. *The Power Consumer Assistance Fund*

NERC is required to establish this fund and administer same under Section 83. The purpose of the fund is to subsidize underprivileged power consumers who are specified by the Minister and the source of the fund shall be contributions delivered by all consumers and eligible customers liable to make contributions under Section 89(1) at a rate to be determined by NERC[495] and any subsidies received from the FGN as appropriated by the National Assembly. Failure to pay to the fund shall attract a fine not exceeding three times the amount owed.[496]

k. *Rural Electrification*

There is established by Section 88 an Agency known as the Rural Electrification Agency as a body corporate.[497] The Minister is required to within one year of the commencement of the Act prepare for the approval of the president a Rural Electrification Strategy and Plan.[498]

The rural electrification scheme is designed to promote, support and provide rural electrification programmes through public and private sector participation in order to achieve regional access to electricity, maximize the socioeconomic and environmental benefits of rural electrification subsidies, promote the expansion of the grid and development of off grid electrification and stimulate innovative approaches to rural electrification.[499]

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493 Section 82(1) of the Electric Power Sector Reform Act (Laws of the Federation of Nigeria) of 2005.

494 Section 82(3) of the Electric Power Sector Reform Act (Laws of the Federation of Nigeria) of 2005.

495 Section 84(1) of the Electric Power Sector Reform Act (Laws of the Federation of Nigeria) of 2005.

496 Section 87 of the Electric Power Sector Reform Act (Laws of the Federation of Nigeria) of 2005.

497 Section 88(1) of the Electric Power Sector Reform Act (Laws of the Federation of Nigeria) of 2005.

498 Section 88(4) of the Electric Power Sector Reform Act (Laws of the Federation of Nigeria) of 2005.

499 Section 88(13) of the Electric Power Sector Reform Act (Laws of the Federation of Nigeria) of 2005.

The Agency is required to establish and administer a fund called Rural Electrification Fund which shall be used to achieve the purposes for which the scheme is created.[500] The FGN through the Ministry of Power has identified three key rural electrification projects to be developed in order to implement the Rural Electrification Plan. First is the grid extension which will require extending the national grid to serve additional communities. Mini-grid projects designed for remote settlement with relatively high demand for power and population density which shall be powered by either fossil fuel or renewable source of energy. Lastly, stand-alone systems designed for localities with low levels of demand which will require individual photovoltaic (PV) systems to satisfy the needs of households and small commercial enterprises.[501]

L States' Government emerging role

For the Nigerian privatized electricity market, regulation is centralized by design. In effect, electric power regulation is listed under the concurrent list[502] in the 1999 Constitution (as amended) but the State can only make laws in areas not already covered by the national grid system within the state with respect to generation, transmission and distribution of electricity.[503] By this arrangement, the power of State Governments is largely whittled down by the constitutional provision so much so that their powers to make law for the establishment of electric power stations in the state is also subject to the powers of the Regulator (NERC) to issue license made pursuant to the reform law (a federal law).

However, there is a proposed constitutional amendment seeking to delete the constitutional provision limiting the power of the state to make laws only in areas not covered by the national grid system within the state.[504] Until the law is passed, regulatory mechanisms in the Nigeria electricity privatized market will remain solely instruments of the Regulator made pursuant to federal laws.

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500 Section 88(11) of the Electric Power Sector Reform Act (Laws of the Federation of Nigeria) of 2005.

501 Federal Ministry of Power and Works Rural Electrification Strategy and Implementation Plan (RESIP)" (2016) 10 – 11.

502 Part II second schedule of the 1999 Constitution containing matters to which both the Federal and State government in Nigeria can legislate upon and the extent to which such legislation can be carried out.

503 Paragraph 14(b) Part II second schedule of the 1999 Constitution (as amended).

504 Bill No.33 Devolution of powers (National Grid System) of the Constitutional amendment Bill (5th Alteration) 2022.

Notwithstanding the constitutional impasse, there is a growing agitation by some of the States to allow States' participation in the production, transmission and distribution of power without the limitation to areas not covered by the national grid system. While some states like Lagos, Edo, Ondo and Kaduna have taken the initiative to enact laws to facilitate their participation, the said laws still suffer the difficulty of being inconsistent with the Constitution.[505]This is so because the Constitution is supreme and any law that is inconsistent with its provisions shall be void.[506]

In line with the mood of the states' emerging participation in power supply in the country, there is also an ongoing amendment process of the Reform Act (Electricity Power Sector Reform Act 2005) 'the Bill', which is supposed to be geared towards accommodating States' participation in the privatized electricity market but has been marred with clarity issues. The original version of the bill for the amendment failed to recognize states' participation, and also seeks to establish a single Federal government appointee as the defacto head and statutory supervisor of all key Federal Government electricity sector departments including the regulator with powers shared with the National Assembly through the mechanism of legislative oversight responsibilities.[507]

Expectedly, with the States' government criticisms and agitation against this development that further validates the single electricity market system, the Report of the Senate Committee on power shows that adjustments have been made to some parts of the original version limiting the states' legislative power/participation to only areas not covered by the national grid system to now cover the entire state.[508] Again, it is important to also emphasize that without the necessary amendment to the earlier noted provisions of the Constitution, the amendment to the Reform Act will also suffer the difficulty of being inconsistent with the provision of the Constitution with the attendant voidability. More importantly, increased States' participation in power supply will help decentralize the power supply system and reduce the burden on the FGN which will in turn boost the efficiency of the power supply chain.

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505 The Vanguard "Amending Constitution for states to generate, transmit and distribute electricity good for consumers" (March 3, 2022) online: https://www.vanguardngr.com/2022/03/amending-constitution-for-states-to-generate-transmit-distribute-electricity-good-for-consumers/ (Date of use: October 5 2022)

506 Section 1(3) of the Constitution of the Federal Republic of Nigeria (as amended) of 1999.

507 The Vanguard "Proposed electricity Bill: Governors write senate, reject bill" (February 28, 2022) online:https://www.vanguardngr.com/2022/03/amending-constitution-for-states-to-generate-transmit-distribute-electricity-good-for-consumers/ (Date of use: October 5 2022).

508 Report of Senate Committee on Power (July 2020)

Notwithstanding the constitutional challenges,[509] some States in Nigeria are beginning to demonstrate their willingness and readiness to create an alternative electricity market from the single market operated centrally. Lagos state passed the Lagos State Electric Power Sector Reform law in 2018,[510] Ondo State passed the Ondo State Electric Power Sector Law 2020,[511] Edo State passed the Edo State Electricity Law 2021[512] and the Edo State Rural Electrification Agency Law 2022.[513] These laws are directed at creating a new electricity market for both served and unserved areas of the States notwithstanding any constitutional limitation preventing the states from legislating over areas already covered by the national grid.

Other notable proposed amendment in the Bill (Electricity Bill 2022)[514] includes provisions largely directed to strengthening the privatized market by seeking to, amongst other things, attract investments to improve the utilization of generated power, entrench the independence and autonomy of the Regulator and the harmonization of the roles of regulators in NESI, the separation of the distribution and retail functions of the Discos into different licenses and the provision of framework for investments in national grid by non-licensees.[515]

m. Analysis of the legal and regulatory framework

Remarkably, the legal framework underpinning the creation of IPP/NIPPs to increase power production has been relatively successful as the power pool has increased from the 5906 MW in the pre-privatization era to an installed capacity in excess of 10,000 MW. However, the installed capacity is largely un-utilized as a result of various transmission and distribution constraints which begs the questions of where should capacity expansion projects begin from, as it will amount to an exercise in futility developing power production capacity while the transmission and distribution capacity remain less than the production capacity.

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509 The President of the Federal Republic of Nigeria on the 17th of March, 2023 signed the Bill No. 33 Devolution of Powers, Fifth Alteration into law which now expands the scope of the State legislative powers to include generation, transmission and distribution of electricity in areas covered by the national grid system.

510 Lagos State Electricity Sector Reform Law 2018 CAP C85 Laws of Lagos State, Nigeria

511 Ondo State Electric Power Sector Law 2020 Laws of Ondo State, Nigeria.

512 Edo State Electricity Law 2021 Laws of Edo State, Nigeria.

513 Edo State Rural Electrification Agency Law 2021 Laws of Edo State, Nigeria.

514 The Bill had eventually been assented to by the President and passed into law in June 2023 incorporating most of the notable provisions of Bill.

515 The Daily post "Gabriel Suswam: Overreaching objectives electricity Bill, 2022, need for stakeholders' support" (24 February, 2022) online: https://dailypost.ng/2022/02/24/gabriel-suswam-overreaching-objectives-of-electricity-bill-2022-need-for-stakeholders-support/ (Date of use: October 5 2022).

Furthermore, some of the issues of the privatized market are directly traceable to the Act. The specific purposes for which NELMCO and NBET are created have been tinkered with upon operation of the market. The insistence by some of the generating companies (Gencos) that pre-privatization debt (legal debt) owed to them still exist in their record books seems to be inconsistent with the instrumentality of absorbing such debt by the creation of NELMCO. The ineffective invoice settlement of the Gencos by NBET, albeit with attendants issues (discussed in chapter 4), in the privatized market is also inconsistent with NBET's primary responsibility of providing payment guarantee to the Gencos for energy purchased by NBET.

Also, the poor implementation of the framework developed for the market development progression as envisaged by the policy, the Act and Rules (Market Rules) developed pursuant to the Act, hampered very seriously the growth of the privatized market. The regulator suspended the transitional stage by the addition of a new phase, Interim Rule Period (IRP) as a result of the absence of contract based electricity trading arrangements amongst others, necessary to activate the Transitional Electricity Market. To a large extent, this new development affected the performance of the Discos as well as the implementation of the mechanism put in place for tariff adjustment (MYTO), and for a long period, kept tariff below cost reflective level.

The Minister's power under the Act to issue general policy directions to NERC on matters concerning electricity, and overall system planning and coordination may not seem to enhance the independence of the regulator but such policy direction has become necessary in view of the many challenges of the privatized market. Although, the government Ministry of power recognizes that the reform requires continued policy and regulatory reappraisal to align with current realities and challenges, no such policy reappraisal has been fashioned out by the government ministry.[516]

The requirement for obtaining license by any undertaking generating power in excess of 1MW and distribution network with a capacity exceeding 100 Kilowatts (KW) in aggregate at site or such other capacity as NERC may determine from time to time to operate without licence seem to have outlived its usefulness in the electricity market. The current reality is that while the electricity supply industry requires regulation, entry regulations will only serve to limit participation and the growth of the market towards competition. The Policy's recommendation for framework modification is that

[516] The Federal Ministry of Power: Answers to questionnaire submitted by Babatunde Olumuyiwa Fasuyi (September 2019) 2

framework for market development can be modified to introduce steps that will ensure that the distribution companies lose their monopoly sales (marketing) franchise and the market for sales to final customers is opened up to a range of new companies who are allowed to compete in the sale of electricity to retail consumers.[517]

3.3.3.3 Roadmap for Power Sector Reform

Arising from factors such as ill-conceived power projects, successive governments' ideological differences, infrastructural decay, industrial labour issues, lack of appropriate electricity pricing regime and functional metering gap[518] which characterized the sector in the critical period of the reform described above, the Government of the late President Umaru Yaradua in 2007, emphasized the need to rejig the reform process[519]but suspended the reform process.

Upon the assumption of office of his successor, President Jonathan Goodluck, a Presidential Action Committee on Power (PACP) and the Presidential Task Force on Power were established. These Committees were established for the purpose of eliminating red tape and the often over-bureaucratic and inefficient nature of decision-making in government and to equally develop a roadmap and provide monitoring to ensure effective implementation of the plan.[520] It is believed that this will ensure a greater degree of transparency and accountability in the reform process. The Roadmap for the Power Sector Reform was developed in August 2010.[521]

At the core of this initiative is the improvement of service delivery to electricity consumers and economic development. The Roadmap identified two key areas of the reform which required improvements namely; the imperative of the Electric Power Sector Reform Act (EPSRA) and improving service delivery throughout the transition. To fast-track the reforms envisaged by the EPSRA, government will carry out the following:[522]

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517 National Electric Power Policy (2001) 26.

518 Olalere P.O. "Privatisation of Electricity Industry in Nigeria: Lessons from Europe and United States of America" 2014 (5) Renewable Energy Law and Policy 141.

519 Idris A and Kura SM "An Assessment of the Power Sector Reform in Nigeria" 2013 (2) International Journal of Advancements in Research & Technology Issue 2 2013" 5.

520 The Presidency of the Federal Republic of Nigeria Roadmap for power sector reform (August 2010)3 – 4.

521 Ogunleye EK "Political Economy of Nigerian Power Sector Reform" 2014 United Nations University World Institute for Development Economics Research 5.

522 The Presidency of the Federal Republic of Nigeria Roadmap for power sector reform (August 2010) 5 – 8.

a. Remove obstacles to sector investment which will require the establishment of appropriate pricing regime and bulk purchaser, provision of Government Credit enhancement to ensure that the Gencos are paid for the power purchased from them, creating an efficient and motivated workforce, operationalizing the Nigerian Electricity Liability Management Company (NELMCO), outsourcing the management of Transmission Company of Nigeria (TCN), clarifying and strengthening the licensing regime and the Nigerian Electricity Regulatory Commission.

b. Clarifying government strategy on PHCN successor companies by granting concessions for the operation of Kainji, Jebba and Shiroro hydro-power plants, the sale of minimum of 51% equity in the thermal generating plants to core investors with technical and financial ability to operate the plants while NIPP plants are to be managed under Operation and Maintenance (O & M) contracts until a clear strategy for their divestiture is communicated after commissioning.

   The Transmission Company of Nigeria was expected to hand over to a credible private sector company with requisite skills, under a five (5) year management contract. The sale of minimum of 51% of government's equity in the Discos to core investors which said sale will emphasize the reduction of technical and commercial losses and increased efficiency of collections. The eighteen (18) successor companies and their particulars are shown in Table 5.

c. Prioritizing reform in fuel to power sector in ensuring that the reforms in the gas industry have direct and positive impact on the electricity industry.

The FGN in the Roadmap equally recognized that in the period leading to full private sector participation in the industry there is the need to improve service delivery to consumers, in the parastatals under its management, in the key areas of fuel to power, generation, transmission, distribution, compilation, processing and disclosure of industry statistics and human capital development.[523]

3.3.3.4 Auction of the Government Assets

In line with the Roadmap prescription, by December 2010, the Bureau of Public Enterprises (BPE) commenced the process of sale and concession of the unbundled

[523] The Presidency of the Federal Republic of Nigeria Roadmap for power sector reform (August 2010) 8 – 14.

PHCN successor companies (Gencos and Discos) and the hydro-power generation companies (Kainji, Jebba and Shiroro) by inviting an expression of interest (EOIs) from prospective core investors[524] through publication in the media.[525] Following the invitation, 331 EOIs were received but 207 firms which met the minimum qualification standards were shortlisted out of which 163 that purchased bid documents were issued with bid documents which included transaction agreement and industry documents with request for comments and recommendation.[526]

The technical bids by the investors were evaluated by the BPE which presented a report that was subsequently evaluated by the NCP to ensure an error free process. At the conclusion of these exercises, nine (9) prequalified bidders for Gencos were approved while thirty-one (31) prequalified bidders for Discos were approved.[527] By 2012, the financial bids were made and accepted by BPE/NCP, ten (10) out of the eleven (11) Discos' bid were accepted while the last one was concluded much later in 2014.[528] Five (5) out of the six (6) Gencos' bids were received which included concession rates for the hydro power generation companies.

The privatization exercises were concluded in line with the Roadmap approved privatization strategies for the successor companies and Transmission Company of Nigeria. The core-investor sale method was approved for the Discos. The bidding parameters for Discos were mainly based on the use of quality of service/efficiency parameters considered against investment proposals made by bidders aimed at reducing Aggregate Technical, Commercial and Collection (ATC&C) losses over an agreed time frame and ensuring that there is technical, financial and managerial competence.[529]

The management contract proposed for the Transmission Company required the contractor to oversee the market and system operations, necessary skills and

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524 A core investor sale is defined by BPE as the transfer of at least 51% of ownership, accompanied by management control, in a company from government to new private owners. Core investors may be individuals or firm, Nigerian or foreign, with the money required to buy and operate the company, and the technical and managerial capacity needed to ensure that the company is profitable.

525 Oni A *The Nigerian electric power sector* (CI-Plus 2013)94.

526 Adedeji AO "Privatization and Performance of Electricity Distribution Companies in Nigeria" 2017 (7) Journal of Public Administration and Governance 194.

527 Oni A *The Nigerian electric power sector* (CI-Plus 2013) 96.

528 Adedeji AO "Privatization and Performance of Electricity Distribution Companies in Nigeria" 2017 (7) Journal of Public Administration and Governance 194.

529 Onagoruwa B (2011) Nigeria Power Sector Reforms and Privatisation Available online: file:///C:/Users/HP-PC/Downloads/Bolanle%20Onagoruwa%20Presentation%20to%20DG%20SEC.pdf (Date of use: 30 July 2019).

expertise to transform the Company, technical loss reduction and network improvement, ensure adequate and equitable generation dispatch according to a fair merit order based on sound regulatory principles, ensure fair market settlements between electricity traders, transfer of skill and expertise to Nigerian counterparts amongst other things.[530]

The privatization strategy for the Gencos is geared towards preventing a monopoly or oligopoly of market power and ensuring an unrestricted market entry of competent operators not only through privatization but through licensing of new IPPs, competitive bulk procurement of electricity by the bulk trader and the bilateral contracting of electricity between generating and distributing companies.[531]

Afam power station privatization which was not concluded in 2013 as a result of the failure by the prospective core investors to meet the required qualifying criteria[532] was later concluded with the acceptance of the financial bid from Transcorp Power Consortium who emerged as the preferred bidder for 100% equity in Afam Power comprising of Afam Power Plc & Afam Three Fast Power Limited with a bid price of N105.3 billion. Afam power station has an installed capacity of 776MW.[533] The Gencos sold by BPE, their owners and capacity are shown in Table 6.

The Discos that were eventually privatized through sale to core investors in 2013 are shown in Table 7. The sale of Kaduna Electricity Distribution Company to the preferred bidder Northwest was later concluded in 2014[534] with the payment of USD$163 million.[535] Apart from the sale of these successor companies, the Government of Nigeria had also been making effort to divest its interests in other power assets like the NIPP[536] completed projects like Calabar, Omotosho, Geregu, Egbema and Gbarain gas fired plants but according to the Managing Director of the NDPHC, post-

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530 Onagoruwa B (2011) Nigeria Power Sector Reforms and Privatisation Available online: file:///C:/Users/HP-PC/Downloads/Bolanle%20Onagoruwa%20Presentation%20to%20DG%20SEC.pdf (Date of use: 30 July 2019).

531 The Presidency of the Federal Republic of Nigeria Roadmap for power sector reform (August 2010) 29.

532 Oni A *The Nigerian electric power sector* (CI-Plus 2013)97.

533 The Bureau of Public Enterprises (BPE) "Transcorp Power Consortium, Quest Electricity win bids for Afam Genco, Yola Disco" (7 May 2019) online: https://bpe.gov.ng/transcorp-power-consortium-quest-electricity-win-bids-for-afam-genco-yola-disco/ (Date of use: 31 July 2019).

534 Adedeji AO "Privatization and Performance of Electricity Distribution Companies in Nigeria" 2017 (7) Journal of Public Administration and Governance 195.

535 Energy Mix Report "Privatized Power Assets: Who are The New Owners?" (2013) online: https://www.energymixreport.com/privatized-power-assets-who-are-the-new-owners/ (Date of Use: 30 July 2019).

536 Please see Chapter 3.3.3.2 pages 118 – 119 above.

privatization challenges such as liquidity constraints, inadequate gas supply, micro economic issues have had a significant impact on the privatization process since 2014.[537]

The bidding parameters for the Discos was aimed at reducing the Aggregate Technical, Commercial and Collection (ATC&C) losses over an agreed time frame, the management contract proposed for the transmission company was aimed at reducing technical loss reduction and network improvement, ensuring adequate and equitable generation dispatch while the privatization of Genco was aimed at removing monopoly and ensuring competition. However, none of these aims has been achieved in the reform process arising from several constraints in the sector value chain.

3.3.3.5 Presidential Power Initiative (PPI)

This initiative also forms part of regulatory framework of the privatized market. In the course of the privatized market development, a fundamental challenge is the noticeable constraint of the Nigeria's power system that reflects in the imbalance between power generation and consumption. While there exist 13,000 MW power generation capacity, an average of 3,400 MW is being transmitted and distributed to consumers.[538] The removal of bottlenecks in the transmission and distribution network is perceived to be necessary for the utilization of the 13,000MW power generation capacity. Arising from this realization, the initiative was conceived as the Nigerian Electrification Roadmap by the Federal Government of Nigeria and Germany on the 18th of August, 2018 while the implementation Agreement was signed on the 22nd of July, 2019 between Nigeria and Siemens representing the German government, for the Nigerian Electrification Project.[539]

It was agreed that the electrification project will be executed in three phases. The first phase is to adopt essential and quick fix measures in the transmission and distribution network to increase the operational capacity to 7,000MW from 5,000MW. The second phase is to remove remaining bottlenecks in the transmission and distribution

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537 The Daily Trust "Nigeria: Preferred bidders propose 30 percent cash 70 percent debt payment on 5 NIPP Gencos" (20 November 2017) online: https://allafrica.com/stories/201711200051.html (Date of use: 31 July 2019).

538 Siemens "Electrification roadmap for Nigeria technical and commercial proposal" (7 May 2019) https://powerlibrary.nigeriaelectricityhub.com/index.php/2019/09/23/nigeria-electrification-roadmap-2019/ (Date of use: 16 April 2020) 3

539 Siemens "Understanding Nigeria's Presidential Power Initiative (PPI)" https://assets.siemens-energy.com/siemens/assets/api/uuid:8d03f57f-bb60-430e-878b-9dd5ec3f4d2c/understanding-nigeria-s-ppi-v2-v3-002-.pdf?ste_sid=e93048e554243456b5f4dcd5dff128d1 (Date of use: 12 October 2022)

networks by upgrading the operational capacity from 7,000MW to 11,000MW to enable the full utilization of existing power generation capacity. The third phase is the expansion of the entire power system, the generation, transmission and distribution, to 25,000MW in the long term.

It was also agreed that 85% of the estimated cost of the electrification project will come from a consortium of German banks guaranteed by the German Export Credit Agency while 15% will come from the Nigerian government in counterpart funding[540] with a 2 – 3 year moratorium and 10 – 12 year repayment period at concessionary interest rates.[541] The FGN is expected to make initial investment cost as a convertible loan on behalf of the Discos considering their inability to secure requisite investments for network improvement. A special purpose vehicle had been established to own and execute the PPI, the company had received the sum of $100m out of $200m from the FGN as take-off grant for the PPI. The Company is expected to on-lend the project cost to the Discos and Transmission Company which is to be repaid from revenue from the market.[542]

The initiative further validates a single market for power supply and a centralized power system. While it is an independent effort of the FGN and Germany through Siemens, the implementation and execution of the first and second phases is carried out through the TCN and Discos with project cost incurred on their behalf. Although, the responsibility for the additional independent power plants to increase operational capacity from 11,000MW to 25,000MW appears to be that of the FGN and Siemens but the unclear funding mechanism attached to it requires clarification. Ultimately, the present challenges of the privatized market should inspire solutions beyond consolidating a centrally controlled single market for power.

3.4 CONCLUSION

The Nigerian Government from 1999 clearly saw a need for government intervention in the power sector as a result of the numerous issues that bedeviled the sector. The intervention could not have come at a more auspicious moment in the history of the

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540 The Punch "Buhari approves, releases N41.6bn take-up grant for presidential power programme" (June 26 2022) online: https://punchng.com/buhari-approves-releases-n41-6bn-take-up-grant-for-presidential-power-programme/ (Date of use: 12 October 2022).

541 Energy for growth hub "Nigeria's Electrification Roadmap: After two years, where does it stand?" online: https://www.energyforgrowth.org/memo/nigerias-electrification-roadmap-after-two-years-where-does-it-stand/ (Date of use: 12 October 2022).

542 The Punch "Buhari approves, releases N41.6bn take-up grant for presidential power programme" (June 26 2022) online: https://punchng.com/buhari-approves-releases-n41-6bn-take-up-grant-for-presidential-power-programme/ (Date of use: 12 October 2022).

country considering the value of electricity to the economic growth of a nation. The need for a reform is obvious from the grim situation in the sector at the time government intervened as shown by the estimated percentage of Nigerians who had access to electricity from NEPA which was said to be only 36%[543] of its total population.

Given the poor access to electricity by the Nigerian people, the intervention came in the form of a reform ushered in by the formulation of the National Electric Power Policy whose content is public-driven and can arguably be said to be in consonance with the public interest theory of regulation. However, what is beyond argument is the notion that extensive government control of the economy in the form of state-owned public enterprises like NEPA had become ineffective in providing the utility. The justification for the concept of natural monopolies had become moribund as a result of lack of competition and failure of public ownership which said factors led to a shift in public ownership of natural monopoly to private sector.

The above clearly informed the reform structure proposed by the Nigerian Government in the NEPP which was geared towards attracting private sector participation and ultimately to lead to a competitive market. The main argument for the unbundling of the government natural monopoly NEPA/PHCN into successor companies and subsequent sale through privatization within a clear regulatory framework was that the private sector is better equipped to manage businesses than Government. The argument was further compounded by World Bank insistence in the 1990s that infrastructure services should be provided largely through the private sector and so the regulatory framework designed by the Government, the Electric Power Sector Reform Act (the EPSR) is to ensure private sector participation from divestiture to continued investment.

While the arguments for government intervention through divestiture and privatization seem to be convincing, post-privatization experiences as shown that the reform may not have considered the peculiarity of the country pluralistic nature and the context in which implementation is to be carried out. The focus of the next chapter is an attempt to consider the impact of key regulatory mechanisms in the privatized market focusing on the challenges of the value chain in the Nigeria electricity supply industry with a

543 National Electric Power Policy (2001) 3.

view to finding areas in the regulatory framework that require minor or extensive amendment in order to tackle post-privatization challenges.

CHAPTER 4

REGULATORY MECHANISMS IN THE NIGERIA ELECTRICITY SUPPLY INDUSTRY: POST- PRIVATISATION ASSESSMENT

4.1 INTRODUCTION

This chapter aims to achieve the fourth objective of the study and will assess the value chain of NESI with respect to the three segments of the power market namely; generation, transmission and distribution, the issues and challenges of these segments, the regulatory mechanisms adopted in resolving the issues, and how they have performed in the post-privatization era of the industry. There is a dearth of theoretical literature on the assessment of post privatized market in NESI because of its nascent status and so the study will necessarily draw on empirical analysis from various interviews with some of the market players in the industry in addition to some literatures adopted. This method is adopted to draw out specific responses of the market players to the issues of the market.

The outcome of these interviews is benchmarked against information available in the public space about the identified issues and challenges of NESI such as market

settlement and payment of invoices of energy generated, enforcement and compliance with Market Rules and Grid code, market players with dual roles/capacity, ineffectiveness of Power Purchase Agreements and Vesting Contracts, tariff setting based on wrong indices, non-cost-reflective tariff, lack of quality of service and improved service delivery, energy theft, inadequate billing and metering system, , persistence trade blaming, lack of coherent regulations and regulatory implementation strategy, lack of transparency, information distortion, pervasive lack of market understanding, trade blaming, technical, collection and commercial losses, and improper development of transmission capacity.

The regulatory interventions and mechanisms adopted by government and the regulator as well as some of the ingenuous approaches of the market players adopted in response to some of the challenges are in some situations counterproductive and have accounted largely for the current financial crisis of the market which may potentially grind the market to a halt. Unless urgent and far reaching implementable steps are taken to arrest the situation and attract the much needed investment for service improvement, the market operation will continue to suffer. This chapter will trace market development in the post privatization era of NESI to appreciate the depth of the challenges, and to also provide a basis for the analysis of regulatory mechanisms initiatives of other electricity industry in chapter 5.

4.2 AN OVERVIEW OF THE VALUE CHAIN OF THE NIGERIA ELECTRICITY SUPPLY INDUSTRY

4.2.1 Summary of market design

Olalere[544] demarcated the market into five sub-sectors namely generation; transmission; system operation; distribution and trading except that the Transmission Company of Nigeria (TCN) combines the role of system and market operation. The value chain is designed in line with the recommended market reform model in the reform Policy which envisages a competitive wholesale market and retail competition in the long run, multi-buyers of energy, private sector driven, and cost reflective tariff. A more apt description of the value chain will place the gas producers/transporters and the power generators in the upstream sector while the distributors and the

544 Olalere P.O. “Privatisation of Electricity Industry in Nigeria: Lessons from Europe and United States of America” 2014 (136) Renewable Energy Law and Policy 140.

consumers will be in the downstream sector, the transmission segment will serve as the connection point for both upstream and downstream.

As discussed earlier, the Market Rules provide for the stages of NESI's market development to achieve the competitive market envisaged. Each of these stages represents a phase of projected market growth with a step closer to full competitive market. The current stage which is the Transitional Electricity Market (TEM) was declared in February 2015 as an intermediate stage based on the satisfaction of some of the conditions precedent (partially satisfied) specified in the Market Rules. It ought to be largely characterized by contract-based arrangements for electricity trading[545] amongst the market players and the introduction of competition.

The current contract-based electricity trading arrangement in NESI requires a Genco (including and Independent Power Producer) to sign Power Purchase Agreement (PPA) with NBET, who is a bulk trader and buffer between the Genco and the Distribution Companies (Disco). NBET is required to sign a Vesting Contract with each of the Discos for energy delivered to them by the Transmission Company. The condition precedent for an active PPA between the Genco (thermal plants) and NBET is that a Genco must have an effective take or pay[546] Gas Sales Agreement (GSA) with a gas supplier for the supply of gas. The Genco must provide a letter of credit as a form of security to back up the GSA for gas supplied in the event that the Genco fails to pay. NBET is also required to provide a letter of credit to the Genco for the purchase of energy generated as a form of security to back up the PPA signed by the parties. This letter of credit serves a similar purpose as the letter of credit given to the gas suppliers, it provides the Genco with a security for energy generated in the event of failure of NBET to pay for any invoiced issued.

The Discos are required to provide a letter of credit to NBET for energy delivered to them as a form of security to back up the Vesting contract signed with NBET. This letter of credit serves a similar purpose as the letter of credit given to the Genco by NBET; it provides NBET with a security for energy purchased from the Genco on behalf of the Disco so that in the event of failure to pay for such energy, NBET shall have recourse to the letter of credit. The Market Rule also underpins this structure during the transitional stage of the wholesale market which is designed to ensure that

545 Paragraph 6.3 of Market Rules for the Nigerian Electricity Supply Industry of 2014.

546 The Take or Pay GSA mandates the Genco for a period of time stipulated in the Contract to take and pay for gas produced by the gas supplier at a particular rate or pay penalty for failure to do so.

energy traded is done by bilateral contracts.[547] The summary of the value chain is shown in Table 8.

A critical aspect of the energy supply chain is the transmission segment, the Transmission Company of Nigeria (TCN) which by market design includes the Market Operator (MO) and System Operator (SO). The SO and MO are entitled to transmission charge and administrative fee calculated by the MO for the participants and load participants on a monthly basis. The SO is entitled to the Transmission Use of System Charge (TUOS)[548] and both the SO and MO are entitled to administrative fee/charge which shall be included in the Settlement Statement prepared for the participants by the MO.[549]

4.3 OBJECTIVE OF THE POWER MARKET AND RATIONALE FOR REGULATORY INTERVENTION

It is important to re-emphasize the key objectives of the NEPP which led to the market reform of NESI in order to ascertain the main objective of the power market after the privatization. It includes attraction of private investments, development of transparent and effective regulatory framework, ensuring that electricity supply is made more reliable, and minimizing government guarantees for privately funded investment.[550]

The FGN vigorously pursued these objectives between 2009 and 2013 when the state-owned asset was eventually sold. How well these objectives have been achieved in the post privatization era can only be ascertained by an assessment of the performance of each of the market segments considering the regulatory environment which has largely shown the absence of the identified elements of the hybrid regulation in chapter 2 namely; the phased efficiency goal, the benefits and interests of the drivers of the efficiency goal (producer, government or consumer), reform of institutional arrangements to reduce transaction cost and increase credible commitment and contextualized applicability.

Sioshansi was of the view that even when there exists a sound initial design of the reformed market, the implementation and transition process can go wrong in some cases with serious consequences (the California market is a case in point)[551]. In his

547 Paragraph 20.1.4 Market Rules for the Nigerian Electricity Supply Industry of 2014.
548 Paragraph 27.10 Market Rules for the Nigerian Electricity Supply Industry of 2014.
549 Paragraph 27.11 Market Rules for the Nigerian Electricity Supply Industry of 2014.
550 National Electric Power Policy (2001) 6 – 7.
551 After the California restructuring programme of 1994 – 1999, serious economic and regulatory factors led to an explosion in wholesale prices, supply shortages, and utility insolvencies in

view, the introduction of market reform usually but necessarily go through the process of acknowledgment of the issues, a debate on how best to fix it, the implementation of the market design arrived at during the debate, a realization that the market reform may not necessarily lead to expected benefits and outcomes, and finally to a stage where it is necessary to deal with the issues associated with the market design flaws, implementation flaws, or unanticipated problems resulting from external factors or events.[552]

The Gencos summarized their problems as gas constraint and contract ineffectiveness.[553] The Transmission Company of Nigeria (TCN)[554] acknowledged gaps in the regulatory system and recognized significant transmission constraints arising from technical issues and lack of expansion and investment, while the Discos admit the lack of performance due to wrong assessment of the loss level (Aggregate Technical, Commercial and Collection losses 'ATC&C') made at the time of bidding for the distribution assets sold to them which has greatly hindered the liquidity of the entire value chain.[555] The Discos' failure to reduce their various loss level shown by the projected ATC&C combined with lack of cost reflective tariff has made them unable to generate enough revenue to meet their obligations one of which is improvement of service delivery to the consumers. The regulator also seems to have a narrow perspective of the market challenges judging from its focus on the Discos as the weakest link. In an interview with the Regulator, it was of the following view:

> "*"Regulatory performance and regulatory compliance, I will say to a large extent we have being able to achieve some level of success in terms of compliance with our regulations. You have a number of players in the industry, the generators, Transmission Company and the distribution companies. With the generating companies, we don't seem to have issues with them complying with our Orders, for the transmission company to a large extent also, they are in compliance with our Orders. The only challenge we seem to have is with the*

California's electricity sector from May 2000 to June 2001 (Joskow PL "California's Electricity Crisis" 2001 Oxford Univerisity Press 365 – 388).

552 Sioshansi F.P. "Electricity Market Reform and Reform of the Reforms" online: http://www.menloenergy.com/wp-content/uploads/articles/MktRfrm.pdf (Date of use: 29 January 2020) 2 – 3.

553 Transcript of interview with Association of Power Generating Company conducted at APGC Office, Abuja (5 September 2019) 1.

554 Transcript of interview with Transmission Company of Nigeria conducted at Energy House, Abuja (5 September 2019) 1.

555 Transcript of interview with Association of Nigeria Electricity Distributors conducted via telephone chat (11 December 2019) 1.

distribution companies which is attributable to a large extent, their lack of capacity, when these companies were privatized, the expectation was that they will have some expertise in the sense that each of them was expected to have some technical managers that were supposed to run it, unfortunately, all across if you check, you will find out that most of them were not there. They have left because of one issue or the other so you are left with the same core investors without technical partners and they lack the expertise."[556]

However, it recognized the fact that market situations determine the type of regulation it issues from time to time.[557] In reality, the market situation in the post privatization is grim and will require a lot of regulatory mechanisms by the Regulator and the market participants as well as a reform of the institutional arrangements in the country to reduce transaction costs and increase credible commitment, in order to stimulate the reform. The study will examine the intractable market situations of the NESI in the post privatization period, the regulatory responses or lack of same, the effect of these responses and the effect of lack of response, in order to see a clear path to a better regulatory mechanism to stimulate the ongoing reform process.

4.4 NIGERIA ELECTRICITY SUPPLY INDUSTRY'S MARKET SITUATIONS AND REGULATORY RESPONSES

At the core of the privatized market challenges is the failure to generate adequate revenue for power supplied from the retail side of the market with a ripple effect on the value chain because the market is linked back to back with contracts as explained earlier. The issue is traceable to an historical infrastructure gap which led to significant performance and financial crisis in the sector. Closely associated to this issue, are other associated issues such as lack of cost reflective tariff, weak regulatory governance and inconsistency, power theft, distribution collection, technical and commercial losses, poor billing and metering system, transmission losses, and ineffective contracts.[558]

The resultant outcomes could be seen in the accumulating tariff and revenue shortfall (market shortfall), accumulating debt, increasing poor performance particularly of the

556 Transcript of interview with Nigeria Electricity Regulatory Commission Market Rate and Competition unit conducted at NERC Office Abuja (6 December 2019) 1.

557 Transcript of interview with Nigeria Electricity Regulatory Commission, Market Rate and Competition unit conducted at NERC Office Abuja 6 December 2019) 1.

558 ANED the Discos' Challenges & Proposed Solutions (ANED presentation 15 November 2019) 8.

Discos, lack of investment and financing, lack of funds for Capital Expenditure (CAPEX) and Operating Expenditure (OPEX), un-utilized installed generating capacity of the Gencos, unpaid and part-paid Gencos' invoices, and gas constraints.[559] Other issues of the market include transmission and distribution network constraints, poor financial viability of sector companies, inefficient and inadequate enforcement of contracts, and lack of investment planning and procurement framework and capacity mismatch.[560]Most of the above identified issues are interrelated in the way they affect the market and so the discussion of one may necessarily dovetail into another.

The performance crisis of the Discos has progressed in stages; from the perceived failure of the bidding method adopted for the auction which was designed to address pre-existing performance issues, to the failures of subsequent years in the privatized market arising from either lack of intervention or poorly implemented regulatory mechanism. While there are visible power generation and transmission constraints, it is doubtful if the consumers will benefit from any improvement by the Gencos and the transmission company with the persistence of the Discos' performance crisis.

4.4.1 Performance Crisis of the Discos

(a) Bidding process stage to 2014

Arising from the infrastructure deficit bedeviling the Nigerian power sector prior to the reform, the government's privatization bidding process was designed to address the issue of performance of unbundled assets so much so that the winning bidders/core investors were made to undertake some performance obligations for a period of time after commencement of operation in order to revamp the sector.

In addition to the transaction documents signed by the power companies, core investors, the Ministry of Finance and the Bureau of Public Enterprises (BPE), Performance Agreements were signed to ensure that the power companies achieve a minimum performance target[561] within a specific target date which is expressed to be generally the fifth (5^{th}) anniversary of the date of the Performance Agreement[562] or from the revision of the baseline Aggregate Technical Commercial and Collection

559 ANED Challenges of the Nigerian Power Sector (ANED presentation 15 November 2019) 1.

560 The World Bank "Power Sector Recovery Performance Based Loan" (29 June 2017) online: http://documents.worldbank.org/curated/en/266341497992825758/pdf/Nigeria-Power-Sector-Recovery-P4R-Concept-Stage-PID-8-3-2017.pdf (Date of use: 1 February 2020).

561 Minimum Performance targets is contained in Schedule 1 of the Performance Agreements.

562 Paragraph 1.1 Schedule 1 of the Performance Agreement between BPE, Ministry of Finance, Kepco Energy Resource Limited and Egbin Power PLC (21 August 2013).

losses (ATC&C)[563] for the Gencos and the Discos[564] respectively. For the Discos, the Performance Agreement requires them from the commencement date of revision of baseline ATC&C and the target date to ensure the following:

i. Reduce the ATC&C Loss level by energy balance, system and data improvement, proper billing system, metering and installation normalization, customer control, street lighting control and so on

ii. Expand the distribution network largely by replacing ageing or deteriorated assets

iii. Increase the number of new customers

iv. Improve the quality of service which includes replacement of equipment and implementation of SCADA system.

v. Operational efficiency which includes adaptation of organizational structure, improvement of personnel skills.[565]

Unfortunately, there is a fundamental flaw in the process of extracting these obligations from the Discos regarding the targets set out in the Agreement. Due to the high technical, commercial[566] and collection losses[567] of the government distribution assets prior to the privatization in 2013, the regulator (Nigeria Electricity Regulatory Commission) and BPE agreed on the modality for carrying out a data study. Since the commitments on the reduction of aggregate losses will be one of the primary determinants for successful bidding for Discos, the regulator was required to carry out a study to create a credible industry performance database, particularly regarding ATC&C loss data which was expected to take about 12 months to conclude. It was also agreed that pending the completion of the study, the sale of the distribution companies should proceed while commitments should be made on the basis of available data (assumption). At the conclusion of the study, it was agreed that any

563 ATC&C loss means the aggregate of the Technical and Commercial Loss and the Collections Loss which represents the difference between the amount of electricity received by the Company from TCN and the amount of electricity for which it invoices its customers plus the adjusted collections loss.

564 Paragraph 1.1 Schedule 1 of the Performance Agreement between BPE, Integrated Energy Distribution & Marketing Limited and Yola Electricity Distribution Company (21 August 2013).

565 Schedule 2 of the Performance Agreement between BPE, Ministry of Finance, Kepco Energy Resource Limited and Egbin Power PLC dated (21 August 2013).

566 Technical and commercial losses mean the amount calculated in accordance with the formula: electricity in MWH billed to consumers divided by electricity in MWH received by the Company.

567 Collection loss means the amount calculated in accordance with the formula: Naira amount collected by the Company divided by Naira amount billed by the Company.

difference in losses, between the data assumed and the data revealed by the study, will be subject to separate reduction targets to be agreed between the regulator and the relevant Discos. The commensurate cost implication of the difference was expected to be adjusted by way of tariff adjustments in the Minor Review (Regulator's tariff adjustment process) of tariff.[568]

The study would have provided a credible source of information for the prospective core investors in the distribution assets to aid the bidding process but was deferred to a later date after the privatization for necessary adjustments. The Discos also stated that they had no access to information concerning the asset losses during the bidding process mainly because there were labour related issues that hindered the technical and financial audit of the assets.[569] It is difficult to ascertain the extent of the labour issues that was serious enough to prevent all the investors from carrying out a proper audit of assets they were willing to pay huge sums of money to acquire as confirmed in an interview with their association. [570]

The implication of the above was that a notional average ATC&C losses value of 35% was arrived at across all the Discos even when it is obvious that all the Discos cannot operate at that loss percent. This was done for the sake of having a number to calibrate the bid template.[571] In other words, the ATC&C loss value was based on assumption and same was infused into the Multi Year Tariff Order (MYTO) to determine the tariff and the loss reduction target projection for a five (5) year loss targets, for successful bidders, during the bid process, as shown in Table 9.[572]

The contracting parties equally ensured that a mechanism to determine the actual loss value to reset the ones based on assumption was contractually determined. It was agreed in the Performance Agreement that the successful companies will submit to BPE a baseline re-computation of the ATC&C losses within a period of one (1) year from the date of signing of the Performance Agreement in order to accurately

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568 Paragraph 5.3 Multi Year Tariff Order for the Determination of the Cost of Electricity sold by Distribution/Retail Companies for the Period 1 June 2012 to 31 May 2017. 33.

569 Odufade B "Core investors in Discos decry lack of returns on investments" (06 August 2018) Business a.m. online:https://www.businessamlive.com/core-investors-in-discos-decry-lack-of-returns-on-investments/ (Date of use: February 7 2020).

570 Transcript of interview with Association of Nigeria Electricity Distributors conducted via telephone chat (11 December 2019) 1.

571 Transcript of interview with Association of Nigeria Electricity Distributors conducted via telephone chat (11 December 2019) 1.

572 Multi Year Tariff Order for the determination of the cost of electricity sold by distribution/retail companies for the period 1 June 2012 to 31 May 2017 34.

determine the actual ATC&C loss level.[573] The baseline study was to be approved or refused by the BPE by a written notice or deemed approved in the absence of such written notice.[574] As it turned out, the outcome of the baseline study carried out by the Discos within the first year of privatization was far beyond the assumed value used for the bid process. For instance, the Abuja Electricity Distribution Company arrived at 52.77%[575] as against the 35% and 40% used for the bid process.

The implication of this development is that the investors acquired assets whose loss value is more than what was agreed and sold. Therefore, achieving the five (5) year loss reduction targets became impossible. The issue was further compounded by the trajectory of loss reduction in the MYTO which already shows the capital investment required to reinforce or improve the assets for a period of five (5) years on the basis of the assumed loss value.[576] The tariff allowed for energy delivered was also fixed by the regulator in the MYTO. The failure of the regulator to immediately respond to the market situation through a tariff adjustment mechanism, aggravated the problem and as expected, within a year of operation, NESI's accumulated financial deficit was about NGN213 billion.[577]

The Regulator's argument is that the assets were sold at a fixed price (regulated price) with a caveat for buyers to show true cost and capabilities in reducing the assets losses (loss reduction trajectory) over a period (loss target). It argued that there was equally an understanding to cap tariff for five (5) years, adjustable only on movement in the macroeconomic variables such as inflation, exchange rate, and generation capacity. It concluded that the aggressive loss reduction projection by the Discos during bidding was done without due diligence and if they had failed in their initial submission, they ought to step aside.[578]

Paragraph 2.1 of Schedule 1 of the Performance Agreement between BPE, Integrated Energy Distribution & Marketing Limited and Yola Electricity Distribution Company (21 August 2013).

574 Paragraph 2.2 – 2.3 Schedule 1 of the Performance Agreement between BPE, Integrated Energy Distribution & Marketing Limited and Yola Electricity Distribution Company (21 August 2013).

575 Transcript of interview with Association of Nigeria Electricity Distributors, ANED office, Abuja (11 December 2019) 1.

576 Multi Year Tariff Order for the determination of the cost of electricity sold by distribution/retail companies for the period 1 June 2012 to 31 May 2017 32.

577 World Bank "Programme for results information document" online: http://documents.worldbank.org/curated/en/266341497992825758/pdf/Nigeria-Power-Sector-Recovery-P4R-Concept-Stage-PID-8-3-2017.pdf (Date of use: February 7 2020) 6.

578 Transcript of interview with Nigeria Electricity Regulatory Commission Market Rate and Competition unit conducted at NERC Office Abuja (6 December 2019)14.

The Regulator's argument seems to sidestep a number of points on the reality of the bid process and post-privatization circumstances which are identified as follows:

I. Prior to privatization, the Regulator conceded that a proper assessment of the ATC&C losses was necessary for calibrating and assessing the bids for those assets.

II. Since the Regulator and the BPE were unable to come up with the actual ATC&C losses due to the labour issue, they settled for a notional value of 35% and 40% as a template to proceed with the bid process.

III. Although the successful bidders were very aggressive with the value (based on assumed loss value), but the Performance Agreement recognized the inaccuracy of the value (assumed value) and so provision was made in the Performance Agreement for reassessment of the loss value, through baseline study, during the first year of the privatized market.

It may be shrewd for the Regulator to point out that the successful bidders were wrong in their submissions and that they should either accept the reality or exit the market on the basis of the contractual principle of pacta sunt servanda. However, the regulator was tardy in failing to immediately remedy the situation in the privatized market act given the flaw inherent in the bid process. The regulator's eventual response in 2014 was also ineffective. By way of the tariff adjustment regulatory mechanism (Minor review Order),[579] the parameters for tariff determination such as inflation, exchange rate, gas price, and generation capacity were reviewed but the regulator failed to adjust the ATC&C loss level (which was based on assumption) in line with the baseline study (which has become available) conducted after the sale of the assets.

(b) Year 2015 - 2016

The poor regulatory intervention continued until January 2015 when the Regulator issued a new tariff Order[580] wherein it reviewed the ATC&C losses in line with the verified baseline study of each of the Discos as shown in Table 10.[581]Nevertheless, the adjustment of the ATC&C losses by the regulator still did not reflect the actual losses of the Discos as shown by the verified baseline study. The yearly loss reduction trajectory of the five (5) year performance period was also reviewed based on the

579 Order on the First 2014 MYTO-2 Minor Review (Order No.NERC/134).
580 Multi Year Tariff Order – 2.1 for the Period 1st January 2015 to 31st December 2018.
581 Multi Year Tariff Order – 2.1 for the Period 1st January 2015 to 31st December 2018 4.

annual percentage reduction rate committed to by each Disco during the sale of the assets as shown in Table 11.[582]

However, by way of incentive the Discos were given an extension of two (2) months to the first year of the loss reduction trajectory which was to have ended by 31st of October, 2014,[583] an apparent compensation for the financial burden inflicted by the delayed intervention. Also, considering the revenue shortfall arising from the misalignment in the ATC&C loss value, they were promised to recover in full the calculated revenue shortfall that resulted from same during the Interim Rules Period (IRP), a new phase in the market development created by the regulator.[584] They were also provided with a commercial loan facility arranged by the regulator and Central Bank of Nigeria to enable the repayment of the debt incurred as a result of the impact of the Interim Period revenue shortfall and some identified previous debts (legacy debts) owed for energy delivered to them which had accrued up to the 1st of November 2013 date of handover of the assets.[585]

It took the Regulator a period of thirteen (13) months after privatization and commencement of operation of the Discos to realize the need to effect an adjustment in a major component of the end-user tariff, regardless of the rising deficit and debt. This aggravated the liquidity crisis in the industry; the Discos' revenue could hardly take care of their capital and operating expenditures, statutory remittance to NBET, Market Operator, TCN, and the regulator. Apart from being historical in its application, the commercial facility extended to them was insufficient to cater for the deficit accumulated in the thirteen (13) months period of operation of the market. In addition, encumbering the financial books of the Discos with debt liabilities, some of predates privatisation, and were designed to be assimilated by the Nigerian Electricity Liability Company (NELMCO)[586] is an incident of poor regulatory response to market challenges.

Less than four (4) months after this review, the regulator amended its tariff Order (MYTO2.1) and removed collection loss as part of the ATC&C losses of the Discos on the ground that in the interest of the public and fairness, it has a responsibility of ensuring that only prudent costs are approved and passed on to consumers. It argued

582 Multi Year Tariff Order – 2.1 for the Period 1st January 2015 to 31st December 2018 4 – 5.
583 Multi Year Tariff Order – 2.1 for the Period 1st January 2015 to 31st December 2018 5.
584 Page…of chapter 3.
585 Multi Year Tariff Order – 2.1 for the Period 1st January 2015 to 31st December 2018 7.
586 Please see Chapter 3 page 123.

that it is imprudent to allow Discos pass on collection losses to the consumers since collection of bills should be within the control of the Discos.[587] In effect, the loss reduction percentage rate and trajectory of the ATC&C was adjusted downward as shown in Tables 12.[588] The regulator's reasoned that the fact that there are consumers willing to pay high tariff cannot be a substitute for the Discos' incompetence in improving their collection losses.*[589]* While the regulator's argument for preventing the Discos from passing through the collection losses to consumers remains plausible but the Discos' grouse seems to be with the timing of the regulator's decision.

Furthermore, when the Discos were struggling to come to terms with the removal of the collection losses as part of ATC&C losses, the Regulator introduced another market phase (in line with the designed market development progression), the Transition Electricity Market (TEM), in February 2015. TEM requires all electricity market transactions to be within a contract-based framework, which entails the activation of the terms of the GSAs, PPAs, and Vesting Contracts, in effect; instruments such as Guarantees and Letters of Credit (LC) under those agreements were to be activated. The declaration of TEM was meant to be based on the satisfaction of specified conditions in the Market Rules, but was declared nonetheless given that some of the specified conditions for its declaration as outlined in Appendix 1 of the Market Rules were satisfied.[590]

In addition to the Declaration of TEM, the regulator made a Supplementary Order to the TEM three (3) months after the declaration.[591] The mechanism was made to direct all the Discos to provide effective payment guarantees to NBET and the Market Operator/Transition Company of Nigeria as required under their Vesting Contracts, failure of which their revenues shall be escrowed for remittance with appropriate sanctions issued. It would appear that the declaration was more superficial than profound. The regulator itself conceded in the declaration that formalization of trading arrangement was not satisfied before the declaration, by the use of the phrase

587 Amended Multi Year Tariff Order (MYTO)- 2.1 for the Period April 1st, 2015 To December 2018 5 – 7.

588 Amended Multi Year Tariff Order (MYTO)- 2.1 for the Period April 1st, 2015 To December 2018 5 – 6.

589 Transcript of interview with Nigeria Electricity Regulatory Commission Market Rate and Competition unit conducted at NERC Office Abuja (6 December 2019)15.

590 Order Directing the Commencement of the Transitional Stage Electricity Market (Order No. NERC/136).

591 Supplementary Order on the commencement of the Transitional Stage Electricity Market (Order No.NERC/15/0011) of 2015.

'sufficiently fulfilled'.[592] The declaration that cost reflective tariff was also in place when it is not, is equally misleading.

In reaction, the Discos, pursuant to their privatization contracts, issued Notices of force majeure to the BPE but later withdrew same on account of the issuance of a new tariff Order (MYTO-2015), that became effective in February, 2016.[593] Nevertheless, the Discos proceeded to court in 2016 and got an injunction restraining the regulator from giving effect to its directive to the Central Bank of Nigeria to escrow the accounts of any Disco who cannot meet its monthly payment obligations under the Vesting Contracts to NBET and who is yet to place its Letter of Credit with NBET in accordance with the directive.[594] In effect, the Vesting Contracts is rendered ineffective if payment for energy delivered cannot be guaranteed.

To further highlight the poor regulatory responses, by 21st of December, 2015, the regulator further amended its tariff Order (MYTO2.1) which became effective in 1st February, 2016. By this amendment, the Regulator reinstated the collection losses component of the ATC&C losses back into MYTO,[595] and for the first time introduced a new baseline ATC&C (the verified ATC&C conducted after privatization), and brought same forward into the loss reduction target commencing from 2015, for each of the Discos. The new baseline/brought forward ATC&C for the year 2015 were changed for all the Discos. For example Port Harcourt Electricity Distribution Company's ATC&C became 52.94% although excluding Ministries, Department and Agencies' (MDAs) debt component to the Disco as shown in Table 13.[596] It also approved a cost-reflective tariff which the Discos acknowledged but complained that it was done two years after the damaging effect of accumulated deficit occasioned by delayed regulatory response.

It is important to point out that this regulatory decision clearly overlooked any potential measure by which the Discos can recover the MDAs debt owed to them since such debt constitutes a substantial fraction of the Discos' collection losses. If the

592 Paragraph 7 Order directing the commencement of the Transitional Stage Electricity Market (Order No. NERC/136) of 2015.

593 ANED Challenges of the Nigerian Power Sector (ANED presentation 15 November 2019) 3.7.

594 Alike E. Thisday "Court restrains NERC from escrowing Discos' account" (19 June 2016) online: https://www.pressreader.com/nigeria/thisday/20160619/281526520344994 (Date of use: 10 February 2020).

595 Paragraph 2 of Multi Year Tariff Order for Port Harcourt Electricity Distribution Company for the Period 1st January 2015 to December 2024.

596 Paragraph 6 - 7 of Multi Year Tariff Order for Port Harcourt Electricity Distribution Company for the Period 1st January 2015 to December 2024.

responsibility to recover this debt is solely that of the Discos who were private firms, the regulator and the FGN (the MDA's principal) should have created a regulatory mechanism to work out a solution for debt recovery considering the slow and painful litigation process in the country.

What would have appeared to be a period of gain given the stable macroeconomic outlook of the country during the period under reference above, was frittered away because by 2016 Quarter 2, recession hit the Nigerian economy (the economy recorded four consecutive quarters of negative economic growth). This occasioned Naira revaluation through the CBN.[597] Also, gas constraint increased as a result of disruptions to Escravos-Lagos Pipeline System (ELPS) and of course the entire macroeconomic parameters of the MYTO namely; inflation rate, foreign exchange rate, available generation capacity, gas price and wholesale cost changed drastically which further hindered the Discos from achieving any conceivable performance target.

(c) Year 2016 - 2019

The Regulator's delayed response to the changes in the parameters that could have stimulated the necessary adjustment to its tariff Order (MYTO) extended through the period of 2016 – 2019. By the regulator's approved tariff Order methodology (MYTO methodology), there ought to have been six (6) minor reviews in accordance with the stipulated biannual review provision in the said methodology. The lack of review of the tariff negatively impacted the Discos and prevented them from meeting up with their performance targets. The performances of the Discos in the year 2015 – 2019 show that they were unable to meet up with their ATC&C reduction rate in the regulator's 2016 review[598]for each of the Discos. The average ATC&C rate by 2019 is shown in Table 14.[599]

In recognition of the enormity of the NESI's challenge, the FGN intervened with the introduction of its Power Sector Recovery Program (PSRP) in 2017. This is a series of thought out policy actions, operational and financial interventions to attain financial viability of the electricity sector and to reset the market. Amongst other things, it is geared towards ensuring Discos' performance and implementation of credible

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597 Power Sector Recovery Implementation Program online: hhtp://pwh.gov.ng/download/14991674947496.pdf (Date of use: 11 February 2020) 6.

598 Multi Year Tariff Order for Abuja Electricity Distribution Company for the Period 1st January 2015 to December 2024.

599 Nigeria Electricity Regulatory Commission Quarterly Report (Fourth Quarter 2019) 40.

business continuity, developing a credible loss reduction plan, ensuring cost reflective tariff and payment of debts.

PSRP recognized that the viability of the Discos is important for the long-term sustainability of NESI since the Discos operational and commercial performance from privatization has affected the financial viability of the entire value chain. For instance, PSRP observed that a review of 2015 – 2016 data on cash remittance from Discos to NBET showed that the Discos did not make full payment for energy received since privatization in 2013, and that they retained more of collected revenues than they were statutorily supposed to under MYTO as shown in Table 15. It also identifies the regulator's delay/failure to carry out tariff reviews as the reason for the Discos' poor performance.[600]

Therefore, PSRP main proposal for the Discos' performance improvement is to implement an electricity tariff trajectory that ensures sustainable tariffs for five (5) years and commit to fund historical and future sector deficits from 2017 – 2021. This strategy requires the Discos to prepare a Performance Improvement Plan (PIP) for the Regulator's approval in preparation for a major tariff review. It also requires the regulator to review tariff application filed by each Disco following the MYTO methodology including the PIP and the setting of performance baselines and targets and to carry out consultation/hearing. The regulator is required to issue a new tariff Order (MYTO) for each Disco, to monitor the implementation of approved PIP, performance results compared to baseline and targets to evaluate improvement of each Disco and to equally carry out minor reviews of tariffs regularly.[601]

Subsequently, the Discos submitted their PIPs with the exception of Yola Electricity Distribution Company which was undergoing a fresh bid process. The PIP is essentially a Business Plan detailing the necessary projects and initiatives required to meet performance benchmarks and meet up with the loss reduction trajectory for five (5) years period from 2020 to 2024 through Capital and Operating Expenditures.[602] The document is an update to the Business Plan earlier submitted to BPE as schedule 3 of the Performance Agreement, it was prepared with proper knowledge based on

600 Federal Republic of Nigeria "Power Sector Recovery Programme 2017 – 2021" (January 2018) online: https://mypower.ng/wp-content/uploads/2018/02/PSRP-Master-Document-January-2018.pdf (Date of use: 12 February 2020) 17.

601 Federal Republic of Nigeria "Power Sector Recovery Programme 2017 – 2021" (January 2018) online: https://mypower.ng/wp-content/uploads/2018/02/PSRP-Master-Document-January-2018.pdf (Date of use: 12 February 2020) 22 – 23.

602 AEDC 2020 – 2024 Performance Improvement Plan (2019) 5.

reality and experience gained from operations in the privatized market so far, to update the assumptions used in the previous plan.

While the PIP is geared towards a major review of MYTO to reset the failing market particularly by allowing for a gradual transition to cost reflective tariff, the regulator also (after three (3) years delay) issued a tariff Order (minor and minimum remittance Order in July 2019). This July 2019 minor review underpins the objectives of PSRP, its objectives are to reflect the impact of changes in macroeconomics variables, ascertain revenue shortfalls, determine tariff deficits, develop and implement framework to manage future revenue shortfalls including mandating the Discos to adopt a minimum remittance requirement, ensure payment securitization and activate market contracts in line with TEM requirements and to ensure that the Discos satisfy their obligations under the Performance Agreement.[603] It emphasized that the years 2017 and 2018 are deemed years of mutual non-performance in the market to account for uncertainties on cost reflective tariffs and revenue recovery. Hence, the ATC&C loss improvement targets of those years were made inapplicable for computing tariffs and relevant revenue deficit in the said years.[604] The Discos' opinion on this development was that the effect of the mutual non-performance declaration ought to have an extension on their agreed loss targets dates. Since the Performance Agreement provides for a loss target reduction of five (5) years, when two years are declared as mutual non-performance years, it automatically should extend the loss target years or the Performance obligation for another two (2) years.

The Regulator rejected the Discos' position and considered same as a misinterpretation of its decision. Technically, the regulator prefers to take those two years as a period the Discos will not be held accountable because tariff was not cost reflective and not as an extension of their performance target dates.[605] However, other than the financial intervention and access to loans afforded to the generation and transmission segment of the market in the PSRP, the Discos' performance has remained poor.

(d) The summary of ATC&C losses and regulatory interventions

603 The 2016 – 2018 Minor Review of Multi Year Tariff Order (MYTO) 2015 and Minimum Remittance Order for the year 2019 (Order No.NERC/GL/170A) 2.

604 The 2016 – 2018 Minor Review of Multi Year Tariff Order (MYTO) 2015 and Minimum Remittance Order for the year 2019 (Order No.NERC/GL/170A) 3 – 4.

605 Transcript of interview with Nigeria Electricity Regulatory Commission, Market rate and Competition unit, conducted at NERC Office Abuja (6 December 2019)12.

The final Report of the regulator for 2019[606] indicates that there was a significant increase in Discos' billing efficiency during the fourth quarter of 2019. It is reported that out of the 6,918GWH total energy received by all Discos in that period, 5,714GWH (82.59%) was billed to the end-users, implying 1.00% increase in billing efficiency which has lowered technical and commercial losses by 17.41% relative to the third quarter.[607] The regulator stated that the level of Discos' billing efficiency shows that for every 10KWH of energy received by Discos from the Transmission System Provider (TSP); approximately 1.74KWH is lost due to technical inefficiencies and energy theft. Table 16 shows the total amount of energy received and billed by Discos in 2019 quarters 3 – 4.[608]

On the flip side, the collection efficiency component of the ATC&C remained low and has continued to adversely impact the financial liquidity of NESI which in turn, hindered financial investment.[609] According to the report, the collection efficiency implies that for every N10.00 worth of energy billed to customers by the Discos in the third quarter of 2019, N3.06 (about 30%) remained unrecovered from customers as and when due.[610] On the whole, the average ATC&C losses which is a combined index of losses due to technical, billing and collection efficiencies in NESI for the fourth quarter of 2019 decreased to 42.63% from 43.65%[611] in the previous quarter, but still substantially greater than the expected average of 26% as allowed by the July 2019 tariff review Order (MYTO minor review).[612] Table 17 shows the rate of the average ATC&C losses by Discos in 2019, quarters 1 – 4.[613]

The Regulator associated the high ATC&C loss level with low investments in distribution networks aggravated by the low level of metering of end-users which created the lingering liquidity challenge to NESI.[614] It stated that by implication, the average level of the ATC&C losses in NESI in the fourth quarter of 2019 is as high as N4.26 (Four Naira twenty-six Kobo) in every N10.00 (Ten Naira) worth of energy received by a Disco (about 40%) which was unrecovered due to a combination of

606 Nigeria Electricity Regulatory Commission Quarterly Report (Fourth Quarter 2019).
607 Nigeria Electricity Regulatory Commission Quarterly Report (Fourth Quarter 2019) 35.
608 Nigeria Electricity Regulatory Commission Quarterly Report (Fourth Quarter 2019) 36.
609 Nigeria Electricity Regulatory Commission Quarterly Report (Fourth Quarter 2019) 38.
610 Nigeria Electricity Regulatory Commission Quarterly Report (Fourth Quarter 2019) 37.
611 Nigeria Electricity Regulatory Commission Quarterly Report (Fourth Quarter 2019) 39.
612 The 2016 – 2018 Minor Review of Multi Year Tariff Order (MYTO) 2015 and Minimum Remittance Order for the year 2019 (Order No.NERC/GL/170A) 5.
613 Nigeria Electricity Regulatory Commission Quarterly Report (Fourth Quarter 2019) 40.
614 Nigeria Electricity Regulatory Commission Quarterly Report (Second Quarter 2019) 39.

energy theft, inefficient distribution networks, weak management effort in revenue collection and low metering and customers' unwillingness to pay.[615]

In terms of regulatory intervention, the regulator proposed an intervention mechanism for resolution of the technical and commercial inefficiency of the Discos. This is to ensure that a five (5) year investment plan is obtained through the PIP submitted by the Discos, including a detailed capital expenditure that will be thoroughly reviewed and optimized for prudence and relevance to service delivery. It also proposed the adoption of a revenue adjustment mechanism for subsequent tariff reviews to claw back any return allowed on previously proposed investments that were not eventually executed by the Discos.[616] By the fourth quarter, the Regulator has commenced the review of the five (5) year (2020 – 2024) PIP.[617]

In addition to the above, in addressing the commercial losses challenge, the regulator equally proposed, in its report, to continue monitoring the Discos' asset mapping and tagging under the framework of the ongoing customer enumeration in order to identify illegal customers and bring them on the Discos billing platforms and to ensure compliance with the Meter Asset Providers (MAP) Regulations.[618]

The measures put in place are insightful but it is unlikely that the funds required for capital expenditure for projects for the reduction of these losses, will be realized from any creative mechanism for tariff reviews only, given the usual backlash by the consumers[619] for any proposed tariff increase. However, the required effort may lie in ensuring the stability, consistency and the implementation of the regulatory mechanisms by the regulator in order to restore and instill investors' confidence in the market. It is doubtful whether any investor will put in money in a market that has poor regulatory intervention and response.[620]

4.4.2 Cost Reflection Crisis of the Discos

615 Nigeria Electricity Regulatory Commission Quarterly Report (Second Quarter 2019) 39.
616 Nigeria Electricity Regulatory Commission Quarterly Report (Second Quarter 2019) 35 – 36.
617 Nigeria Electricity Regulatory Commission Quarterly Report (Second Quarter 2019) 37.
618 Nigeria Electricity Regulatory Commission Quarterly Report (Second Quarter 2019) 37.
619 The Punch "Power Crisis: Consumers Demand Sanctions Against Discos" (4 November 2019) online:https://punchng.com/power-crisis-consumers-demand-sanctions-against-discos/ (Date of use: February 15 2020).
620 The Punch "Unstable Regulations in Power Sector Scares Investors (1 August 2019) online: https://punchng.com/unstable-regulations-in-power-sector-scaring-investors-umeh/ (Date of use: February 15 2020).

Prior to the reform, Nigeria operated a uniform pricing regime of electricity because electricity was considered a social service and so regardless of changes in gas pricing (gas is the dominant source accounting for about 80% of the energy mix), the electricity prices was fixed and highly subsidized by government. The retail price was not commensurate with the production price which resulted into accumulated deficits. Arising from this, the state-owned company was hindered from investing in infrastructure that would have facilitated efficiency.

Against the above background, the tariff regulation mechanism contained in the Electric Power Sector Reform Act (the "Act") was designed to address the tariff issue in the privatized market of NESI.[621] In line with the enabling provision in the Act, the regulator created a tariff methodology[622] by which it laid down pricing principle to achieve fair outcomes, efficient outcomes that involves the lowest costs to Nigeria and encourages investment in generation and simple, transparent and prevention of excessive regulatory costs.[623]

(a) The Tariff Methodology

The methodology used by the regulator to determine the tariff is described as the building blocks approach which is said to be an incentive-based regulation. The mechanism seeks to ensure performance ratemaking for fostering long-term efficiency in utility operations. It attempts to effect additional cost savings in utility that will result in lower rates to customers. The incentive is the opportunity for superior profits for firms that achieve lower costs through higher efficiencies.[624] The adoption of this mechanism explains the rationale for the selection of bidders for the Discos and readily lends itself to the phased efficiency element of the hybrid theory of regulation of the study.

However, it has been argued that reduction of cost of service overtime (the target of the mechanism) may reduce quality of service.[625] To guide against this, it is important to also make it achieve a high degree of information observation at real time level by the regulator, about the firm's cost and to investigate whether the firm is making its

621 Section 76 of Electric Power Sector Reform Act 2005 A77 of 2005.
622 Multi Year Tariff Order Methodology 1.
623 Nigerian Electricity Regulatory Commission's Notice of Proposed Establishment of a Methodology for a Multi Year Tariff Order (Government Notice No.15 B125 – 133) B126.
624 Terzic B "Incentive regulation efficiency in monopoly" 1994 Natural Resources & Environment 26.
625 Khalfallah H "An Assessment of incentive regulation in electricity networks the story so far" online: https://halshs.archives-ouvertes.fr/halshs-00931301/document (February 20 2020) 6.

best managerial effort in terms of reducing costs and increasing efficiency.[626] The reliance on unverifiable and secondary data by the regulator in the privatized market raises concerns about the veracity of the process of computation of MYTO (a consideration under the generation constraints below).

The suitability of this methodology for NESI lies in the structure of operating one integrated transmission owner and system operator that provides synchronized information about on-grid energy, as it may be difficult in a balkanized ownership structure of transmission assets.[627]From market development in NESI and commentaries from the market players, nothing has suggested the unsuitability of the mechanism. Therefore, the challenges to the methodology from a market perspective, lies in the implementation of the provisions of the tariff adjustment mechanism (MYTO) which is founded on the performance rate of the Discos.

(b) MYTO Regime

In order to have a firm understanding of the tariff mechanism (Multi Year Tariff Order) designed by the regulator, it is important to backtrack to the period shortly before the privatization in 2013. As noted earlier, the uniform pricing policy adopted by the state-owned enterprise was grossly inadequate to achieve improvement in service delivery, expansion and efficiency. Therefore, one of the objectives of the privatization exercise is to achieve a cost-reflective tariff in the long-run for the Discos. However, the regulator is yet to optimally utilize this regulatory mechanism to achieve cost reflective end-user tariff for the Discos while the Discos are also under performing for the reasons discussed hereunder.

(i) MYTO Methodology and MYTO 2008 (MYTO 1)

The Regulator created MYTO 2008, acting in pursuance to the reform Act[628] which seeks to ensure that prices charged by licensees are fair to consumers and equally sufficient to allow the licensees to finance their activities and to allow for reasonable earnings for efficient operation.

626 Khalfallah H “An Assessment of incentive regulation in electricity networks the story so far” online: https://halshs.archives-ouvertes.fr/halshs-00931301/document (February 20 2020) 6.

627 Joskow PL “Incentive regulation in theory and practice electricity distribution and transmission networks” online: https://www.nber.org/chapters/c12566.pdf (Date of use: February 20 2020) 339.

628 Section 35(1)(d) Electric Power Sector Reform Act A77 of 2005.

The 2008 MYTO provides a fifteen (15) year tariff path for NESI with minor and major reviews to be done bi-annually and every five years respectively.[629] It envisages a minor tariff review each year by the Regulator based on changes or variation in parameters such as rates of inflation, cost of input fuel for electricity generation (primarily gas) and foreign exchange rate fluctuations, used for tariff computation.[630] The five (5) year major review is also designed to consider each of the input assumptions for tariff computation such as power generation capacity, electricity demand forecast, Capital expenditure, actual and projected sales, Operating costs, fuel cost, interest rates, subsidies, weighted average cost of capital (WACC) and ATC&C level,[631] in order to update them to appropriate current values. There could also be an adjustment or variations of these components before the five (5) year interval, if industry participants can demonstrate to the Regulator that the parameters have changed from those used in previous tariff reviews to such an extent that a review is required urgently to maintain industry viability.[632]

An important aspect of the 2008 MYTO is that while it provides that costs and other inputs used in the methodology will be historical, the tariff path is made to be forward-looking and based on projections of performance by the Discos. Therefore, it encourages the Discos with an incentive to do better than the projected performance levels built into the tariff path. The three standard building blocks used in the methodology are namely; the allowed return on capital (the return necessary to achieve a fair rate of return on the necessary assets invested in the business), allowed return of capital (associated with recouping the capital over the useful lives of the assets) and efficient operating costs and overhead.[633]

It was also understood that the inputs to the building blocks methodology include an initial capital valuation and future levels of capital expenditure, operating costs, sales volumes, cost and efficiency improvements to derive a future average regulated tariff for each year of the tariff review (MYTO).[634] The Discos' incentive to out-perform the

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629 Nigerian Electricity Regulatory Commission's Notice of proposed establishment of a methodology for a Multi Year Tariff Order (Government Notice No.15) of 2007 B125.

630 Nigerian Electricity Regulatory Commission's Notice of proposed establishment of a methodology for a Multi Year Tariff Order (Government Notice No.15) of 2007 B132.

631 Multi Year Tariff Order for the determination of the cost of electricity sold by distribution/retail Companies for the period 1 June 2012 to 31 May 2017 of 2012 14.

632 Nigerian Electricity Regulatory Commission's Notice of proposed establishment of a methodology for a Multi Year Tariff Order (Government Notice No.15) of 2007 B127 - B132.

633 Nigerian Electricity Regulatory Commission's Notice of proposed establishment of a methodology for a Multi Year Tariff Order (Government Notice No.15) of 2007 B127.

634 Nigerian Electricity Regulatory Commission's Notice of proposed establishment of a methodology for a Multi Year Tariff Order (Government Notice No.15) of 2007 B127.

performance standards in the MYTO will be based on its own costs and productivity considerations.[635] Based on this methodology, the regulated prices at the commencement of the operation of MYTO was designed to be relaxed over time as the competition increases in NESI and electricity supply is sufficient to meet demands. Both Transmission and distribution prices were regulated based on the building block approach for the Transition and Medium Term market phases. It is important to note that the major component of the distribution tariff is capital expenditure needed to build and maintain the distribution network,[636] the absence of which has hindered the Discos' performance as emphasized by one of the Discos.[637]

However, by the time the bids for the distribution assets of the state-owned company were won, the successor Discos requested that the major review scheduled for 2013 be brought forward in order to quickly take care of the increasing cost of power, the rising cost of Operation and Maintenance and the declining revenue due to the absence of the growth in generation capacity envisaged in the 2008 MYTO as at the time.[638] The Regulator acceded to the request which presented an opportunity for all the stakeholders to evaluate the methodology and to review the assumptions which eventually led to the issuance of MYTO 2 in 2012 by the Regulator at about the time the assets were handed over to the new investors..

(ii) MYTO 2012 (MYTO 2)

Under the 2012 major review of MYTO, the Regulator projected that cost reflective tariff will lead to a general increase in tariffs across all customer classes. In order to avoid the effects of a rate shock on more vulnerable consumers, the tariff paid by certain customer classes was made less than cost reflective values for the first two years of the privatized market (up to June 2014). It was equally stated by the review that the FGN will support and provide subsidy to make up the shortfall in tariff between the actual and cost-reflective tariffs over the said period, as the tariff moves gradually towards viable levels.[639]The government subsidy was meant to last for a period before

635 Nigerian Electricity Regulatory Commission's Notice of proposed establishment of a methodology for a Multi Year Tariff Order (Government Notice No.15) of 2007 B127.

636 Nigerian Electricity Regulatory Commission's Notice of proposed establishment of a methodology for a Multi Year Tariff Order (Government Notice No.15) of 2007 B133.

637 Transcript of interview with Eko Electricity Distribution Company conducted at EEDC Office Lagos (5 December 2019) 1.

638 Multi Year Tariff Order for the determination of the cost of electricity sold by distribution/retail companies for the Period 1 June 2012 to 31 May 2017 of 2012 14.

639 Multi Year Tariff Order for the Determination of the Cost of Electricity sold by Distribution/Retail Companies for the Period 1 June 2012 to 31 May 2017. 14.

power availability increases enough to enable a further rebalancing of tariffs, The MYTO review was meant to cover the period of 2012 - 2017.[640]

The above constitutes the underlying framework tariff mechanism with respect to cost reflective tariff and government subsidy for the initial phase of the privatized market. The Discos' recent argument that the sale of the assets to them was premised on the existence of a cost-reflective tariff to be allowed by the Regulator as a precondition for satisfying their performance obligations in ensuring efficiency in the distribution segment of NESI, runs contrary to the above underlying framework.

There is no part of the Performance Agreement or the framework of MYTO that made cost-reflective tariff a basis for Discos' performance improvement, rather, the entire methodology is geared towards incentivizing and encouraging the Discos for optimal performance. A better approach to understanding the issues will be to focus on the key factors responsible for the Discos' lack of performance in order to deconstruct the tariff problem in the post-privatization era.

(iii) MYTO 2012 and Interim Rule Period

By the time the assets were handed over to the Discos, it was anticipated by the reform designers that the Transition Electricity Market (TEM) stage[641] will kick off; allowing contracts across the market's value chain to be effective to the extent that payment for energy delivered would have been in accordance with the PPAs, Vesting Contracts and MYTO 2012 provisions. However, owing to the inability to conclude all the privatization transactions required to be completed before the TEM is implemented, the Regulator unilaterally introduced a new phase of market development, the Interim Market Rules "the Rules".[642] This development operated in a manner that modified existing arrangements under the MYTO 2 and as envisaged by the Market Rules.[643]

The Rule was designed to establish a framework to govern trading arrangements during its application (November 1, 2013 – February 28, 2014), a period the PPAs and Vesting Contracts will not be effective. It was also created to manage the probable revenue shortfall in tariff that is expected in view of the operational non cost reflective

640 Multi Year Tariff Order for the Determination of the Cost of Electricity sold by Distribution/Retail Companies for the Period 1 June 2012 to 31 May 2017. 14.

641 Please see Chapter 3 pages 124 – 126.

642 Rules for the Interim Period between Completion of Privatization and the Start of the Transitional Electricity Market of the Nigeria Electricity Supply Industry (2013).

643 Rules for the Interim Period between Completion of Privatization and the Start of the Transitional Electricity Market of the Nigeria Electricity Supply Industry (2013) 3.

tariff in the first phase of the privatized market, by determining the revenue allowable to market participants during the period. The Rule determined the payment arrangements and flow of funds from Discos through the Market Operator to all beneficiaries (NBET, Gencos, Transmission Company) and established the sources of funds required to ameliorate the probable shortfall in revenues collected by Discos during the period.[644] It outlined the rate of threshold payments obligation by the Discos to NBET as shown in Table 18.[645]

This regulatory mechanism was intended as a stopgap because the situation was not contemplated in the privatization agreements. It was highly criticized by the Discos as an ad hoc approach which contributed to the sector's financial problem that eventually led to the liquidity crisis of NESI. According to the Discos, the effect of the provisions of the Rules were far reaching; capital investment became scarce since the Discos had no cost-reflective tariff to make them attractive to prospective lenders for capital expenditures.[646] Expectedly, in the period, the market accumulated deficits rose to N213 billion comprising of N196 billion from tariff and market shortfall[647] and N14 billion legacy gas debts of the Gencos.[648]

Consequently, the FGN intervened to prevent any incident of market failure that may arise from the unanticipated situation, by attempting to stabilize the market. It introduced the Nigerian Electricity Market Stabilization Facility (NEMSF) into NESI, a commercial loan facility for the Discos. The regulatory mechanism adopted was to incorporate it into MYTO as CBN intervention fund through a minor review by the Regulator.

(iv) Order on the First 2014 MYTO-2 Minor Review and Multi Year Tariff Order – 2.1 for the Period 1st January 2015 to 31st December 2018 (MYTO-2.1)

Further to the above regulatory review of the tariff adjustment mechanism (MYTO), the Regulator carried out a minor review of the basic assumptions of the parameters

644 Rules for the Interim Period between Completion of Privatization and the Start of the Transitional Electricity Market of the Nigeria Electricity Supply Industry (2013) 4.

645 Rules for the Interim Period between Completion of Privatization and the Start of the Transitional Electricity Market of the Nigeria Electricity Supply Industry (2013) 6 – 7.

646 ANED Challenges of the Nigerian Power Sector (Presented by Association of Nigeria Electricity Distributors Abuja 15 November 2019) 2.

647 Federal Republic of Nigeria "Power Sector Recovery Programme 2017 – 2021 (January 2018)" online:https://mypower.ng/wp-content/uploads/2018/02/PSRP-Master-Document-January-2018.pdf (Date of use: 12 February 2020) 24.

648 Federal Republic of Nigeria "Power Sector Recovery Programme 2017 – 2021 (January 2018)" online: https://mypower.ng/wp-content/uploads/2018/02/PSRP-Master-Document-January-2018.pdf (Date of use: 12 February 2020) 11.

in MYTO-2 which became effective in June 2014 and made applicable to all Discos. The Regulator readjusted downward the assumptions of some of the components for tariff computation in MYTO-2 which was done to make them consistent with current economic reality. Inflation rate which was previously assumed to be 13% was readjusted to 7.8% (inflation rate in March 2014), foreign exchange rate which was assumed to be N178 was readjusted to N158.57 (foreign exchange rate in March 2014), gas price which was fixed at US$2.30 was readjusted to US$1.80, generation capacity which was assumed to be 9,061 MW was readjusted to 4,306MW (available capacity in March 2014). Consequently, the expected revenue for that period was also readjusted to be less by 36.56% in line with economic reality.[649]

However, the general effect of the modified operation of MYTO-2 in the Interim Rule Period (IRP), and the delayed minor review carried out in 2014 (as reflected in the Order on the First 2014 MYTO2 Minor Review), potentially created a dicey situation for the market and the Discos in particular. While MYTO-2 had envisaged a subsidy (specified under the MYTO) from the FGN to make up for the deficit in the regulated tariff, the Interim Rule Period ended with an accumulated market deficits arising from the absence of the subsidy and the non-cost reflective tariff that was in operation.

In response, the Regulator's intervention came by way of another biannual minor review of MYTO-2 in December 2014 which became operational as MYTO2.1 in January 2015.[650] MYTO2.1 recognized that the Interim Period tariff shortfall amounted to N196, 334,452,911.91 billion, legacy gas debt amounted to N14, 291,811,848.66 billion,[651] making a total of N210, 626,264,760.57 billion as accumulated deficit of NESI, with the Discos responsible for 90% of the burden. The most unique and creative regulatory mechanism intervention under MYTO2.1 was the extension of a commercial facility to the Discos,, a commercial loan facility popularly referred to as the Nigeria Electricity Market Stabilization Fund (NEMSF), sponsored by the CBN and the Regulator to enable the repayment of the IRP revenue shortfall in tariff and the legacy gas debt[652] owed by the Gencos to the gas suppliers arising from the failure of the Discos to settle previous outstanding payment for energy delivered.

Contrary to the intention of the designers of this mechanism, the fund generated a lot of controversy regarding whether it was a government subsidy in the sense of being a

649 Order on the First 2014 MYTO-2 Minor Review (Order No.NERC/134) of 2014 2.
650 Multi Year Tariff Order – 2.1 for the Period 1st January 2015 to 31st December 2018.
651 Multi Year Tariff Order – 2.1 for the Period 1st January 2015 to 31st December 2018.8.
652 Multi Year Tariff Order – 2.1 for the Period 1st January 2015 to 31st December 2018. 7.

grant or a gift to the Discos. The controversy further placed the Discos in an invidious position with the consumers as public figures like government ministers also seem not to understand the purpose of the fund going by their utterances which suggested that the Discos benefitted from government largesse but remained unable to improve on service delivery to the consumers.[653] In reaction to ministerial comments on Discos underperformance, the Discos provided an insightful explanation on the real purpose of the funds as follows:

> "*As previously stated in a series of publications on this issue, the Nigerian Electricity Market Stabilization Fund (NEMSF) N210.61 billion intervention has been labeled, interpreted and surrounded with various erroneous and misleading information, especially in relation to the Discos. The Intervention was a vehicle provided by the CBN to ease the beginning of the liquidity crisis that is much worse today. It is not a subsidy or a bailout, but a loan (repayable over a ten-year period) to the sector that is carried on the Discos' financial books."*[654]

The implementation of the fund by the Regulator also created some challenges, a 10% per annum interest rate was applied on the facility on a reducing balance basis to be recovered from tariff collection. The repayment was made to remain a first in line charge on the Discos' revenue until it is completed.[655] The Discos argued that by this approach, the Regulator puts the debt on their financial books which essentially jeopardized their ability to access debt financing from other sources.[656]

Another challenge is in the disbursement of the fund, while the Discos were made to shoulder 90% of the component of the shortfall in tariff, and also considering that MYTO2.1 envisaged that the Discos were to fully recover their revenue shortfall from the fund,[657] the fund was not fully disbursed three (3) years after it was established. It was also apportioned lopsidedly, N152.16 billion (75.25%) was allocated as payment to the Gencos and gas suppliers while N58.45 billion (27.75%) was allocated as

653 The Punch "FG's Interventions in Power sector now N1.5 trillion" (25 September 2019) online:https://punchng.com/fgs-interventions-in-power-sector-now-n1-5tn-osinbajo/ (Date of use: 4 March 2020).

654 Thenationonlineng "Electricity Distributors Fight Back" (3 August 2018) online: http://thenationonlineng.net/electricity-distributors-fight-back-ii/ (Date of use: February 28 2020).

655 Multi Year Tariff Order – 2.1 for the Period 1st January 2015 to 31st December 2018. 8- 9.

656 ANED Challenges of the Nigerian Power Sector (ANED presentation 15 November 2019) 2.

657 Multi Year Tariff Order – 2.1 for the Period 1st January 2015 to 31 December 2018. 7.

payment to the Discos for the tariff shortfall in MYTO 2.[658] This position was also captured by the Discos in their response to the ministerial comments.[659]

This study shows that at best, it is an intervention fund availed to the market by the FGN which is required to be repaid over a period of time. The position of the government minister in charge of power that censured the Discos for merely paying 15% of energy received while benefiting from government's subsidy should be contextualized. Since the MYTO stipulates the purpose and disbursement ratio between the market participants for the loan, the Discos are not at liberty to appropriate the fund outside of the provision regardless of whether they were made to incur the liability on behalf of the market. Furthermore, since the repayment is tied to future Discos' revenue, the Discos will need to put in a superlative performance in their obligations to the market to reduce their losses (ATC&C) in order to realize sufficient revenue to cater to the repayment and other market obligations.

On the other hand, if considered from the perspective that the failure of the Discos to properly remit payment for energy delivered to it will render NBET unable to pay the Gencos, then any government intervention fund to pay up the Gencos' debt will amount to subsidizing the Discos as such it may well be a plausible argument for tagging the Discos as beneficiaries of government subsidy.

This financial crisis which arose from the poor implementation of the MYTO regime has continued to increase the market debt, and despite subsequent government interventions, it has remained largely unchecked because of non-reflective cost tariff and the AT C&C losses. The detail of how the Discos utilized this fund is not provided by the Regulator, but one of the Discos was sanctioned by the Regulator for converting part of the fund for the benefit of its shareholders.[660] The incident clearly suggests poor implementation by the Regulator.

The Discos also raised the concern that the assumptions in MYTO-2.1 for computing the tariff were subjective and imposed on them by the Regulator. This concern immediately raises the absence of inclusion and transparency in the process of tariff

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658 ANED Challenges of the Nigerian Power Sector (ANED presentation 15 November 2019) 2.

659 Thenationonlineng "Electricity Distributors Fight Back" (3 August 2018) online: http://thenationonlineng.net/electricity-distributors-fight-back-ii/ (Date of use: 28 February 2020).

660 NERC "NERC suspends the Board of Directors of Ibadan Disco" online: https://nerc.gov.ng/index.php/media-library/press-releases/568-nerc-suspends-board-of-directors-of-ibadan-disco (Date of use: 7 May 2020).

adjustment by the Regulator. The Regulator through its Director, Market, Competition and Rates explained this process when it stated as follows:

> "*It is very inclusive, it is well documented so you have the MYTO methodology approved in 2007 and amended in 2012 and so we have a rate review regulation that clearly specifies the processes of how it is being done. Currently, since the privatisation, what we have been doing is a minor review and few extraordinary reviews of one component specifically losses of the Discos. So for the Gencos, once we approve their PPAs, they are out of the MYTO or their PPAs is just an input cost into the basket of the MYTO. For the Discos, since inception, we have been doing only minor reviews and few extraordinary reviews which are only formulae changes in variables that are clearly known. We don't manufacture those variables namely; inflation, exchange rate, available generation capacity and their costs are already provided at least for the first 5 years of their Performance Agreement signed with BPE.*
>
> *Everybody participates in the review process because there is pubic consultation, we requested for participation and people who may wish to make presentation during the public hearings, we developed a consultation paper, we published the consultation paper and asked for comments, we received comments and reviewed them, responded to the comments and also held public hearings."*[661]

The above explanation is a rehash of the carefully drafted provisions of the Regulations on procedure for electricity tariff reviews in NESI[662] but there seems to be a disconnection between regulations and reality as rightly argued by the Discos as follows:

> "*It is good to write Regulations, the reality is that economists work for government, when their job is actually to appraise policies, does the Regulator appraise the cost or impact or implication or the unintended consequences that will fall out from its regulations, these are the things that need to be done.*
> *Let me put this another way, the public hearing is asking a group of stakeholders to give comments, opinions and views about something very different, an unintended consequence that could fall out from the regulation by*

661 Transcript of interview with Nigeria Electricity Regulatory Commission, Market and Competition unit (NERC) NERC Office, Abuja, (December 6 2019) 7 - 8.

662 NERC Regulations on Procedure for electricity Tariff Reviews in the NESI 2014.

indirect stakeholders (not stakeholders that will normally show up and say I am a stakeholder). So if you take for example when there was the economic crisis in 2015, CBN had a series of knee-jerk reactions to contract the foreign exchange requirements which led to a number of unintended consequences, in that instance it was almost a losing battle because it was almost profitable for anybody to get on a flight, go to Dubai, withdraw dollars from the ATM machines and fly back home to sell. You would not have gotten that feedback from bankers' forum that some will see opportunities and exploit it. The process of enacting Regulation is fine and I think the Regulator is trying its best in that regard but in appraising the consequence both intended and unintended, I think there is a bit more that could be done."[663]

The point made by the Disco is that the regulatory review process may be good theoretically but the failure of considering the unintended consequences alongside intended consequences of a proposed regulation may be the difference in the result when implemented. In other words, contextualizing the unintended result is just as important as the intended result. In this instance, the conception and implementation of the NEMSF and the incorporation into MYTO was poor.

(v) Declaration of Transitional Electricity Market (TEM), Amendments to MYTO-2.1 and MYTO-2.1 Minor Review

The attainment of cost-reflective tariff was one of the condition precedents for the declaration of TEM. In reality, since cost-reflective tariff was not in place, it is assumed that the Regulator pretended that cost-reflective tariff was in place going by its position in the Order directing the commencement of TEM[664] in February, 2015, that tariff has become cost-reflective. On the basis that other condition precedents and the assumed cost-reflective tariff were in place, the Regulator declared TEM which created some difficulties for the Discos.

Since TEM requires that all electricity market transactions should be contract based, in effect, the framework requires the activation of guarantees and letters of credit (LC) under the respective agreements namely; GSA, PPAs, and Vesting Contracts. It is not very difficult to appreciate the difficulties posed by this declaration. The Discos' argued

663 Transcript of interview with Abuja Electricity Distribution Company, AEDC office, Abuja, (6 December, 2019) 6.

664 Paragraph 7 of Order Directing the Commencement of the Transitional Stage Electricity Market (Order No. NERC/136) 3.

that a cost-reflective tariff is the bedrock for a contractual relationship in NESI and by implication, it will be illogical for them to operate by providing LCs when they know that due to tariff shortfall, they cannot meet their obligations. In other words, if a Disco provides LC and it fails to remit market revenue commensurate with energy delivered to it appropriately, recourse shall be made to its LC (presumably the value covers the total cost of energy delivered) for payment by NBET regardless of the prevailing market situation.

Realizing this, the Regulator anticipated that there is the likelihood of compliance issue by the Discos, and so made a Supplementary Order to the TEM.[665] By this Supplementary Order, it directed all Discos to provide effective payment guarantees to NBET and the Market Operator/Transmission Company of Nigeria as required under their Vesting Contracts, failure of which their revenues shall be escrowed for remittance to NBET. It also directed that Discos without payment security should activate their contracts within three (3) months after the declaration failure of which shall attract appropriate sanctions.

While this was ongoing, the Regulator carried out another minor review in April 2015 to MYTO 2.1[666] to amend the MYTO-2.1. By this amendment, the Regulator removed collection losses component of the ATC&C when the ATC&C was just barely adjusted to base line study level as discussed earlier. By the removal of collection losses, the Regulator refused to accept collection loss as a loss for the purpose of tariff computation, until any of the Discos show proof by evidence to the Regulator, during its tariff application review process, why such losses should be passed through to consumers.[667]As stated earlier, the Discos considered this to further worsen their financial situation by moving the tariff away from cost level.

It is doubtful if the rapid regulatory responses carried out by MYTO-2.1, TEM declaration and an amendment to MYTO-2.1 in a space of four (4) months were carried out in the best interest of NESI given the inconsistencies highlighted. It is also doubtful that this action of the Regulator was planned and consistent with market framework and reality before the implementation. It directly conflicts with the terms of the Performance Agreement of the Discos which defines ATC&C losses to include

665 Supplementary Order on the Commencement of the Transitional Stage Electricity Market (Order No.NERC/15/0011) of March 2015.

666 Amended Multi Year Tariff Order- 2.1 for the period April 1st, 2015 To December 2018 of 2015.

667 Amended Multi Year Tariff Order- 2.1 for the period April 1st, 2015 To December 2018 of 2015 19.

collection losses. It looks more like a fiat that makes nonsense of the trading arrangements and further increases the regulatory risk of NESI. The reaction from the Discos were spontaneous and expected, they issued notices of force majeure pursuant to their Sales Agreement, but later withdrew same upon a 2016 review[668]of the regulatory decision. By this review, the Regulator made a volte-face in realization of its error and reconsidered the removal of collection losses by admitting that collection loss is an essential component of the tariff as specified in the Discos' privatization bid documents.[669]

(vi) MYTO Macroeconomic Crisis

The MYTO methodology anticipates changes in macroeconomic variables such as foreign exchange, inflation rate, gas price and available generation capacity but did not anticipate an economic recession that will drastically change the variables. By 2016 Quarter 2, recession hit the Nigerian economy with the economy recording four consecutive quarters of negative economic growth. This occasioned Naira revaluation through CBN,[670] gas constraint increased as a result of disruptions to Escravos-Lagos Pipeline System (ELPS) and of course the entire macroeconomic parameters of the MYTO namely; inflation rate, foreign exchange rate, available generation capacity, gas price and wholesale cost changed drastically. This development further aggravated the financial crisis of the Discos.[671]

This intervening event made the Regulator extremely reluctant to carry out any further review whether minor, major or extraordinary and of course, it created a bad credit outlook for the Discos and the market. Investors became unwilling to place reliance on the regulatory mechanism for tariff adjustment (MYTO) which was supposed to increase the tariff and give adjustments when there are adverse movements in the economy in order to guarantee cost recovery.[672] This lasted for a period of three (3) years, from 2016 – 2019 when ordinarily there ought to have been six (6) minor reviews. Investors cannot invest in a regulatory environment where institutions cannot

668 Multi Year Tariff Order for Port Harcourt Electricity Distribution Company for the Period 1st January 2015 to December 2024 of 2015.

669 Multi Year Tariff Order for Port Harcourt Electricity Distribution Company for the Period 1st January 2015 to December 2024 of 2015 1.

670 Federal Republic of Nigeria "Power Sector Recovery Programme 2017 – 2021 (January 2018)" online: https://mypower.ng/wp-content/uploads/2018/02/PSRP-Master-Document-January-2018.pdf (Date of use: 12 February 2020) 6.

671 Transcript of interview with Abuja Electricity Distribution Company conducted at AEDC office Abuja (6 December 2019) 2.

672 Transcript of interview with Abuja Electricity Distribution Company conducted at AEDC office Abuja (6 December 2019) 2.

guarantee credible commitment and a reduction of transaction cost, a fundamental element of the institutional and hybrid theory of regulation.

(vii) Government Intervention and The 2016 – 2018 Minor Review of Multi Year Tariff Order (MYTO) 2015 and Minimum Remittance Order

In the same vein, as the PSRP addressed the performance crisis of the Discos, it also addressed the tariff crisis with proposal for immediate and long term plan particularly regarding clearing of accumulated deficits. The PSRP, a policy document by the FGN, acknowledged that end-user tariff only reached a sustainable level between February and March 2015 since post-privatization. Apart from the N213 billion accumulated deficit between November 2013 and January 2015 which NEMSF was designed to manage, the sector has further accumulated another tariff shortfall of N420 billion between January, 2015 to December, 2016.[673]

The deficit was categorized into market shortfall of N476 billion and tariff shortfall of N420 billion. For clarity sake, the market shortfall is described as the total amount underpaid by all the Discos to NBET and Market Operator (MO) for settlement of invoices to each Disco for electricity delivered to their networks, calculated by deducting each Disco's monthly payment to NBET and the MO from the value of each month's electricity invoice by NBET and MO. The tariff shortfall on the other hand is the aggregate amount of shortfall in the allowed revenue for each Disco due to the lack of a sustainable tariff, the excess of the market shortfall over the tariff deficit is said to be the net amount due from Discos to the market. The entire aggregate reflects payments due to all NESI participants.[674]

The PSRP primarily sought to create a financial plan by the FGN to address the deficits. While the FGN conceded its responsibility for the tariff deficit, it stated that it expects the excess of the market shortfall over the tariff deficit (N56 billion at the time), to be addressed under the existing Vesting Contracts between NBET and the Discos.[675] The PSRP financial plan envisages an immediate plan to clear the deficit between 2017 - 2021 and a sustainable plan in ensuring tariff gets to cost recovery level and remains there.

673 Power Sector Recovery Implementation Program online: hhtp://pwh.gov.ng/download/14991674947496.pdf (Date of use: 11 February 2020) 7.

674 Power Sector Recovery Implementation Program online: hhtp://pwh.gov.ng/download/14991674947496.pdf (Date of use: 11 February 2020) 24.

675 Power Sector Recovery Implementation Program online: hhtp://pwh.gov.ng/download/14991674947496.pdf (Date of use: 11 February 2020) 24.

With respect to the immediate plan, the PSRP estimated a total of NGN1.150 trillion as a projected total tariff shortfall from 2017 – 2021 and proposed sources of funding namely; NGN 701.9 billion guaranteed by the FGN through Payment Assurance facility to NBET, USD1 billion Performance Based Loan from World Bank and NGN 927 billion through budgetary contribution.[676]

More importantly, the intervention is a combination of policy and regulatory measures to reset NESI, the plan was to support the market over this target period, 2017 – 2021 in order that tariff may attain a cost-reflective level at the end of 2021. In this regard PSRP sustainable plan requires the FGN to issue a policy to guide the tariff trajectory towards cost recovery level by 2021 which said policy is to be implemented by the Regulator. The Regulator was expected to refine the procedures/approaches within the existing MYTO methodology for the determination of the main parameters of the revenue requirement of each Disco. This includes operating and capital expenditures, regulatory asset base, rate to be applied for the remuneration on investments, remuneration of investments, and allowances on losses, in accordance with applicable laws and policies and also taking into consideration the specific situation of the distribution segment at the time.[677]

It was equally emphasized that the Regulator will determine the revenue requirement for Discos and for TCN, through a consultation process that will lead to a major MYTO review. The process will require that the Discos prepare Performance Improvement Plan (including investment plans) in line with guidelines to be issued by the Regulator. Clearly, the policy and regulatory measures proposed by PSRP are lofty and requires painstaking efforts by the FGN, Regulator and the market participants to achieve the desired result.

However, the implementation strategy seems sketchy; for instance, beyond the FGN's provision of NBET Payment Assurance Guarantee which the Discos criticized for only taking care of NBET's payment obligations arising from generation invoices of the Gencos,[678] and the various loans secured from the World Bank and other financial

676 Power Sector Recovery Implementation Program online: hhtp://pwh.gov.ng/download/14991674947496.pdf (Date of use: 11 February 2020) 25.

677 Power Sector Recovery Implementation Program (March 2017) POWER_SECTOR_RECOVERY_PROGRAM.pdf (Date of use: 11 February 2020) 22.

678 Transcript of interview with Association of Nigeria Electricity Distributors, ANED office, Abuja (11 December 2019) 5.

institutions[679] which were dedicated to the transmission segment of the market,[680] it is difficult to assess the benefit the PSRP will have on the Discos.

The Payment Assurance Guarantee for the Gencos was designed as a bridging finance until other financing sources are realized. It lasted for one year, 2017 – 2018 by which time; the sector's deficit had gone up significantly while the World Bank loans were aggressively being pursued. The FGN budgetary contribution for another funding intervention was not approved until late 2019 when it approved a N600 billion payment assurance facility for Gencos which was meant to last till June 2020.[681] Again, according to the Discos the new assurance facility was designed to take care of the Gencos' invoices component of the market deficit.

The implementation of PSRP seems to be a palliative approach which excludes the Discos in terms of funding, this approach may be understandable to the extent that a significant portion of the market deficit are debt owed to the Gencos and gas suppliers in the upstream segment of the market. While this approach may constitute enough incentive to invest in the upstream segment, it certainly dis-incentivizes any investment in the distribution segment with an increasing debt profile. A case in point is the construction of Azura-Edo IPP, a 461MW open cycle gas turbine power generating station which shows additional investment in the upstream since the commencement of the privatized market.

Notwithstanding the government PSRP intervention, the study shows that the Discos' situation did not improve, considering the tariff shortfall of each of the Discos stated in the July 2019 MYTO minor review[682] which is in excess of N1 trillion for the year 2015 - 2018. For instance, the Abuja Electricity Distribution Company's historical shortfall for 2015 – 2018 and projected shortfall for 2019 – 2020 is shown in Table 19,[683] which amounted to a total of N160,554,560,421 (One Hundred and Sixty Billion, Five

679 The Punch "AFDB Approves $210m Power Transmission Projects for Nigeria" (28 November 2019) online: https://punchng.com/afdb-approves-210m-power-transmission-projects-for - Nigeria-2/ (Date of use: March 5 2020).

680 Financial Services Monitor Worldwide "World Banks Bailout To Nigeria Power Sector Hits N1.3bn in Four years (24 October 2019) online: https://search.proquest.com/docview/2307956020?accountid=14648 (Date of use: March 5 2020).

681 Thenationonlineng "Federal Government Approves N600 billion Assurance Facility for Power Sector" (September 28, 2019) online: https://thenationonlineng.net/fed-govt-approves-n600bn-assurance-facility-for-power-sector/ (Date of use: March 5 2020).

682 The 2016 – 2018 Minor Review of Multi Year Tariff Order (MYTO) 2015 and Minimum Remittance Order for the Year 2019 (Order No. NERC/GL/170A).

683 The 2016 – 2018 Minor Review of Multi Year Tariff Order (MYTO) 2015 and Minimum Remittance Order for the Year 2019 (Order No. NERC/GL/170A). 4.

Hundred and Fifty Four Million Five Hundred and Sixty Thousand Four Hundred and Twenty One Naira).[684]

The next minor review of the tariff was carried out by the Regulator in July 2019 which came after a three year period in which six (6) minor reviews ought to have been carried out as envisaged by the MYTO methodology. The review seeks to reflect the impact of changes in the variables for the period of 2016 – 2018 (historical) to determine cost reflective tariffs and ascertain the revenue shortfalls, determine the historical tariff deficits, develop and implement a framework to manage future revenue shortfalls and implement a minimum market remittance requirement to account for differences between cost-reflective tariffs and allowed tariffs in the settlement of invoices issued by NBET and MO, establish interim payment arrangements and steer the market to gradual activation of market contracts in line with TEM.[685]

The objectives of the July 2019 minor review is another reflection of the regulatory inconsistencies highlighted in the previous years. The argument is somewhat repetitious with regards to the Regulator's role in the cost reflection crisis of the Discos. For instance, in the face of a growing tariff shortfall and an economic recession, both acknowledged by the PSRP in 2017, the failure of the Regulator to activate the reviews envisaged by the MYTO methodology not until July 2019 is questionable. By the review, the Regulator re-established an interim payment arrangement, which by implication is a reversal or suspension of TEM because it is obvious NESI was not ready for the activation of market contracts at the time it was done and so the consequences that followed that regulatory misadventure was needless. The intention to steer the gradual activation of market contracts in line with TEM should have been the objective at the time TEM was imposed on NESI.

4.4.3 Resultant effect of Discos' Crisis and the Regulatory Mechanisms/Interventions Adopted

The resultant effect of the identified cost and performance crisis of the Discos are numerous ranging from economic, market to customers' issues. However, the ones identified in this study are predominantly the intractable problems of the industry judging from the Regulator's focus in its quarterly reports. While the Regulator is constantly adopting regulatory mechanisms to solve some of the resultant effects,

684 An equivalent of $USD…..

685 The 2016 – 2018 Minor Review of Multi Year Tariff Order (MYTO) 2015 and Minimum Remittance Order for the Year 2019 (Order No. NERC/GL/170A) 2.

others such as the contract inefficiency and invoice settlement crisis are either partially addressed or ignored all together. The following issues are some of the resulting effect and the regulatory mechanisms adopted to resolve the crisis.

4.4.3.1 Estimated Billing and Metering Problem

Estimated billing is a regulatory mechanism created by the Regulator to address the collection losses issue of the government enterprise (NEPA) prior to privatization. Prior to the operation of the privatized market, a lot of energy consumers supplied by the distribution segment of the government enterprise were unmetered, in some cases actual meter reading to arrive at appropriate billing was equally difficult for various reasons like lack of access to consumer premises, faulty meters, colluding/sabotaging NEPA staff, and vandalism. For these reasons, estimated billing was introduced with a methodology for computation of bills to avoid arbitrary inflation.

This was done by the Regulator through the issuance of the Estimated Billing Regulation in 2012[686] which targeted certain categories of customers namely; existing customers who have been issued meters which are no longer functional (customers with faulty meters), customers whose meter readings could not be obtained by the distribution company due to inaccessibility occasioned by locked doors, absence from home or presence of dogs on premises (customers whose meters cannot be read) and customers that have not been provided with meters (existing customers without meters).[687]

To ensure compliance with the methodology, the Regulator mandates the Discos to provide a report of estimated bills in every billing cycle which is required to contain names and addresses of the Discos, list of metered Feeders (33KV, 11KV transformers and any other) and energy or load recorded on the Feeders during the billing cycle, a record of the number of customers with functional Credit meters, Pre-paid meters and faulty meters, data and the result of historic statistical analysis on Feeders used to determine the weighted class average, list of Feeders, availability and load on the Feeders, summary of the result of the estimated average load per

686 Nigerian Electricity Regulatory Commission (Methodology for Estimated Billing) Regulations (S.I. 65 2012) 2012.

687 Nigerian Electricity Regulatory Commission (Methodology for Estimated Billing) Regulations (S.I. 65 2012) 2012 B 1779.

tariff class, report on estimated customers in clusters within a Feeder with additional outages amongst other details.[688]

In the privatized market, arising from the financial crisis of the Discos, expectedly, the implementation of this Regulation was hindered by the inadequate level of metering of Feeders and distribution transformers which form the source of data for the Regulator to achieve effective monitoring of the application of the estimation methodology.[689] The Regulator also noted that the inadequacy of accurate data required for the estimation of consumption of unmetered consumers as well as the non-provision of meters and unrealistic billing of unmetered customers constituted most of the customers' complaints lodged at Discos' customer care centers, dispute filed at Forum Offices and appeals to the Regulator.

One of the Discos also noted that the consumers find the billing to be too high which created apathy for expected payment.[690] This adversely affected the market revenue of the Discos and willingness to settle market invoices (NBET and transmission invoices) in full.[691] Notwithstanding the introduction of pre-paid meter in 2006 in solving the difficulties associated with estimated billing, the Discos are yet to fully embrace the pre-paid billing system for their revenue collection in the post-privatization period largely because of their weak financial position.

The Regulator intervened by the issuance of the Meter Asset Provider Regulation[692] in 2018, a regulatory mechanism designed to ensure that the Discos execute Meter Service Agreement with a procured Meter Asset Providers for the deployment of meters based on the Discos' meter deployment plan. This Regulation is geared towards ensuring that the estimated billing practices is eliminated, attracts private investment for the provision of meters in NESI, the development of independent and competitive meter services, close the metering gap through accelerated meter roll out and enhance revenue assurance.[693]

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688 Nigerian Electricity Regulatory Commission (Methodology for Estimated Billing) Regulations (S.I. 65 2012) 2012 B 1783.

689 Order on the Capping of Estimated Bills in the Nigerian Electricity Supply Industry (Order No/NERC/197/2020) 2020 3.

690 Transcript of interview with Eko Electricity Distribution Company, EEDC office, Lagos (5 December 2019) 1.

691 Order on the Capping of Estimated Bills in the Nigerian Electricity Supply Industry (Order No/NERC/197/2020)2020 3.

692 Meter Asset Provider Regulations (Regulation No:NERC-R-112 2018) 2018.

693 Meter Asset Provider Regulations (Regulation No:NERC-R-112 2018) 2018 4.

The mechanism recognizes the fact that lack of appropriate billing and metering system is mainly responsible for high collection losses component of the Discos' ATC&C and so any regulatory mechanism must necessarily provide measures for increasing collection and in effect, ensure revenue generation for the electricity market generally. However, since its introduction, the rate of bridging the metering gap has not been too slow. The metering gap was reported by the Regulator in its second quarterly report for 2021 to be 39.80% (4,404,013) of the total of 11,058,939 registered electricity customers as at 30 June 2021.[694] The gap bridging rate has not been encouraging for the effective implementation of the Meter Asset Regulation but with a slight improvement as a result of the introduction of National Mass Metering Programme by the FGN in 2020.

The National Mass Metering Programme (NMMP) is a scheme introduced by the FGN for financial support to the Discos and local manufacturers of Meters. It operates as a financial loan from the Central Bank of Nigeria to the Discos and local manufacturers of meters payable over a period of ten (10) years. The interest rate for the loan is pegged at 9% and to be shared between the CBN and any participating financial institution at 3% and 6% respectively.[695] The Regulator had since fused the NMMP' scheme with the Meter Asset Provider regulatory mechanism by issuing the Meter Assets Provider and National Mass Metering Regulation in August 2021 in ensuring that both mechanisms operate concurrently.[696]

Notwithstanding the FGN's intervention, by February 2020, the Regulator conceded its failure in metering and issued an Order on the capping of estimated bills in NESI.[697] The Regulator states that data received from ongoing customer enumeration exercise indicates that the customer population has grown from 5 million in 2012 to over 10 million as at December 2019 with about 52% of the population being invoiced on the basis of estimated billing.[698]

694 Nigeria Electricity Regulatory Commission Quarterly Report (Second Quarter 2021) 52.

695 Central Bank of Nigeria "Framework for financing of National Metering Programme (NMMP)" online: https://www.cbn.gov.ng/out/2020/ccd/mass%20metering%20financing-procurement_guidelines_updated_18-10-20.pdf (Date of use: 4 August 2022).

696 Meter Asset Provider and National Mass Metering Regulations (Regulation No:NERC-R-113 2021) 8.

697 Order on the capping of estimated bills in the Nigerian Electricity Supply Industry (Order No/NERC/197/2020) of 2020 2.

698 Order on the capping of estimated bills in the Nigerian Electricity Supply Industry (Order No/NERC/197/2020) of 2020 2.

The introduction of this regulatory mechanism (Order on the capping of estimated bills repealed the Estimated Billing Methodology Regulation) is directed at the Discos. It requires the Discos to ensure that customers on tariff class A1 are identified and properly metered by 30 April 2020, that unmetered R2 and C1 customers are not to be invoiced for the consumption of energy beyond the cap stipulated in the Order, R2 customers on less than 50 Kilowatt hour (KWhr) consumption monthly rate are to remain at N4 per Kilowatt hour (KWhr), while all other customers on higher tariff classes must be metered not later than 30 April, 2020. The failure of the Discos to comply with the directive exempts the customers from paying any estimated bill or further payment without power supply disconnection until a meter is installed on their premises.[699] It is expected that compliance can only be through enforcement and sanctions by the Regulator.

The above regulatory mechanisms take into cognizance some of the elements of the theories of regulation that underpins the study. For example, the estimated billing regulation considered the peculiar difficulties of the regulatory environment in Nigeria, an element of the hybrid regulation, in terms of efficient metering system, by striking a balance between the collection interests of the Discos and preventing arbitrary billing of power consumers. Arguably, the Meter Asset Provider Regulation introduced third party investors and seeks to protect their interest in meter asset provision considering the fact that the Discos may be unwilling to yield ground for such, giving the monopoly enjoyed by them in their various franchise areas.

The NMMP mechanism is another financial intervention by the FGN to the Discos who are supposed to be technically and financially independent operators of the sold government assets. While the obvious rationale for both regulatory mechanisms is to bridge the metering gap, the concealed rationale is to avoid a collapse of the distribution market taking into consideration the sectional interest of the Discos and the third party investors. Although, not necessarily harmful to the market, but it must be noted that the approach is inconsistent with the privatization objective.

4.4.3.2 Market Settlement Crisis, Contracts Inefficiency and Investors' Apathy/Lack of Access to Finance

699 Order on the capping of estimated bills in the Nigerian Electricity Supply Industry (Order No/NERC/197/2020) of 2020 2.

The market framework is to ensure that the Discos properly collect revenue and remit payments to other market participants who ensured that energy was dispatched and delivered in accordance with the value chain contracts.[700] However, owing to the financial challenges identified previously, remittance of revenue by the Discos for payments to these market participants has been poor, below par and deficient. The 2015 – 2019 periods was marred by the low remittances from the Discos and because the market contracts were ineffective, payment securitization to ensure payment is made was largely absent.

The PSRP also acknowledged this problem by bringing to fore the Discos' failure to make full payment for energy received since privatization in 2013 and the Discos' refusal to remit collected revenues to the market as allocated under the tariff adjustment regulatory mechanism (retention of market revenue under MYTO).[701] The PSRP figures showed that while the Discos' collection rate for 2015 and 2016 was 64% and 67% respectively from energy received, their invoice settlement rate for the same period was 53% and 29% respectively.[702] By 2017, the situation further deteriorated going by the Regulator's report which stated that in the third quarter of 2017, out of the issued invoice of N147 billion for energy received from NBET and for services provided by the market administrators, only N44 billion was settled.[703]

The situation continued to deteriorate in 2020 given the Regulator's report which showed that out of the issued total invoice of N185.08 billion for energy received by the first quarter of the year, only a total of N60.20 billion (35.53%) of the invoice was settled by the Discos.[704] By the second quarter of 2020, the total invoice of N222.52 billion was issued from NBET and for administrative services by MO but only a total of N62.41 billion (28.05%) was settled by the Discos.[705]

The implication of these low remittances is the impact on the ability of NBET to honour its obligations to the Gencos, while other service providers like TCN and MO also struggle to meet their obligations due to financial constraints arising from low remittance from the market downstream by the Discos. It equally creates investors' apathy and serves as a barrier to access fund considering that no reasonable financier

700 Please see Table 8.
701 Power Sector Recovery Implementation Program (March 2017) POWER_SECTOR_RECOVERY_PROGRAM.pdf (Date of use: 13 March 2020) 17.
702 Power Sector Recovery Implementation Program (March 2017) POWER_SECTOR_RECOVERY_PROGRAM.pdf (Date of use: 13 March 2020).
703 Nigeria Electricity Regulatory Commission Quarterly Report (Third Quarter 2018) 34.
704 Nigeria Electricity Regulatory Commission Quarterly Report (First Quarter 2020) 41.
705 Nigeria Electricity Regulatory Commission Quarterly Report (Second Quarter 2020) 42.

will invest in a debt-ridden asset in an atmosphere of uncertainty with respect to returns and recouping investment. It goes without saying that if there is no money to improve performance as expected of the Discos because there is a higher leakage in their system, the more energy they get will generally make worse the market financial situation.[706]

The Regulator also conceded the point that it tolerated the Discos' uncontrolled remittances prior to the July 2019 minor review.[707] However, the Regulator introduced a regulatory mechanism to ensure that the Discos make a minimum remittance to the market. This was done by the issuance of a Minimum Remittance Order which obligates the Discos to settle their market invoices in full as adjusted and netted off by applicable tariff shortfall approved by the Regulator. The earnings of the Discos were made subject to the satisfaction of specific payments prescribed as a waterfall in the Order namely; repayment of CBN-NEMSF facility, 100% settlement of MO's invoice based on the tariffs applied by the MO in determining respective invoices prior to the Order, and full settlement of certain percentages (45% in Abuja Disco's case) of NBET's monthly invoices as the minimum remittance threshold.[708]:

This regulatory mechanism is based on market expediency and so it is difficult to comprehend the Discos' complaint particularly because the obligated payments are reasonably justified. The Discos' complaint is that mandatory specific payment under the regulation renders them out of pocket and makes operational expenses such as staff salary payments and maintenance costs difficult. They also suggested that a likely outcome of the operational constraint is a reversal of the Performance Improvement Plan giving the limited Capital and Operation expenditure allowances. The Association of the Nigerian Electricity Distributors (ANED) summarized this development as a death sentence to the various Discos.[709]

However, two provisions of the Order stand out. First, making NEMSF repayment first line charge on the Discos' revenue and at the same time making the recovery of MDAs' debt solely Discos' responsibility is illogical. NEMSF with its inherent flaws described above (satisfying debt by the creation of another debt) is a debt obligation of the Discos

706 Transcript of interview with Abuja Electricity Distribution Company, AEDC office, Abuja (6 December 2019) 8.

707 Transcript of interview with Nigeria Electricity Regulatory Commission, Market rate and Competition unit conducted at NERC Office Abuja (6 December 2019) 2.

708 The 2016 – 2018 Minor Review of Multi Year Tariff Order (MYTO) 2015 and Minimum Remittance Order of 2019 5 – 6.

709 Transcript of interview with the Association of Nigeria Electricity Distributors (Conducted through phone on 11 December 2019) 6.

to FGN through CBN and so FGN stands to directly benefit from the repayment of the loan. MDAs is made up of both FGN and state governments' ministries, departments and agencies. Their debt profile constitutes a significant portion of the Discos' collection losses; therefore, the Regulator's lack of interest in making this distinction before removing collection losses as pass through cost is an indication of regulatory capture. It demonstrates a total lack of empathy and lack of institutional independence. At best an arrangement to set off this debt against monetary expectation from the Discos ought to have been considered to reduce transaction cost and increase credible commitment in the regulatory environment.

Contrary to the Discos' position, the Regulator argued that the FGN intervention fund which is both historical and forward looking (N600 billion) takes care of the deficit in the revenue requirement of the Discos and by that, it meant that the minimum remittance scheme will remain but the Discos will not be held accountable to cost and they are not allowed to collect from customers since the payment assurance guarantee in the Order will supplement the minimum remittance. Therefore, the Discos will be held accountable for whatever they are allowed to collect, with the caveat that what they are allowed to collect must first and foremost meet their own operational need which is the prerequisite to access the FGN's intervention fund.[710]

In a nutshell, the Regulator views the minimum remittance Order as a cost reflective regime because in its opinion, since 65% of the Discos' cost of operation is cost of energy received from Gencos and are not required to pay in full by the operation of the Order (45% payment obligation to NBET with 65% subsumed by payment assurance guarantee of PSRP in Abuja Disco's case study). It further argued that to the extent that the Discos were meeting their operational obligations prior to the Order (when some Discos made zero remittance), which stagnated NESI financially, the Discos' current argument then seems to hold no water since 65% of its cost of energy received has been taken off its shoulder.

With this regulation in place, compliance became a challenge to the Discos so much so that by October 2019, the Regulator issued a Notice of Intention to cancel licenses of eight (8) out of the eleven (11) Discos for non-compliance with the Minimum

[710] Transcript of interview with Nigeria Electricity Regulatory Commission, Market Rate and Competition unit NERC Office, Abuja (6 December 2019) 2.

Remittance Order except cause is shown within sixty (60) days from the date of issuance.[711]

It is suggested that a sector financial audit may be required to ascertain Discos' financial standing. The Regulator might have been poised to do something similar to that because it insisted on conducting public hearings whereat the defaulting Discos were required not only to demonstrate why their licenses should not be cancelled but also provide particulars and information relating to their businesses including directors' earnings and related party transactions. The Regulator however makes compliance with minimum remittance threshold payment by the Discos as a condition not to carry out the public hearing.

The proposed public hearing would have gone a long way in availing the public with useful information with respect to the areas that require regulatory mechanisms or amendments to existing mechanisms to resolve the financial challenges of NESI since power has become a national and public issue. However, the defaulting Discos eventual compliance meant that [712] they are not interested in putting their operational and financial information in the public space

4.4.3.3 Enforcement and Compliance/Load Dumping and Load Rejection Problem

Another resultant effect of the performance and tariff crisis of the Discos is their inability to invest in infrastructure which also impedes on their network capacity and service delivery. The sector wide view is that the inability of the Discos to take the energy load allocated to them by the energy allocation mechanism in MYTO creates an imbalance in the power system. According to the Regulator, this occurs when the power supplied to a Disco is either in excess or short of the percentage of capacity allocated to it based on the load allocation formula.[713] These imbalances are due to various reasons but mainly attributable to transmission and distribution constraints.[714]

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711 Notice of intention to cancel licenses issued pursuant to Section 74 of the Electric Power Sector Reform Act of 2019.

712 Sunday SE "Six discos escape NERC sanctions but Enugu P/H may lose Licenses" (14 December 2019) The Daily Trust online: https://www.dailytrust.com.ng/six-discos-escape-nerc-sanctions-but-enugu-p-h-may-lose-licences.html (Date of use: March 18 2020).

713 Order on the imbalance application mechanism during the Transitional Electricity Market (Order No. NERC/139 2015) of 2015 1.

714 Federal Republic of Nigeria "Power Sector Recovery Programme 2017 – 2021 (January 2018)" online: https://mypower.ng/wp-content/uploads/2018/02/PSRP-Master-Document-January-2018.pdf (Date of use: February 12 2020) 16.

The regulatory mechanism for maintaining balance in the power system, achieving fair and just distribution of energy on the grid is the load allocation formula inserted into MYTO and adopted by the Disco's Vesting Contracts. The MYTO framework from inception of NESI makes provision for a five (5) year projection (2012 – 2016) load allocation formula to the Discos as shown in Table 20.[715] This was done as a result of the generation and transmission grid inadequacy at the inception of NESI. It is expected that whatever amount of energy that is available on the grid has to be allocated on some fair, transparent and easily understandable basis. Consequently, the mechanism for achieving this, under MYTO, envisages that load allocation formula will be utilized in executing all Vesting Contracts and same shall continue to be in used until such a time when the total amount of energy delivered daily to the distribution companies consistently increases above 3,200MW from the Gencos.[716]

The Regulator through MYTO also tied any further load allocation after the increase of energy delivered daily beyond the 3,200MW mark to the performance of each Disco. It is expected that during each minor review of tariff Order, data on each Discos' performance will be considered to enable the System Operator allocate energy on the basis of the performance review.[717] However, the Discos' performance have been very poor, they have not been able to improve on their various distribution networks/capacities since the post-privatization era with the exception of a few who are able to slightly take more energy than allocated. Given this state, any improvement in generation and transmission capacities seems to be lost on the Discos. The energy imbalances that ensued from this situation occasioned a lot of trading of blames amongst the operators in NESI particularly between the generation, transmission and distribution operators.

The blames principally revolves around the Gencos' perception that their operation which is below energy installed capacity level is largely due to transmission and distribution constraints.[718] The Transmission Company also believes that the grid energy wheeling capacity is being compromised by the failure of the Discos to accept

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715 Multi Year Tariff Order for the Determination of the Cost of Electricity sold by Distribution/Retail Companies for the Period 1 June 2012 to 31 May 2017 34.

716 Multi Year Tariff Order for the Determination of the Cost of Electricity sold by Distribution/Retail Companies for the Period 1 June 2012 to 31 May 2017 35.

717 Multi Year Tariff Order for the Determination of the Cost of Electricity sold by Distribution/Retail Companies for the Period 1 June 2012 to 31 May 2017 35.

718 The Punch "We are Being Forced to Reduce Generation – Power Firms" (29 October 2018) online: https://punchng.com/were-being-forced-to-reduce-generation-power-firms/ (Date of use: March 24 2020).

energy allocated to them.[719] The Discos believe that their inability to accept load is due to technical issues with the transmission company in transporting/wheeling energy to where energy is demanded by the Discos.[720]

One of the Discos' position on this issue is expressed in the interview conducted as follows:

> "*The framework also has an arrangement whereby you think about the national generation as a cake, contractually every Disco now has a slice of it, Abuja has 11.5% of the available national generation capacity, so let's call that X which is kind of funny again, it opens up another challenge, we know that national generation is not static, it moves from an available national generation of 4,500MW to 5000MW, it drops to 2500MW. So contractually a Disco does not have any certainty of the volume of the entire generation that it is going to get. 11.5% of 4000MW is about 460MW, if it drops by half it comes to 230MW, it is still 11.5% of X, and if that doubles, that is eight hundred and something, still 11.5% of X, so I think looking at the industry framework as well, it is a significant flaw in the industry structure."*[721]

The above position on the entire load allocation formula is flawed particularly on the point that the load allocation constitutes a challenge to the operations of the Discos. The background to this issue lies in the disclosure of the various energy capacities of the different segments of the value chain. The System Operator, the arm of the transmission segment responsible for the load allocation puts the nation's installed generation capacity at 12,910.40MW, available capacity at 7,652.60MW, transmission wheeling capacity at 8,100MW while the peak generation ever attained was 5,375MW.[722] In reality, this mismatch in the energy capacity across the value chain poses a challenge for the entire power system.

From the figures available, the total energy the Discos were able to receive from January – June 2019 was 2,418MW, 2,298MW, 2,559MW, 2,351MW, 2,310MW and

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719 The Nation online "Why Power will Remain Epileptic by TCN" (August 12 2019) online: https://thenationonlineng.net/why-power-will-remain-epileptic-by-tcn/ (Date of use: March 24 2020).

720 Transcript of interview with Association of Nigeria Electricity Distributors, ANED office, Abuja (11 December 2019) 3.

721 Transcript of interview with Abuja Electricity Distribution Company, AEDC office, Abuja (6 December 2019) 3.

722 Asu F "Power supply worsens as generation drops to 2,915MW" (19 October 2019) The Punch online: https://punchng.com/power-supply-worsens-as-generation-drops-to-2915mw/ (Date of use: March 25 2020).

2,183MW respectively.[723] But these figures are compared with available figures on the total available energy for dispatch from the Gencos for the corresponding period it shows 5,597MW, 6,553MW, 6,158MW, 6,094MW, 5,949MW and 6,162MW[724] respectively were available. Considering these figures, the focus should be on the factors responsible for the significant difference in available capacity and Discos' received energy.

Due to the misaligned capacity, it is obvious that any increase in energy generation capacity will be constrained by the obvious capacity limitation of the grid (transmission wheeling capacity). Likewise, any increase in transmission capacity will be constrained by the limitation of the distribution network in receiving available energy. A study carried out by Siemens pinpointed several bottlenecks in the transmission and distribution networks. It identified transmission transformer feeders' bottleneck (132/33KV), bottleneck across transmission network, Discos' 33KV sub transmission bottleneck, operational challenges impacting system stability and value chain, limited in-feed from TCN and capacity bottlenecks in distribution networks.[725]

On this premise, it is too simplistic for the Discos to argue that transmission constraint is solely responsible for load rejection. More details shall be provided in the study on transmission constraints. However, there is some force in the aspect of the Discos' argument that cohesion between the Discos and TCN is poor with regards to the load demands of the Discos within the operational framework of the Grid Code. For instance, a situation where TCN for political consideration, decides to concentrate capacity expansion projects where it is less needed by the Discos, while neglecting areas where it is needed, is not envisaged by the load allocation mechanism. The Regulator confirmed this lack of cohesion when it stated as follows:

> "*Now in the Benin area, where you have Azura and the rest, you have so much stranded power within the area, the transmission capacity is not there, in places where the power is needed they cannot get it and it is mainly due to transmission problem and they also don't seem to work hand in hand with the Discos. The Discos may like capacity somewhere and TCN will be building capacity elsewhere. These to me essentially are their challenges.*"

723 Nigeria Electricity Regulatory Commission Quarterly Report (Second Quarter) of 2019 73.
724 Nigeria Electricity Regulatory Commission Quarterly Report (Second Quarter) of 2019 23.
725 Siemens "Electrification roadmap for Nigeria technical and commercial proposal" (7 May 2019) https://powerlibrary.nigeriaelectricityhub.com/index.php/2019/09/23/nigeria-electrification-roadmap-2019/ (Date of use: 16 April 2020) 8.

Notwithstanding the validity of this aspect of the Discos' argument, one of the Discos confirmed the inadequacy of synergy for power supply and distribution between the TCN and the Discos when asked to explain what load rejection and load dumping mean. It stated as follows:

> "*One can actually say I don't want to consume or accept energy within my network, it becomes rejection or one can decide to say I want to give you more supply, it becomes dumping. EEDC has a network and within the network we have a certain capacity, we have 52 injection substations for transmission of energy from a certain voltage level from 33KV to 11KV then cascade down to primary users. Our major backbone is 33KV, before now we had an old network which is not healthy enough like our feeders, transformers, switch gears. These are installations that have lasted for years and the pattern of loading when they were new will not remain the same, for instance a 33KV feeder does 20MW maximum but sometimes it has a tolerant limit of 22MW but with an underground network that has multiple chance the more you load the more they are susceptible to fault, those joints can fail, that is one constraint. Now when TCN is saying Discos are rejecting loads, you can as well tell me to take as much as you can provide and I have looked at my network and I am seeing that I cannot manage this load within the status of my network, is that rejection, that is not rejection per se and you know there is no buffer by which you can store energy once you generate you have to transmit and consume."*[726]

The total disregard for the mechanisms provided in the Grid Code and Market Rules in ensuring that there is no arbitrary load dumping or rejection by the System Operator and the Discos respectively is an indication of a breakdown of market operation between these two arms of the supply chain. The Grid Code requires all users of the grid including the Discos to provide the System Operator with data on Day-ahead Demand and available forecast[727] on the last business day of the week, which shall include demand forecast factors, demand forecast methodology, demand profiles. The Discos (Demand Off takers) are required to supply data on active and reactive power demand profiles by 8:00 hours on the Pre-Dispatch Day of the amount and duration of anticipated demand control per connection point that may result in a demand change

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726 Transcript of interview with Eko Electricity Distribution Company conducted at EEDC office Lagos 5 December 2019) 1.

727 Defined in Appendix 1 of the Grid Code as demand forecast for the following 24 hours starting at 00:00 hours.

of 1MW or more during each dispatch period of the dispatch day.[728] There is also the mandatory requirement of the Discos to supply information by 01:00 hour and 12:00 hour on a daily basis on the active power profiles per connection point for the previous dispatch day and to also notify System Operator of their intending demand control including customers demand management which may result in change of 5MW or more power on the grid.[729]

The essence of these provisions is to ensure the reliability of the grid and stability of grid power. This is necessary because when the Discos reject or are unable to take load, it causes high voltage which may lead to system collapse. The Grid Code is also geared towards ensuring the ability of the Discos to accept the energy the grid can wheel to them; otherwise, the effect of their rejection will cause a myriad of commercial and technical issues including a reduction in the output of the Gencos.

As a way to correct this anomaly in load allocation, the Regulator introduced an energy imbalance mechanism into MYTO 2.1.[730] To implement the energy imbalance mechanism, the Regulator tied each Disco's tariff to its estimated energy delivered so that any reduction in the expected energy delivered to a particular Disco will automatically cause disequilibrium in the Disco's tariff. On the other hand, there is a provision for monthly compensation of a Disco that takes in excess energy over what is allocated to it.

This regulatory mechanism specifically targets some identified market conducts inconsistent with the operation of the Grid code, such conducts includes; System Operator's request to some Discos to take load that is at variance with their MYTO/Contract allocations (sometimes to maintain the grid), some Discos willfully taking load beyond their MYTO and System Operator's allocations, some Discos deliberately avoiding/rejecting load and effectively taking load below their MYTO and System Operator's scheduled allocations in order to unduly earn imbalance charges, and some Discos inability to take energy due to their own local constraints.[731]

The regulatory mechanism also serves to ensure even distribution of available load on a daily basis in accordance with the load allocation formula, taking into consideration

728 Paragraphs 19.4.4 – 19.4.5 Grid Code for Electricity Industry of Nigeria of 2014 92.
729 Paragraph 19.5.1 of the Grid Code for Electricity Industry of Nigeria of 2014 93.
730 Multi Year Tariff Order – 2.1 for the Period 1st January 2015 to 31st December 2018 (Order No.NERC/135) of 2015.
731 Multi Year Tariff Order – 2.1 for the period 1st January 2015 to 31st December 2018 (Order No.NERC/135) of 2015 14.

the limited quantity of available energy dispatched on the grid. It prevents a situation of commercially inducing rejection by a Disco to benefit from the compensation scheme. A situation where the inability of the Disco to take load is not attributable to such Disco but to System Operator's instruction, the mechanism allows the Disco to take a reduced quantity (by reflecting what the actual load taken) and be entitled to imbalance payment as compensation. A Disco who took load to save the market from a reduction in available power generation level on the grid will not be liable to pay imbalance compensation to other Discos (who are not ready to take load) on the basis that the other Discos did not suffer loss of opportunity to earn. The mechanism also placed a burden on a Disco who took energy from the grid in excess of its allocation outside of the System Operator's instruction and in the process impacted the ability to maintain grid balance, to pay twice the imbalance payment it would ordinarily have made to the other Discos whose allocation were taken.[732]

By the February 2016 minor review of MYTO, the Regulator further reiterated that it shall penalize Discos for rejecting supply contrary to its load allocation mechanism. In addition to prohibiting a Disco from benefitting from imbalance payment for taking less energy than allocated to it by the Regulator for any reason other than System Operator's instruction, the Regulator makes the Disco liable to pay compensation associated loss of revenue by the TCN. On the other hand, the Disco shall also be entitled to be compensated by TCN for imbalance in revenue arising from TCN's inability to deliver allocated energy due to transmission grid constraints.[733]

However, subsequent report of the Regulator shows that some Discos still receive less energy than their MYTO allocation due to technical limitation of their networks and/or commercially inducing rejection (low load off take) while some also receive more energy than their allocated quantity.[734] The persistence of this problem regardless of the regulatory mechanism adopted is attributable to the larger problem of capacity mismatch across the value chain. Creating regulatory mechanisms without necessary network expansion in the transmission and distribution to reduce technical hitches, will continue to serve as mere palliatives as against long term solution. Other regulatory interventions being considered by the Regulator such as the imposition of take or pay obligation on capacity equivalent of MYTO allocation and/or adjustment of tariff

732 Multi Year Tariff Order – 2.1 for the period 1st January 2015 to 31st December 2018 (Order No.NERC/135) of 2015 14.

733 Paragraph 18(h) Multi Year Tariff Order for Port Harcourt Electricity Distribution Company for the Period 1st January 2015 to December 2024(Order No NERC/142.10) of 2016.

734 Nigeria Electricity Regulatory Commission Quarterly Report (Second Quarter) of 2019 32 – 33.

mechanism to discourage rejection and encourage investment in distribution networks,[735] may not necessarily achieve those goals until the appropriate network expansion is carried out in the transmission and distribution network.

4.5 REGULATORY CONSTRAINTS OF THE TRANSMISSION SEGMENT

The TCN is the transmission licensee licensed to carry out transmission,[736] system and market operations through three interdependent entities namely; Transmission Service Provider (TSP), System Operator (SO) and Market Operator (MO). Their constraints can be categorized into three namely; investment & governance, technical issues and lack of independent System Operator.

4.5.1 Investment Planning, Execution and Governance Issues

As noted earlier in this study,[737] the privatization framework of the TCN was a concession/management contract to private investor, as opposed to divestiture and sale to private investors adopted for other unbundled government assets like the Gencos and Discos. However, according to TCN, the concession arrangement failed principally because of the absence of the required level of expertise expected from the manager (Manitoba Hydro), and lack of understanding of the business terrain by the manager. TCN suggested that the FGN should have adopted a pilot scheme approach to the TCN reform.[738] There were also reports of government undue influence on the management of TCN. The Manager eventually handed over TCN back to the FGN in 2016 at the expiration of the Concession Agreement.[739]

Following the failure to renew the contract of Manitoba, the FGN completely reversed the privatization policy of the transmission segment by undertaking the administration and management of TCN. This position is in conflict with the rationale and objective of the reform given government previous management failure with public enterprises. There is a strain of argument in transmission ownership which suggests that investment adequacy should be one of the primary requirements for identifying suitable transmission ownership arrangement to achieve competitive wholesale, retail

735 Nigeria Electricity Regulatory Commission Quarterly Report (Second Quarter) of 2019 33.
736 Please see Chapter 3 page 122.
737 Please See Chapter 3 page 136 - 137.
738 Transcript of interview with Transmission Company of Nigeria (Conducted in Energy House Abuja 5 September 2019) 6.
739 Okafor C “TCN management returns to FG as Manitoba exits” (31 July 2016) This Day online: https://www.thisdaylive.com/index.php/2016/07/31/tcn-management-returns-to-fg-as-manitoba-exits/ (Date of use: 30 March 2020).

market and effective regulation of monopoly networks.[740] If the past record of the FGN in utility management is anything to go by, it is doubtful if the FGN is suitable for the ownership role.

The post privatization experience of this segment of NESI reveals the magnitude of the investment requirement in the transmission network in Nigeria. This is largely due to the need to replace aging infrastructure and the need for transmission network expansion to accommodate the increased power generation capacity. Interestingly, it does appear that the FGN is leveraging on its government status to secure substantial funding and financial support for investment in the rehabilitation and expansion projects of TCN which might otherwise not be easily accessible for private investors. Notwithstanding, there are challenges with the implementation of the expansion plan and there are still obvious and typical governance challenges associated with government owned asset impacting on increasing capacity and ensuring grid reliability.

The FGN's policy intervention in the transmission segment in the 2010 Roadmap recognized that projected transmission capacity will lag behind the projected generation capacity without necessary investments. Consequently, to avoid stranded energy generated as a result of lack of evacuation, the FGN proposed a 30% increase in the transmission capacity of the country's 330KV network which stood at 4,500MW, between July 2010 and April 2011.[741] The FGN later realized that without re-planning and completing a whole range of new/ongoing TCN short-to-medium term system reliability and capacity expansion projects scheduled for delivery in 2014 – 2016 periods, transmission of power will be an impediment to power supply by 2015.[742] The TCN project delivery plan was unclear given the provision of a wide range of project financing sources made available to it which at that time included AFDB loan and budget allocations. Therefore, there was the utmost need to develop a clear plan for operational improvement for realizing grid reliability, particularly with respect to project delivery.[743] The absence of any regulatory mechanism for achieving these measures

740 Pollit M. "The Arguments for and against ownership unbundling of energy transmission networks" 2008 Energy Policy 704 – 713.

741 The Presidency of the Federal Republic of Nigeria Roadmap for power sector reform (August 2010) 42 – 44.

742 Presidential Task Force on Power (PTFP) "Maintaining service delivery & the early stabilisation of the infant privatised Nigerian Electricity Supply market (30 - 31 January 2014) http://www.power.gov.ng/Power%20Summit/PTFP%2020140130%20CPTFP%20Power%20Summit.pdf (Date of Use: March 31 2020) 23.

743 Presidential Task Force on Power (PTFP) "Maintaining service delivery & the early stabilisation of the infant privatised Nigerian Electricity Supply market (30 -31 January 2014)

clearly served as a constraint for the TCN to cohesively develop and realize projects that would have enhanced the grid reliability to properly evacuate and transmit power efficiently.

Subsequent to the failure of the Concession Agreement the transmission Manager in the privatized market, the FGN's PSRP 2017 intervention and resort to internal measures within the TCN were combined to forge mechanisms for TCN's investment plan. The new government management team of the TCN established the Transmission Rehabilitation and Expansion Programme (TREP) as a framework and strategy for investment planning. On the other hand, the FGN's PSRP also acknowledged that despite the evacuation of a record peak capacity of 5,074MW on February 2, 2016 by the TCN, its operation was well below international reliability and security standards. There were twenty-two (22) collapses and nine (9) partial system collapses in 2016[744] attributable to inadequate maintenance of outdated equipment and lack of a comprehensive and modern Supervisory Control and Data Acquisition (SCADA) system to ensure real time data and manage real time operation and control for maintaining balance in the power system.[745]

The government's plan is to secure financing from the World Bank and other international financial institutions to fund transmission infrastructure priority needs and investment and to ensure grid stability and sector governance. It sets a clear implementation plan namely; to identify and prioritize power plants to be supported to achieve the minimum 4,500MWh/Hour baseline transmission, preparation of transmission expansion plan by the TCN to be submitted for approval by the Regulator, publication of transmission expansion plan by the TCN, monitoring of the TCN implementation of transmission investment plan by the Regulator, preparation of annual operation plan by System Operator to include an assessment of expected transmission and system security constraints and annual update of transmission expansion plan by the TCN.[746] It became clear that the entire infrastructure need for

http://www.power.gov.ng/Power%20Summit/PTFP%2020140130%20CPTFP%20Power%20Summit.pdf (Date of Use: March 31 2020) 24 – 25.

744 Federal Republic of Nigeria "Power Sector Recovery Programme 2017 – 2021 (January 2018)" online: https://mypower.ng/wp-content/uploads/2018/02/PSRP-Master-Document-January-2018.pdf (Date of use: 12 February 2020) 16.

745 The World Bank "Programme for results information document concept stage" (29 June 2017) online: http://documents.worldbank.org/curated/en/266341497992825758/pdf/Nigeria-Power-Sector-Recovery-P4R-Concept-Stage-PID-8-3-2017.pdf (Date of use: February 7 2020) 6.

746 Federal Republic of Nigeria Power Sector Recovery Programme 2017 – 2021 (January 2018) online: https://mypower.ng/wp-content/uploads/2018/02/PSRP-Master-Document-January-2018.pdf (Date of use: 12 February 2020) 31.

the TCN's grid stability rests on the investment adequacy and implementation of plans geared towards it. The subsequent issuance of detailed transmission expansion plan[747] in December 2017 by TCN as well as the issuance of TREP[748] was directed at providing infrastructure solution.

The FGN and TCN appeared to have leveraged on the government ownership arrangement to secure finance to execute the TCN's expansion projects identified in the plan, a remarkable effort considering the liquidity problems of the industry due to the performance and cost-reflection crisis. The TCN identified lines and substations projects for development as part of its first phase investment plan namely; Nigeria Transmission Expansion Project (NTEP) valued at $410 Million to be supported by the AFDB, Nigeria Electricity Transmission Access Project (NETAP) valued at $486 Million to be supported by the World Bank, WAPP North Core Transmission Project valued at $29 Million to be supported by the World Bank, Lagos/Ogun Transmission Infrastructure Project valued at $200 Million to be supported by JICA, Abuja Transmission Ring Scheme valued at $170 Million to be supported by the AFD, and Northern Corridor Transmission Project valued at $274 Million to be supported by the AFD and the EU.[749]

The TCN also secured the sum of $486 Million for NTEP and $29 Million for WAPP North Core Transmission Project from the World Bank[750] and obtained an approval for $210 Million for NTEP from AFDB.[751] In addition to these loans, the FGN had also directly obtained $3 Billion from the World Bank to finance the expansion of transmission and distribution networks.[752] Laudable as this is, the FGN's approach

747 Transmission expansion plan development of power system master plan for the Transmission Company of Nigeria of 2017 online: https://tcnpmu.ng/pmu_assets/pmu_files/2018/02/Final-Report-Text.pdf (Date of use: March 31 2020).

748 Transmission rehabilitation and expansion program (February 2017) online: https://tcn.org.ng/repository/projectdocuments/Transmission%20Rehabilitation%20and%20Expansion%20Program%20(TREP).pdf (Date of use: March 31 2020).

749 TCN "Transmission rehabilitation and expansion program" online: https://tcn.org.ng/repository/projectdocuments/Transmission%20Rehabilitation%20and%20Expansion%20Program%20(TREP).pdf (Date of use: 31 March 2020).

750 Financial Services Monitor Worldwide "World Banks Bailout to Nigerian Power Sector Hits N1.3bn In Four Years (24 October 2019) online: https://search.proquest.com/docview/2307956020?accountid=14648 (Date of use: 1 April 2020).

751 The Punch "AFDB Approves $210m Power Transmission Projects for Nigeria (28 November 2019) online:https://punchng.com/afdb-approves-210m-power-transmission-projects-for-nigeria-2/ (Date of use: 1 April 2020).

752 Energy Monitor Worldwide "Nigeria Secures $3 Billion Loan to Improve Its Power sector, but will that Solve the Problem" (October 22 2019) online: https://search.proquest.com/docview/2307393989?accountid=14648 (Date of use: 1 April 2020).

runs contrary to the concept of utility privatization which was designed to stem the tide of government inefficiencies in managing utilities. This new approach supports the idea that it enables government to gain access to international concessionary and commercial credit that would be denied to small local entrepreneurs[753] or private investors.

It is doubtful that without this government intervention in the transmission segment, the private investors would have been able to secure the significant amount of loan facilities for transmission expansion projects.[754] However, what is not in doubt is that private sector discipline is required for the management and financing of the transmission projects particularly to recover substantial portion of the capital investments through revenues generated from the use of the network/grid (charges, Transmission Use of System paid by users of the grid). Although the transmission charge is guaranteed by the tariff adjustment mechanism (MYTO),[755] TCN has not been generating sufficient revenue arising from factors such as, the Regulator's delayed review of the transmission tariff established by the transmission MYTO created in 2012 (only reviewed in 2015 and 2019 since the start of privatized market), and the continuing financial crisis in the sector which has prevented the Discos from remitting market money including the transmission charge(the Discos owes TCN money).[756] Again, it must be emphasized that no amount of money spent by the TCN on capacity increase will solve the transmission constrain without commensurate investment in the distribution segment, a point conceded by TCN itself.[757]

With respect to planning and execution of projects, there are indications from the Regulator that some of the TCN's projects are being executed for political considerations as against technical necessity and requirements and that there exist

753 Nellis JR Public Enterprises in Sub-Saharan Africa (World Bank Discussion Paper No. 1 "Washington DC: World Bank November 1986) 12 – 16.

754 The Presidency of the Federal Republic of Nigeria Roadmap for power sector reform (August 2010) 44.

755 Nigerian Electricity Transmission and Institutional Charges Multi-Year Tariff Order (May 31 2012) of 2012.

756 The Punch "N270bn Debt: Reset Discos' Books TCN Tells NERC (28 September 2019) online: https://punchng.com/n270bn-debt-reset-discos-books-tcn-tells-nerc/ (Date of use: April 1 2020).

757 Asu F and Nnodim O "Grid expansion meaningless without recapitalisation of Discos-TCN" (11th December 2018) The Punch online: https://punchng.com/review-discos-performance-now-electricity-workers-tell-fg/ (Date of use: April 1 2020).

managerial incompetence within TCN. When asked about the challenges of TCN, the Regulator opined as follows:

> "*Probably their biggest challenge is funding, next will be internal capacity. There are two/three essential operations of transmission service, there is the physical wire business-the transmission service, the one with license to put in the infrastructure, the heavy voltage transformer and lines etc, then there is the system operator that handles the issue of dispatch, then the market operator that is embedded within the system operation, and you will find out over the years so far that they have not shown competence, especially through system operation. There was a time when the government concession to a contractor to run it, we felt it that they were doing better, we had less system collapse, we had better management of funds even though it was under government and the expectation was that over time they should be able to transfer the expertise and knowledge to the TCN staff but that did not happen, because there was not much synergy between the foreigners and the Nigerians.*
>
> *The government at a time insisted that it had to appoint its own market operator because in Nigeria we are always concerned with who holds the purse even though part of the Agreement was that there will be a market operator so foreign entity was made redundant to an extent then the contract was terminated. So I think if TCN can be adequately funded and if they can have the right people in the right place. Considering the volume of money they require and the volume of money they have and the kind of contract they do, they need people with exceptional project management skills because you will find out they have abandoned projects all over, and there is not much synergy or cohesion in the way the projects are done, a number of them are done for political considerations not because we need them.*
>
> *Now in the Benin area, where you have Azura and the rest, you have so much stranded power within the area, the transmission capacity is not there, in places where power is needed they cannot get it and it is mainly due to transmission problem and they also don't seem to work hand in hand with the disco. The*

disco may like have capacity somewhere and TCN will be building capacity elsewhere. These to me essentially are their challenges."[758]

It is observed that the regulatory environment does not encourage a proper control of TCN by the Regulator. Clearly, in the absence of a regulatory mechanism setting out investment plans and execution, execution of infrastructure investment will be flexible and easily distorted for sectional purposes and gains other than technical viability.[759] For instance, during the budgetary allocation process to the TCN, a process largely controlled by the legislators (National Assembly), the legislators lobby TCN to execute projects in their constituency or places of interest in exchange for budgetary approvals. The result is that projects may be executed in such areas that have little or no economic value for the Discos operation or areas with limited energy demand.[760] It is not surprising that a Disco will refuse to take an injection substation built by FGN.[761] The existing mechanism in the Grid Code to ensure proper placement of transmission capacity in the TCN expansion plan, which requires the validation of the Discos' demand study or securing funding for projects, is not enough,[762] without insulating the TCN from government interference to ensure that capacity is technically and evenly distributed at all levels.

4.5.2 Technical Issues

Most of the technical challenges confronting the TCN are traceable to the poor infrastructural state of the segment. The industry's Grid Code, Distribution Code and Metering Code are all designed to ensure high quality and reliable electricity supply and a reliable grid. However, implementing the available regulatory mechanisms power transmission mainly in areas such as system planning, energy dispatch, voltage and frequency regulation constitutes a major challenge for the System Operator and the system users particularly the Gencos and the Discos. This is due to the numerous technical challenges of the transmission network.

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758 Transcript of interview with Nigeria Electricity Regulatory Commission, Market Rate and Competition unit NERC Office, Abuja (6 December 2019) 8 – 9.

759 There is an attempt to amend the Reform Act to reflect a better control of the TCN with respect to investment plans and execution.

760 Transcript of interview with Nigeria Electricity Regulatory Commission, Market Rate and Competition unit NERC Office, Abuja (6 December 2019) 10 – 11.

761 Transcript of interview with Transmission Company of Nigeria conducted at Energy House, Abuja (5 September 2019).

762 Transcript of interview with Nigeria Electricity Regulatory Commission, Market Rate and Competition unit NERC Office, Abuja (6 December 2019) 11 – 12.

The TCN's description of its technical issues borders on transmission losses which are occasioned by its long range network, lack of infrastructure such as Feeders, substations and adequate power lines, single circuit lines as opposed to double circuit and the radial nature of the network which makes it non redundant and unreliable.[763]It emphasized the need for double circuit lines as opposed to the aging single circuit line in use for maintenance purposes so that if one line is to be maintained, the other circuit ought to be able to transmit power to everywhere until the other line is restored.*[764]*

The TCN also emphasized significant power generation (generating stations) deficit and load balancing challenge in the TCN planning regions (the exception of Benin and Port Harcourt) as part of its constraints. This is because energy demand exceeds the available power generation arising mainly from the concentration of power generation in the South of the country (thermal stations in Port Harcourt, Enugu, Benin and Lagos) and Central West (hydro stations in Jebba, Kainji and Shiroro). The absence of generating stations in the Central, North and North East parts of the country results to transmission challenges.[765] Since the load demand is mainly in the areas with the concentration of generating stations (South and South West), to supply load in the areas with little or absence of generating stations such as the North East, long 330KV transmission lines are built to connect these areas. As a result, voltage regulation becomes an issue for the System Operator because of the excessive reactive power flowing through the lines which necessitates large reactive power compensation equipment (reactors) at the corresponding substations.[766]

At the distribution interchange with the transmission network, some of the 132KV/33KV lines and transformers which interface with the Discos are overloaded causing equipment failure and disequilibrium. This is mainly due to the fact that electricity consumption of the Southern Discos is much higher than the Discos located in the North. Seventy three percent (73%) of the electricity is consumed by Discos in

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763 Ajao K.R. et al "Electricity Transmission Losses in Nigeria Power Sector: A Smart Grid Approach" 2016 (4) ATBU Journal of Science, Technology & Education 53.

764 Transcript of interview with Transmission Company of Nigeria conducted at Energy House, Abuja (5 September 2019) 4 – 5.

765 Transmission Company of Nigeria (TCN) "Transmission Expansion Plan Development of Power System Master Plan for the Transmission Company of Nigeria" (December 2017) online: https://tcnpmu.ng/pmu_assets/pmu_files/2018/02/Final-Report-Text.pdf (Date of use: 31 March 2020) 2.

766 Transmission Company of Nigeria (TCN) "Transmission Expansion Plan Development of Power System Master Plan for the Transmission Company of Nigeria" (December 2017) online: https://tcnpmu.ng/pmu_assets/pmu_files/2018/02/Final-Report-Text.pdf (Date of use: 31 March 2020) 2.

the South while twenty seven percent (27%) is consumed by Discos in the North.[767] There is a host of other more complex technical and engineering issues preventing an efficient power transmission beyond the scope or competence of the study for which a foray into engineering discuss will be required. However, since the purpose of this study is to bring to the fore the regulatory mechanisms that will better serve the value chain supply of NESI through appropriate implementation; we have confined the study of the technical issues to the fragmented part affecting regulatory controls of the transmission network.

The effects of the technical issue is the resulting load imbalance and disequilibrium, frequency and voltage poor control and system collapse all of which are associated with failing equipment. The TCN would rather suggest that system collapse occurs as a result of energy rejection by the Discos which creates system balancing challenges and result to high voltages. It is said that when the limit of the TCN's capacity is overstretched by high voltages, the Gencos are requested (by the System Operator) to reduce their generation capacity and in the event that the Gencos are unable to respond promptly, it leads to partial or total transmission system collapse.[768] The Gencos equally have their commercial and technical challenges with such frequent and unexpected requests from the TCN (as we shall discuss under their constraints).

As at 2019, a total of seventy four (74) total system collapse and twenty four (24) partial collapses had been recorded between November 1, 2013 and February 28, 2019.[769] Of course, the damaging effect of the SO's frequent instruction to reduce or increase load to the Gencos (ramp up and ramp down instruction by the TCN)[770] is impacting on the Gencos' operational efficiency as well as the Grid Code's implementation.

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767 Transmission Company of Nigeria (TCN) "Transmission expansion plan development of power system master plan for the Transmission Company of Nigeria" (December 2017) online: https://tcnpmu.ng/pmu_assets/pmu_files/2018/02/Final-Report-Text.pdf (Date of use: 31 March 2020) 27.

768 Transcript of interview with Transmission Company of Nigeria conducted at Energy House, Abuja (5 September 2019) 4 – 7.

769 Asu F "Blame game rocks power sector five years after privatisation" (21 March 2019) The Punch online: https://punchng.com/blame-game-rocks-power-sector-five-years-after-privatisation/ (Date of use: 3 April 2020).

770 Asu F "We are being forced to reduce generation – power firms" (29 October 2018) The Punch online: https://punchng.com/were-being-forced-to-reduce-generation-power-firms/ (Date of use: 3 April 2020).

The provisions of the Grid Code regulating load and demand forecast, expansion planning, conditions for grid connection, data acquisition by SO from users, power system control, load dispatch, frequency and voltage regulation are all designed to prevent load imbalances, load rejection, grid frequency and voltage fluctuations beyond the regulated limit. Notwithstanding these regulations, technical and operational problems have persisted as shown by the Regulator's report on four Key Performance Indicators for the TCN namely; transmission losses, system collapse, grid frequency and voltage fluctuations. Transmission losses remain high, increasing number of recorded incidences of system collapse, grid frequency remains above regulated limit, and voltage continues to fluctuate high and below the regulated limits.[771]

The reason for the persistent technical and operational failure of the TCN also lies in the poor implementation of the Grid Code as well as lack of enforcement and compliance with the provisions for administering the transmission network in the Grid Code. For example the application of sanctions by TCN for breach of Market Rules and Market Participation Agreement on defaulting Discos (encouraged compliance in some cases)[772] have proven to be an effective regulatory mechanism for deter errant Discos from breaching market rules.

To ensure grid stability and reduce incidents of system collapse arising from frequency and voltage fluctuations, the SO's directed the Gencos to adopt a Free Governor Control mechanism in their power plants.[773] The Governor is an important controller in the power plant which regulates the turbine speed, power and participates in the grid frequency regulation.[774] According to the Grid Code, frequency must be maintained at 50 Hz, but could be controlled within a tolerant level of +/- 0.5% (49.75 – 50.25) at least 97% of the time, during normal conditions, while under stress, could be controlled within the limits of 50 Hz +/- 2.5% (48.75 – 51.25 Hz).[775]

771 Nigeria Electricity Regulatory Commission Quarterly Report (Second Quarter) of 2019 28 – 31.

772 The Daily Post "TCN Speaks on Suspension Slammed on Discos" (11 August 2019) online: https://dailypost.ng/2019/08/11/tcn-speaks-suspension-slammed-discos/ (Date of use: 2 April 2020).

773 TCN "TCN & Gencos Collaborate to Improve Grid Stability" (3 June 2017) online: https://www.nsong.org/MediaPublicity/NewsDetails?NewsID=73 (Date of use: 2 April 2020).

774 Xavier P and Muthukumar S. Frequency Regulation by Free Governor Mode of Operation in Power Stations (International Conference on Computational Intelligence and Computing Research 2010) 1

775 Paragraph 15.3 of the Grid Code for Electricity Industry of Nigeria of 2014 70.

The SO also adopt the mechanism of incentivizing the Gencos by prioritizing dispatch from Gencos whose generating plants operate on the Free Governor mode through its Merit Order.[776] However, the SO's intervention has not been effective enough to stem the tide of system collapses arising from out of control frequency limit. Therefore, there is a need to further explore regulatory measures outside of the SO's regulatory mechanism to resolve this technical challenge particularly given the complete non-responsiveness of the Regulator to this issue. This will require the SO to concede to its own limitations in grid stability and energy dispatch and to dispassionately take into consideration the challenges of the Gencos in synchronizing their operations with the grid.

Another regulatory mechanism initiative by the TCN to resolve the problem is the attempt to activate the procurement of spinning reserve[777] pursuant to its ancillary services obligation as a transmission licensee in the industry. The applicable tariff adjustment mechanism (MYTO) on transmission allows TCN to charge for ancillary services as part of the TUOS.[778] Because it was determined by a TCN committee that the tariff for the spinning reserve is inadequate, the Gencos are unwilling to provide it.[779] Therefore, TCN applied for the ancillary service rate review in the Tariff Order (MYTO) on transmission under the extraordinary tariff review process to enable SO procure adequate spinning reserve from Gencos for grid stability. Upon the application, the Regulator directed TCN to undertake a competitive procurement process for the spinning reserve and had since reviewed the process carried out, determined its compliance with due process and ready to incorporate the cost in Tariff Order (MYTO) on transmission.[780]

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776 Paragraph 3 of Order on the Mandatory Dispatch of Hydro Power Plants in the Nigerian Electricity Supply Industry (Order No.NERC/182/2019).

777 Spinning reserves is a mechanism to ensure power system security by which generating units running without load can be made to synchronize to the system and pick load within microseconds to cancel the effect of the tripped generating unit on the system frequency that may cause a system collapse

778 NERC "The Guide for the Review, Approval and Monitoring of Integrated Power System Plans in Nigeria" (November 2019) The+Guide+for+Integrated+Power+System+Planning+in+Nigeria_V1 (1).pdf (Date of use: 2 April 2020).

779 Transmission Company of Nigeria (TCN) "Transmission Rehabilitation and Expansion Program" (February 2017) online: https://tcn.org.ng/repository/projectdocuments/Transmission%20Rehabilitation%20and%20Expansion%20Program%20(TREP).pdf (Date of use: 31 March 2020) 3.

780 NERC "Consultation Paper on the Proposed Extra-Ordinary Tariff Review of the MYTO-2015 Tariff Order for the Nigerian Electricity Supply Industry" online: file:///C:/Users/HP-PC/Downloads/CONSULTATION+PAPER+ON+EXTRAORDINARY+TARIFF+REVIEW+-+Feb+2020.pdf (Date of use: 2 April 2020).

The mechanism may be sound and implementable for ensuring grid stability but it is important to also reiterate situating the implementation within the larger financial troubles of NESI in terms of how to generate sufficient revenue from the distribution segment ought to be first considered.

4.5.3 Unbiased System Operator

The neutrality of the System Operator (SO) and the Market Operator (MO) in the administration of the Grid Code and the Market Rules is of utmost importance in ensuring power transmission efficiency. The SO and MO are both licensed market participants in NESI, with shared disciplinary responsibilities with the Regulator. They are also interdependent bodies within the TCN (a licensed operator). While the reform Act gives the Regulator the power to establish technical codes and manuals required to operate a reliable grid like the Grid Code, the SO is given the power to enforce the provisions of the Grid Code in accordance with Rule 45 of the Market Rules, guidelines from the Regulator and Grid Connection Agreements.[781] By the provision of Rule 45 of the Market Rules, the SO's enforcement powers in the Grid Code are complimented by its power to ensure compliance to the Grid Code in the Market Rules.[782]

In ensuring compliance with the Grid Code, the SO is required to submit a complaint against any breaching market participant to the MO, while a participant with evidence that another participant is in breach of the Grid Code and Market Rules may equally file a complaint with the SO or the MO as the case may be. Complaints against SO and MO when in breach are lodged with the Stakeholder Advisory Panel, a creation of the Regulator.[783] In all the cases of breach of the Grid Code or the Market Rules, the MO is given disciplinary power over any market participant by issuing directives to comply with the Grid Code or Market Rules, or to cease to carry out conduct constituting the breach. It can impose reporting obligation on the participants, impose financial penalties, issue non-compliance letter or take any other action in accordance with the Market Rules or Grid Code.[784]

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781 Paragraph 2.3 Grid Code for Electricity Industry of Nigeria of 2014 10.

782 Rule 45 Market Rules for the Nigerian Electricity Supply Industry of 2014 183.

783 Rule 45.1.3 – 45.1.5 of Market Rules For the Nigerian Electricity Supply Industry (December 2014) of 2014 183 – 184.

784 Rule 45.2 of Market Rules For the Nigerian Electricity Supply Industry (December 2014) of 2014 184 – 186

The extensive enforcement and disciplinary powers given to the SO and MO are shared regulatory roles with the Regulator and ought not to be exercised by government-owned licensed participants who may be conflicted given their dual capacity in the electricity market (participant and regulator). Regulatory independence and accountability in any utility reform is usually a key to maintaining consistency in policy in the interest of the public.[785] It is also necessary to minimize the risk of lack of regulatory credibility which will erode confidence in the government commitment to liberalization and transparency.[786]

It is important to insulate these technical agencies from any form of governmental interference to instill confidence in the electricity market and to ensure neutrality in regulatory decisions. The Discos consider the current procedure by which the Regulator relies on the SO and MO for market data verification as one of the fallout of the anomaly.[787] Arising from government's poor utility management and lack of emphasis for corporate governance in public institution, the Gencos also consider the SO and MO as lacking in the required specialized skills for market operation. The Genco's perception is based on the lack of restraint displayed by the staff of the SO who they believed are oblivious of the business impact of their frequent instructions to increase and decrease energy produced from their generating plants to regulate frequency and voltage of the grid when maintaining load balance. Consequently, regulatory mechanism for continuous capacity building to ensure strong regulatory substance is fundamental to guarantee a good technical regulator.[788]

There is the need for an Independent System Operator without government control. Fortunately, there is a provision of the Act which enables the Regulator to transfer the function of TCN regarding system operation to an independent system operator (consisting of SO and MO) upon its directive when NESI has become substantially

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785 Cambini C and Franzi D "Independent Regulatory Agencies and Rules Harmonization for the Electricity Sector and Renewables in the Mediterranean Region" 2013 (60) Energy Policy 181.

786 Cambini C and Franzi D "Independent Regulatory Agencies and Rules Harmonization for the Electricity Sector and Renewables in the Mediterranean Region" 2013 (60) Energy Policy 181 – 182.

787 Transcript of interview with the Association of Nigeria Electricity Distributors conducted through phone chat (11 December 2019) 4.

788 Eberhard A. the Independence and Accountability of Africa's Infrastructure Regulators: Re-Assessing Regulatory Design and Performance (Keynote address 4th Afur Annual Conference Livingstone, Zambia 25 April 2007) 6 – 7.

privatized.[789] Beyond the consultation paper issued by the Regulator on the scope and framework for an independent system operator in May 2015,[790] nothing has been done in this regard even when the Regulator acknowledged the potential interference of TCN into the activities of the SO and MO.

4.6 POWER GENERATION REGULATORY CONSTRAINTS

The ineffectiveness of the contracts that are meant to ensure the smooth operation of the value chain is the main constraint of this segment. The contracts are the various Power Purchase Agreements signed by the Gencos with NBET, which contains the terms and obligations of the Gencos and NBET and also underpin other agreements and instruments (Gas Supply Agreement, Gas Transportation Agreements, Letter of Credit) for gas supply to the Gencos.

Unfortunately, due to the fact that electricity trading in the Transition Electricity Market (TEM) is based on contracts, introducing regulatory mechanisms by the Regulator to solve some of the Gencos' constraints may be perceived as an unnecessary interference in contractual arrangement. The dominant issue surrounding the activities of the Gencos is the ineffectiveness of the Power Purchase Agreement signed by them. The resulting effect of this issue is seen in the gas challenge, expansion/performance disincentive, lack of payment security, lack of funds and cash flow, and lack of verifiable data, prevailing in the market. There is also the challenge attributed to the poor performance of the transmission and distribution segments that constitutes an impediment for efficient energy dispatch.

The focus of this aspect of the study and the interview conducted with the Regulator and the market participants is to have an in-depth knowledge of these constraints from an operational and market perspective for a better understanding of the Gencos' performance limiting factors. It seeks to identify areas that require regulatory mechanism for solution.

4.6.1 Ineffective or Non-Active Contracts

The Gencos' trading arrangement in the privatized market is based on contracts with back-to-back securitization provisions which are designed to minimize risk and

789 Section 26(7) of Electric Power Sector Reform Act, (CAP A77 Laws of the Federation of Nigeria) of 2005.

790 Nigerian Electricity Regulatory Commission (NERC) Draft Consultation Paper on the Terms and Conditions for Establishment of an Independent System Operator (ISO) (May 2015).

guarantee payment for gas suuplied to Gencos for energy production, and energy dispatched to the grid by the Gencos for seamless market operation. NBET which was set up as a credit worthy off-taker to buy bulk power from the Gencos and sell to the Discos enters Power Purchase Agreement (PPA) with the Gencos comprising of both the thermal plants (including IPPs and NIPPs), and hydro plants. The PPA was originally proposed to be backed by the FGN's sovereign guarantee [791] but was replaced by the off-taker approach through the creation of NBET.

However, key aspects of the PPA have been rendered ineffective, non-active and misinterpreted such that the provisions on billing, payment and prices are affected because of the non-satisfaction of conditions precedent required of the parties to the PPA.[792] The PPA makes provisions for the activation of rights and obligations of the parties to be subject to the satisfaction or waiver of some conditions precedent (except some identified clauses that will be in operation until the satisfaction of the conditions), one of which is the provision of payment security by NBET for energy procured and also a provision for the Gencos to enter Gas Supply Agreement (GSA) and Gas Transportation Agreement (GTA) with gas suppliers subject to the review and approval of NBET.[793]

The PPA also makes provisions for the Gencos' invoices to cover both capacity payment and energy payment.[794] Barring any limiting factor specified by the PPA, capacity payment must be paid and ought to be calculated in reference to the available capacity of the plant that reflects as separate elements of the capital cost recovery payment for the plant and fixed operation and maintenance payment as defined by the PPA. The energy payment is the amount payable for net electrical output of the plant.

Operationally, these provisions in the PPA dealing with payment security as a condition precedent and capacity payment have not been contractually satisfied for various reasons advanced by the relevant parties. First, it must be noted that not all on-grid Gencos are affected by these ineffective clauses, some Gencos at the start of the privatized market had valid existing GSAs arising from the cross-ownership they share with their gas suppliers and so it was easy for NBET to fully activate their PPAs.

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791 Owonubi O. et al Nigeria:Power Sector Reform Roadmap (Vetiva Capital Management 2010) 2.

792 NBET 'NBET Power Purchase Agreement' (30 January 2017) online: file:///C:/Users/HP-PC/Downloads/NBET-PPA-.pdf (Date of use: 10 April 2020).

793 NBET 'NBET Power Purchase Agreement' (30 January 2017) online: file:///C:/Users/HP-PC/Downloads/NBET-PPA-.pdf (Date of use: 10 April 2020) Schedule 1 – 8.

794 NBET 'NBET Power Purchase Agreement' (30 January 2017) online: file:///C:/Users/HP-PC/Downloads/NBET-PPA-.pdf (Date of use: 10 April 2020) 62.

Other Gencos like hydro plants and some NIPPs are not also faced with gas-related and contract activation issues, mainly because hydro plants do not use gas while NIPPs by reason of their creation had in existence valid GSAs. However, Gencos (legacy Gencos) who are predominantly thermal plants and are more in numbers, have their separate PPAs and are affected by these contract issues. In effect, any Genco who fails to contract a valid GSA with a gas supplier (a condition precedent for PPA activation) cannot rely on the PPA to enforce NBET to provide a similar payment security for energy procured from it.

Secondly, upon the commencement of operations in the privatized market, NBET could not meet up with its payment obligation in the PPAs due to the failure of the Discos to equally provide a similar payment security as provided in their Vesting Contracts with NBET by posting Letters of Credit in favour of NBET. Due to this absence of payment security along the value chain, NBET has not been remitting full payment for energy purchased from the Gencos. In January 2020, NBET only paid an average of 30% of the Gencos' monthly invoices submitted to it as shown in Table 21 leaving the Gencos out rightly exposed without any security for payment.

The main issue here seems to be fluid going by the responses from the Regulator and the parties. The interpretation of the PPAs by the affected Gencos is that NBET is obligated by the PPAs to provide payment security for them and that the fact of Discos' failure to provide NBET with similar payment security cannot be an excuse for avoiding its obligation under the PPA. They are equally of the view that NBET's unwillingness to carry out this obligation negates its purpose of establishment which is to provide guarantee for the Gencos' payment in the privatized market.[795]

Relatedly, the payment security challenges has been further accentuated by the refusal of NBET to make capacity payment[796] (a component of the Gencos' price invoice), to the Gencos. NBET's ground for taking this position is that it cannot make capacity payment to a Genco to enable it recover cost for such capacity that has not been incurred or committed to incur considering the fact that the affected Gencos are

795 Transcript of interview with Association of Power Generating Companies, Abuja office, Abuja (5 September 2019) 10.

796 Gencos Heartbeat Five Years After- Assessing the Successes and Challenges in Operating a Genco in the Nigerian Electricity Supply Industry (NESI) (Volume 2 series 2) 15.

operating without GSAs or valid GSAs which would have ensured that they provide their gas suppliers with payment security (Letters of Credit).[797]

The above scenario throws up some contractual related issues which are stated as follows:

a. Is the obligation of NBET to satisfy its payment guarantee requirement of the PPA subject to the satisfaction of other conditions in the agreement or any other agreement?

b. Is there any exculpatory element in the PPAs by which NBET can evade capacity payment which is a component of the Gencos' prices?

The answer to the first poser can be found in the PPA which makes the rights and obligations of the parties subject to the satisfaction of the conditions precedent contained in Schedule 1 of the contract. It requires each party to do a number of things including procuring a legally binding and enforceable GSA and GTA, for NBET's approval, and the provision of payment guarantee by NBET. These conditions precedent were expected to have been satisfied within a prescribed number of days (Target Closing Date) upon the execution of the PPA subject to an extension in the event that a party in delay gives reasons for the delay or in the absence of which, parties can mutually agree on an extension which shall not exceed a certain number of days (Long stop Closing Date).

Any breach or failure to satisfy these conditions is a ground for the termination of the PPA. If it is a breach by the Genco, NBET is entitled to liquidated damages and can draw or make demand under a Development Security provided in the contract, subject to the right of the Genco to dispute same if the breach was due to NBET's failure to satisfy a condition precedent, for which NBET is primarily responsible for under the PPA. These provisions of the PPA is to ensure that both the Genco and NBET jointly satisfy their corresponding obligations to satisfy the conditions precedent before a specific date (the Long Stop Date) set out in the contract, without one taking priority over the other. Therefore, it is difficult to ascertain how the satisfaction of the conditions precedent by both sides is to be modulated in the operation of the privatized market.

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797 Transcript of interview with First Independent Power Limited, Trans Amadi office, Port Harcourt, (11 December 2019) 5 – 6.

The highlights of the interview with the parties, shows the existence of the following scenarios in the privatized market:

i. Some Gencos provided GSAs and GTAs for approval by NBET, in satisfaction of the condition precedent while others failed to do so;[798] and

ii. In either of the two cases, NBET failed to provide payment guarantee in satisfaction of the condition precedent.

iii. There are in existence a certain class of Gencos (identified above) who have valid GSAs or existing valid GSAs, and on this basis, were provided with payment security.

A simple interpretation of the PPA shows that the failure of a Genco to provide a valid and enforceable GSA and GTA makes the Genco liable to pay liquidated damages for such breach to NBET. The Genco's PPA will also remain inactive if NBET elects to waive its right to terminate the PPA for the breach. For this reason, it is doubtful if such Genco can complain about NBET's failure to provide payment guarantee in accordance with the PPA, particularly taking into consideration that the PPA is also silent on what sanction is applicable to NBET for its failure to provide payment security as a condition precedent in the PPA. In the light of this interpretation, there is lack of conviction in the various concerns raised by the Gencos. The fact that some of the GSAs that were inherited after the sale of the government assets to them had expired, some GSAs were made on interim basis to enable the sale of the assets such that renegotiation of such GSAs will take time giving their less favourable market financial position (poor cash flow from partially settled invoice), cannot be a basis to avoid their obligation to enter valid GSAs in accordance with the signed PPAs[799]

However, with regards to Gencos who provided GSAs, GTAs, and also satisfied other obligatory conditions precedent in the PPA, NBET will be in breach of its primary responsibility if it fails to provide payment guarantee to such Gencos, notwithstanding, the failure of the Gencos in providing payment security and LC to their gas supplier. The subsequent approach of NBET has not been helpful in resolving the challenge. By introducing exemption clauses through PPA disclaimer, executing PPA Activation

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798 Transcript of interview with Nigeria Electricity Regulatory Commission, Market Rate and Competition unit NERC Office, Abuja (6 December 2019) 2 – 3.

799 Transcript of interview with First Independent Power Limited, Trans Amadi office, Port Harcourt, (11 December 2019) 5 – 6.

Agreement PPA (PPA Activation Agreement)[800] as precondition for the Gencos to assess FGN intervention funds,[801] cannot be an alternative to the provision of payment security. For this category of Gencos, a contractual solution in seeking the right interpretation of the terms of the PPA as well as giving a direction will be a valuable option for dispute resolution.

In view of these scenarios, the assertion by the Gencos that NBET is solely responsible for the ineffectiveness of the PPAs is not correct.[802] However, NBET's reason for not providing the payment security (Letters of Credit) to these Gencos on the pretext that the Discos (with whom it is contracted with through the Vesting Contract), had failed to provide it with corresponding Letters of Credit, runs contrary to the PPA trading arrangement. First, the doctrine of privity of contract does not envisage the imposition of obligations on anyone other than the parties to the contract.[803] Therefore, NBET cannot rely on the non- performance of obligations in its Vesting Contract with the Discos, as its defence for the non-performance of its obligation in the PPA with the Gencos, since the Gencos are not privies to the Vesting contract.[804]

Secondly, because there is no provision of the PPA requiring the provision of payment security by NBETas a condition precedent to the activation of the terms of the PPA, therefore, NBET cannot also import the provisions of a different contract as its condition for performance in the trading arrangement with the Gencos. It is absolutely desirable and necessary for the efficiency of the energy market for all parties to maintain the sanctity of the trading contracts. NBET had altered its market contractual position as an energy off-taker required to provide security for the Gencos' payment considering the reason given by it for the partial settlement of the Gencos' energy invoice. The Regulator has also refused to intervene on the ground that it is purely a

800 Gencos Heartbeat Developing a Viable Risk Matrix: Panacea to Sector Problems (Volume 3 issue 01) 16.

801 The Punch "Gencos Forced to Sign Weak Agreements" (13 October 2019) online: https://punchng.com/gencos-forced-to-sign-unpleasant-agreements-ogaji/ (Date of use: 14 April 2020).

802 Transcript of interview with Association of Power Generating Companies conducted at APGC Office Abuja (5 September 2019) 10.

803 Febson Fitness Centre & Anor v Cappa Holdings Limited & Anor (2014) LPELR-24055 (CA) 18 e- f.

804 United Bank for Africa PLC & Anor v Alhaji Babangida Jargaba (2007) LPELR – 3399 (SC) 19 d – f.

contractual dispute and any potential remedy should be sought within the contractual framework.[805]

Furthermore, the misinterpretation of the right of the Gencos to be paid for available capacity of their power plants as contained in the PPA further destabilizes the payment regime designed for the Gencos. The PPA provides for the Gencos' prices to include capacity[806] and energy payments.[807] The capacity payment is to capture all available capacity a Genco is ready to dispatch but unable to do so for reasons not attributable to it.[808] However, NBET has refused to make capacity payment to the Gencos for three reasons namely; overriding regulatory intervention,[809] inactive contract clauses and Gencos' failure to provide GSAs and/or lack of Letters of Credit to gas suppliers.

NBET position stems from the Regulator's inconsistency in the management of the privatized market operations. Contrary to the agreed components of the Gencos' prices in the PPA, the Regulator changed the definition of capacity payment in its Supplementary Order on Transition Electricity Market in March 2015.[810] It equalized capacity payment to energy delivered,[811] in effect, ensuring that capacity payment is no longer recognized as part of the component of Gencos' invoices. Regulating to redefine contract clauses to suit NBET's unwillingness to pay for capacity component of Gencos' payment is unjust and bad for credible commitment.

In the interview with the Regulator, it specifically agreed with NBET's position when it stated the following:

> "*There are certain conditions precedents to these contracts to be active. You are a thermal plant and you want to be paid for capacity and energy, you are using gas and you have a Gas Supply Agreement that is not effective. It means that you only receive this gas whenever, because there is no implication for the*

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805 Transcript of interview with Nigeria Electricity Regulatory Commission, Market Rate and Competition unit NERC Office, Abuja (6 December 2019) 2 – 3.

806 The PPA defines capacity as payments by buyer to seller that reflect as separate elements the capital cost recovery payment for the Plant and fixed operation and maintenance payment and energy payment as the amount payable for Net Electrical Output.

807 NBET 'NBET Power Purchase Agreement' (30 January 2017) online: file:///C:/Users/HP-PC/Downloads/NBET-PPA-.pdf (Date of use: 10 April 2020) 62.

808 NBET 'NBET Power Purchase Agreement' (30 January 2017) online: file:///C:/Users/HP-PC/Downloads/NBET-PPA-.pdf (Date of use: 10 April 2020) 45 – 46.

809 Supplementary Order on the Commencement of the Transitional Stage Electricity Market (TEM) (Order No. NERC/15/0011 March 2015) of 2015 3.

810 Rules For the Interim Period Between Completion of Privatisation and the Start of the Transitional Electricity Market (TEM) (December 2013) of 2013 5 – 7.

811 Supplementary Order on the Commencement of the Transitional Stage Electricity Market (TEM) (Order No. NERC/15/0011 March 2015) 3.

supply (since GSAs are usually on a Take or Pay basis). The supplier can decide not to supply you today since there is no contract and penalty for not supplying you so why am I paying for capacity. I am paying for capacity to enable you recover your fixed asset, cost, including this Agreement you have also with the gas supplier. if there are certain fixed cost attached to it and this fixed cost also are like the capacity payment because the gas contract are usually Take or Pay. So if you don't have an effective take or pay contract, I don't have an assurance that I will get supply consistently from you because you also don't have an assurance that you will get gas consistently. In the absence of that why should you also be entitled to capacity payment, but for those that have a contract like Azura, we take cognizance of the fact that in our tariff determination (they have a capacity in excess of 500MW) irrespective of whether it is fully dispatched or not there is a capacity payment which is being paid to it. If we don't pay, they will invoke their payment guarantee mechanism. As at today, ACU gas supplier has written to the Minister that they are going to call up their guarantee because Niger Delta Power Holding Company has failed to pay them for gas supplied. But if you don't have a contract you can't expect us to be providing money for nothing. How many of them have contracts, only five."

The Regulator further expressed what it considers as the rationale behind the Gencos' unwillingness to commit to the GSAs that will compel them to provide payment security (Letters of Credit) to the gas supplier when it stated:

"*It is their own problem because they are trying to avoid paying money. I know I have a plant of 500MW, I need a particular volume of cubic of gas, and if I sign this contract on 'take or pay', I know that whether my plant is running or not I will have to pay this particular volume but I know that my machine is good enough to fire 100MW so I am scared of entering into that contract because I know the consequences and of course, before the bulk trader will come and make these contracts active they will come and do an inspection (capacity testing) to determine if these your machines are firing up to capacity or capable from time to time at least on a quarterly basis. So if you sign a contract for 500MW and you know your machine can only produce 100MW, if they come and they determine it is only 100MW, the effect is that you contract for energy and capacity for only 100MW and not for the remaining 400MW. So I want to*

believe that a number of them are scared of that and that is why they are not very forceful about it. Some of them may also lack the financial capacity to provide LC cover because the gas companies will also demand for LCs, a guarantee which must be cash covered so that if you default they can just collect their money because for them it is investment. Also maybe the gas transportation infrastructure is not there then gas companies have to factor it into the contract with the Gencos. They have to find a means of recovering their money irrespective of whether the Gencos utilize the gas or not, they know that within this number of years of the contract period, they are assured of getting their money."

As reasonable as the above position is, it is not consistent with the provisions of the PPA. It is inconceivable that a party who is in breach of its obligation in a contract (NBET failure to provide guarantee) will seek to benefit from the same contract because of the other party's breach. While the Gencos should provide valid GSAs, NBET should equally provide payment security, none is conditional on the other, the obligations of the two parties reside pari passu.

To the extent that capacity payment is required to satisfy the costs borne by the Gencos in ensuring the availability of energy whenever it is needed (a globally and contractually recognized practice), the Regulator's perspective is justified. The effect of the failure of the Gencos to incur gas cost by entering valid GSAs and GTAs with the gas suppliers is such that they cannot be entitled to capacity payment. Notwithstanding this economic rationale for the lack of capacity payment, it is largely recognized that gas cost accounts for forty (40) – sixty (60) percent of power generation cost by thermal plants[812]but gas cost is not the only cost involved in power generation. One of the Gencos identified the depreciating cost of the plant, operating cost (labour/staff salaries), maintenance cost based on running hour not megawatt, as part of the costs not considered by the Regulator and NBET in taking this position.[813]

The better approach would have been to exclude gas cost required for each Genco and pay for the other costs associated with the capacity output of the Genco. It is doubtful that such approach will make sense to NBET considering that its failure to make such payment is due to its poor financial status because of revenue remittance

812 Transcript of interview with Gas Aggregation Company of Nigeria GACN Office, Central Area, Abuja (6 September 2019) 9.

813 Transcript of interview with First Independent Power Limited, Trans Amadi office, Port Harcourt, (11 December 2019) 5.

challenges from the Discos, therefore, cleverly relying on inactive clauses in the PPA as an excuse for non-payment may as well be the easy way out.

It is also observed that a more compelling point glossed over by the Regulator and NBET is the recognition of what actual available capacity represents as defined in the PPA and the Regulator's Order on Capacity Made Available,[814] for determining capacity payment. In line with the Interim Rule and the PPA provision on available capacity,[815] the Regulator defines capacity made available by the Gencos to include what it described as Deemed Capacity,[816] which is the fully running capacity of the Gencos declared to the System Operator (SO) for dispatch regardless of subsequent SO's instruction for reduction for grid stability. Therefore, it goes without saying that this verified and declared available capacity for which gas cost has been incurred ought to be paid for in full by NBET.

From the above, it is clear that there is no exculpatory element in the PPAs and the payment regime exempting NBET from making capacity payment to the Gencos. While the position taken by the Regulator and NBET maybe well-informed economically, same has no basis within the contract framework existing between the parties in view of the identified provisions of the PPA. On the whole, the need for regulatory mechanism is obvious giving that the contracts are incomplete.[817] To avoid contract misinterpretation, the regulator must learn to adopt simple and clear interpretation to contract terms and provide regulatory mechanisms to guide against misinterpretation by market operators with a view to stabilizing the energy trading arrangements.

The festering situation from the payment challenges seems to be the cause of other sector nagging issues such as gas constraints, expansion/performance disincentive, lack of funds and cash flow, and lack of verifiable data for the Gencos.

(a) Gas constraints

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814 Order on the Definition of Capacity Made Available as Referred to in Section 16 of the Rules for the Interim Period Between Completion of Privatisation and the Start of the Transitional Electricity Market (TEM) (Order No.NERC/140008 2014) 2.

815 NBET 'NBET Power Purchase Agreement' (January 30 2017) online: file:///C:/Users/HP-PC/Downloads/NBET-PPA-.pdf (Date of use: April 10 2020) 45 – 46.

816 Capacity would have delivered electrical energy but for the System Operator's instruction to the said generator to derate its capacity, that is reduce its energy delivery, to achieve grid balance and stability.

817 Eberhard A. the Independence and Accountability of Africa's Infrastructure Regulators: Re-Assessing Regulatory Design and Performance (Keynote address 4th Afur Annual Conference Livingstone, Zambia 25 April 2007) 11.

The study interview conducted shows that the immediate gas constraint of the Gencos (thermal Gencos) is directly linked to their inability to adequately pay for gas as a result of their cash flow problem. The Gencos' gas constraint is not necessarily linked to the macroeconomic challenges of the gas suppliers such as infrastructure deficit, poor investment, and vandalism in the gas sector. Arising from the absence of effective Take or Pay agreements with the gas suppliers, there is no sanction for failure to supply or procure gas and there is equally no commitment from the gas suppliers whose payment are not guaranteed by the Gencos but usually made against Gencos' expected cash inflow from NBET.

The implication is that the gas-to-power portfolio of the privatized market is being operated on a best endeavour basis, and not based on serious commitment to gas supply in accordance with trading contracts. The Gas Aggregator, the Regulator responsible for stimulating growth of natural gas utilization in the Nigerian domestic market puts the blame strictly on the reliability of payment for gas supplied to the Gencos, as the main market challenge.[818] It deemphasized the issue of infrastructure deficit and placed the solution solely on the commercial viability of the electricity market value chain through guaranteed revenue, as the incentive for investment and injection of additional capital by the gas supplier.[819]

(b) Expansion/Performance Disincentive, Lack of Funds and Cash Flow

The Gencos sold at privatization (legacy Gencos) and their parent companies signed Performance Agreements (PA) with the BPE, and the Federal Ministry of Finance for committing the Gencos to an obligation to recover the lost capacities of the various power stations. At the time of assets were taken over by the new companies, the available capacity of each Genco was identified and captured by the PA, while a minimum performance target was set for the Gencos to improve the performance of the power plants within a period of five (5) years by replacing or expanding the power plants to increase the identified available capacity to specific level.[820]

The Gencos' claim that their massive recovery plan with these assets in line with the performance commitments was achieved (except Sapele, Ogorode due to lack of due

818 Transcript of interview with Gas Aggregation Company of Nigeria GACN Office, Central Area, Abuja (6 September 2019) 5.

819 Transcript of interview with Gas Aggregation Company of Nigeria GACN Office, Central Area, Abuja (6 September 2019) 5.

820 Paragraph 1.1 and 2 of Schedule 1 to the Performance Agreement between BPE, Ministry of Finance, Kepco Energy Resource Limited and Egbin Power PLC (21 August, 2013) 38.

diligence by the investor) pales in comparison with recent available capacity which is said to be 7913MW out of which an average of 3000 – 4000MW is operational and in use by power consumers.[821] The current installed generation capacity is said to be 13496MW out of which the Gencos claim to have 7913MW as available generation capacity.[822] From the historical generation data supplied shown in Table 22, the average available generation capability of the Gencos from 2014 – 2018 are 6154.05MW, 6616.28MW, 7,183.59MW, 6,995.37MW and 7384.27MW respectively.[823]

In the period shown above, from the available generation capacity figures, an average of 3419.10MW, 6616.28MW, 3266.79MW, 3,622.64MW and 3864.15MW were utilized leaving 2734.94MW, 3010.24MW, 3266.79MW, 3372.72MW and 3520.12MW as unutilized (stranded/idle generation capacity) capacity[824] arising mainly from transmission and distribution constraints. These utilized capacities also further suffer reduction when the Gencos comply with SO's instruction to reduce load for grid stability.[825] Giving this unutilized available capacity, capacity recovery and further expansion by the Gencos can only be based on the utilization of existing available capacity otherwise the effect of capacity recovery will be lost in the value chain as currently being experienced and the Gencos will continue to suffer associated consequential losses.

(c) Lack of Verifiable Data

The design of the trading arrangements for the Gencos in the privatized market makes returns on investment in power generation assets dependent on the financial viability of the distribution segments at least until power demand increases and the market evolves towards competition. Consequently, a phased privatization or reform process starting from the distribution and moving progressively to the transmission and

821 Siemens "Electrification Roadmap for Nigeria Technical and Commercial Proposal" (7 May 2019) online: https://powerlibrary.nigeriaelectricityhub.com/index.php/2019/09/23/nigeria-electrification-roadmap-2019/ (Date of use: April 16 2020) 70.

822 Gencos Heartbeat Five Years After- Assessing the Successes and Challenges in Operating a Genco in the Nigerian Electricity Supply Industry (NESI) (Volume 2 series 2) 13.

823 Gencos Heartbeat Assessing the Challenges in Operating a Genco Given Market Consideration (Volume 3 series 1) 7 – 9.

824 Gencos Heartbeat Assessing the Challenges in Operating a Genco Given Market Consideration (Volume 3 series 1) 7 – 9.

825 Gencos Heartbeat Assessing the Challenges in Operating a Genco Given Market Consideration (Volume 3 series 1) 12.

generation, ought to have been the preferred method of investment in the different segments of the electricity market.

With respect to operational figures and statistics, the Regulator's penchant for collecting and relying on secondary data from market participants plays a major role in potentially undermining the quality of data collected by the Regulator. For example, for the computation of tariff in MYTO, the Regulator collects data on the key components for computation of the tariff from market participants and other government departments. For generation capacity, SO and NBET supplied data to the Regulator, Nigerian rate of inflation is based on data collected from the Nigeria Bureau of Statistics (NBS), foreign exchange rate is based on data from CBN, US rate of inflation is based on data from US Bureau of Labour Statistics' internet website while gas price is based on the regulated amount in the Domestic Supply Obligation (although a fixed and regulated price).

The reliance on secondary data obtained from market participants (SO and NBET) with conflicting operational and contractual interest in the privatized market can only serve to undermine the quality of such data and regulatory efficiency. On the other hand, data obtained from other government departments and US government department (CBN, NBS and US Bureau of Labour Statistics) may not necessarily lack the required quality but the process of obtaining the data is unclear and the source of data is unverifiable. No methodology was stated in obtaining this data (whether through phone calls, website or official correspondence), how regularly updated and recent is the data, the Regulator's method of synergizing with other government departments for proper update in the event of a significant shift in rates that may affect the computation of tariff and other necessary considerations for transparency.

The Discos on their part admitted that the Regulator (including the SO and MO) relies on information the Discos furnish to the Regulator and recommends a real time data platform for the Regulator to improve on quality of data.[826] It is also not surprising that the Gencos fault the generation capacity figure and the exchange rate used for tariff computation in MYTO by the Regulator as not representing the actual generation capacity because it excludes the stranded/idle capacity shown in the historical generation data.[827] They also stated that they are unable to access dollar at the CBN

826 Transcript of interview with Association of Nigeria Electricity Distributors, ANED office, Abuja (11 December 2019) 4.

827 Transcript of interview with Association of Power Generating Companies, Abuja office, Abuja, (5 September 2019) 19 – 20.

official exchange rate ($305) used for the tariff computation in MYTO.[828] The logical explanation is that NBET will only furnish the operational capacity it is willing to pay for against the actual available capacity the Gencos were willing and able to dispatch but was reduced by the SO's instruction. It is also doubtful that the CBN will disclose the fact of Gencos' inaccessibility of the CBN official exchange rate to the Regulator at the point of data collection.

The data quality problem also exist between the market participants, there are reported incidents of SO relying on data/information on available capacity supplied by the Gencos through telephone calls in the process of dispatching energy on the grid.[829] The PSRP recognized the need to improve on operational and commercial data quality and transparency but it is doubtful if the requirement of the market participants to submit information to the Regulator periodically will ensure data quality except through an implementable regulatory mechanism.[830]

4.6.2 Transmission and Distribution Constraints of the Gencos

Beyond the commercial challenges aforesaid, the transmission and distribution segments of the privatized market present some technical and operational challenges for the Gencos. These challenges include; grid instability and inability to evacuate Gencos' available capacity resulting into load rejection with its attendant impact (maintenance costs and availability of the plants) on the generating plants, the frequency of the SO's instructions to the Gencos to either increase load or decrease load or shut down for the reasons stated above causing stresses to the components of the machines.

The thermal and hydro power plants are designed to operate optimally and efficiently at specific minimum load (base load) to deliver power. According to a Genco, operating the plants away from their base loads reduces the efficiency or increases the consumption of gas by as much as 15 – 20%.[831] The Genco described the problems as an abnormality because no framework is provided for their compensation giving the effect of the unusual operation of the plant by operating the plants away from the base

828 Transcript of interview with Association of Power Generating Companies, Abuja office, Abuja, (5 September 2019) 9 – 10.

829 Transcript of interview with Association of Power Generating Companies, Abuja office, Abuja, (5 September 2019) 12.

830 Federal Republic of Nigeria Power Sector Recovery Programme 2017 – 2021 (January 2018) online: https://mypower.ng/wp-content/uploads/2018/02/PSRP-Master-Document-January-2018.pdf (Date of use: 12 February 2020) 35.

831 Gencos Heartbeat Five Years After- Assessing the Successes and Challenges in Operating a Genco in the Nigerian Electricity Supply Industry (NESI) (Volume 2 series 2) 16.

load neither did the plant manufacturers also envisaged such mode of operation for the plants.[832]

Due to the unusual operation of the plants mainly occasioned by the frequency of the SO's instruction to reduce load, the maintenance cycle of the plant is shortened from four (4) years to two (2) years. Considering the cost implication of such maintenance which is about an average of $15,000,000.00 (Fifteen Million US dollars) depending on the plant capacity, recovering investment cost had become challenging. [833]

The directive by the SO to the Gencos to adopt the Free Governor Mode operation[834] designed to enable the generating plants automatically adjust to grid frequency fluctuation is a positive regulatory intervention which ought to be complemented by the technical and operational improvement of the transmission and distribution network for grid stability. Another regulatory intervention being pursued by TCN as part of its ancillary services is the procurement of spinning reserve (a defined amount of capacity) to enable power generating units running without load to pick load within microseconds to cancel the effect of the tripped generating unit on the system frequency that may cause a system collapse. TCN's application to the Regulator for rate review of its ancillary services to enable it procure adequate spinning reserves from the Gencos will serve as an incentive to the Gencos to make required investment with the existence of a good tariff and a committed off-taker.

Giving the global acceptance of regulatory reserve in ensuring power system security, the implementation method of deploying the right tools aided by the Energy Management System (EMS SCADA) and managed by personnel with requisite skills and knowledge particularly within the SO/TCN, should be the main focus of any regulatory mechanism to be adopted for the operation of the spinning reserve. Otherwise, the Regulator may be stuck with an ineffective regulation if the market is unsuitable for its implementation.

4.7 INDEPENDENT REGULATORY MECHANISM SOLUTION TO GENCOS, TCN AND DISCOS' CONSTRAINTS

832 Transcript of interview with First Independent Power Limited, Trans Amadi office, Port Harcourt, (11 December 2019) 29.

833 Transcript of interview with First Independent Power Limited, Trans Amadi office, Port Harcourt, (11 December 2019) 30.

834 Transmission Company of Nigeria (TCN) "TCN & Gencos Collaborate to Improve Grid Stability" (3 June 2017) online: https://www.nsong.org/MediaPublicity/NewsDetails?NewsID=73 (Date of use: 2 April 2020).

The two main independent regulations issued by the Regulator in 2017 to address the generation capacity challenge, transmission load inefficiency and distribution network weaknesses of NESI are the Eligible Customer Regulation and Nigerian Electricity Regulatory Commission Mini Gird Regulation.

(a) Eligible Customer Regulation

The main objective of this Regulation is to facilitate competition in the privatized market/NESI, promote the expansion of generation capacity and quality in the value chain, encourage third party access to transmission and distribution infrastructure, allow Gencos to access unserved and underserved customers with capacity not contracted out (to NBET and others) and to enhance stability and operational efficiency of the Gencos.[835]

However, the Regulation has been fraught with theoretical and implementation drawbacks for the reasons advanced hereinafter. The Electricity Act (EPSRA) makes provision for the Minister of Power to issue a directive to the Regulator specifying the class or classes of end-use customers that shall constitute eligible customers. The directive was issued by the Minister on the 19th of May, 2017, acting pursuant to this directive; the Regulator issued the Regulation.

The Minister's directive as well as the Regulation provide for four classes of eligible customers. Customers or group of customers consuming more than 2MWh in the course of one month connected to 11KV or 33KV delivery point on a Disco's network, under a Distribution Use of System (DUOS) agreement with such Disco, for the connection and delivery of energy.[836] Customer or group of customers connected to a metered 132KV or 330KV delivery point on the transmission network under a Transmission Use of System (TUOS) agreement with TCN for delivery of energy. The third class is a customer or group of customers consuming more than 2MW/h in the course of one month connected to a metered 33KV delivery point on the transmission network, under the TUOS agreement, and with bilateral agreement with a Disco operating in the customer franchise area for the purpose of construction, installation and operation of distribution system used to connect the customer to the 33KV delivery point. Lastly, a customer or group of customers registered with the Regulator consuming more than 2MW/h in the course of one month connected through a

835 Paragraph 2 of Eligible Customer Regulation (Regulation No.NERC-R-111 2017) of 2017

836 Paragraph 5(1) and (2) of Eligible Customer Regulation (Regulation No.NERC-R-111 2017) of 2017

metered delivery point to a Genco's facility it intends to purchase energy from and has entered into a bilateral agreement with a Disco in the franchise area for the construction, installation and operation of the distribution system used to connect the customer to the generating facility of the Genco.[837]

The various classes of customers were designed to be introduced in phases from eligible customers connected to transmission delivery point, to those connected to Gencos' delivery point and finally to those connected to distribution delivery point.[838]

Theoretically, this arrangement is in consonance with the privatized market framework designed to progress towards the wholesale competitive market envisaged by the reform. However, the Discos consider the implementation of the Regulation will operate to limit their customer base to less paying customers who are currently being cross-subsidized by the high paying customers (2 MWh customers) that may likely opt out of their network if declared as eligible customers. They also contended and that since there is no framework for the Competition Transition Charge (CTC)[839] (a charge to be collected from the eligible customers departing the Discos' network to enable the Discos recover permitted revenue and return on invested assets arising from the exit of such customers), there cannot be a level playing ground for Discos and the eligible customers.[840]

The Discos also thought that the SO will need to have a pact with the Gencos (a practiced considered by them to be unwholesome giving the required neutrality expected from the SOl) to enable the eligible customer connected to the TCN know whose energy it is purchasing since the Gencos are all connected to the 330KV lines of TCN, which carries the power pool from all the Gencos without adding any extra to the pool.[841] In addressing the issue of the CTC, it is important that the Regulator should not create or endorse a platform through which the Discos will lose customers that formed part of their investment assets without first providing a means by which they

837 Paragraph 5(3) and (4) of Eligible Customer Regulation (Regulation No.NERC-R-111 2017) of 2017

838 Paragraphs 34 and 35 of Eligible Customer Regulation (Regulation No.NERC-R-111 2017) of 2017.

839 Sections 28 of Electric Power Sector Reform Act (CAP A77 Laws of the Federation of Nigeria) of 2005.

840 Transcript of interview with Eko Electricity Distribution Company, Power Procurement and Regulatory EEDC Office, Lagos (5 December 2019) 6 – 7.

841 Transcript of interview with Abuja Electricity Distribution Company Financial Services, Strategy and Planning, AEDC Office, Abuja (6 December 2019) 7 – 8.

will be compensated as envisaged by the Electricity Act (EPSRA).[842] The absence of any compensatory arrangement (the CTC) sin the Regulation makes the Regulation inchoate. The Regulator's delay in issuing the framework for the payment of this CTC will constitute an impediment for the implementation of the Regulation.

The Gencos and TCN's advocacy for the implementation of the Regulation is understandable for the simple reason that the Gencos' business perspective will be to sell their stranded energy by whatever means given the difficulty the inability to operate at full capacity has posed to their cash inflow. The TCN on the other hand being currently paid TUOS charges by the Discos loses nothing if the Discos' departing customer is contracted to TCN through Transmission use of system agreement considering that its charges will still be paid under a new agreement with the eligible customers. The Regulation makes no provision for counterbalancing the opposing views and fails to take these unanticipated market realities into consideration.

Also from the Regulator's perspective, since the issuance of the Regulation, it has not sanctioned any eligible customer transaction due to the implementation failure of the Regulation. It criticized the FGN overbearing influence in endorsing and permitting eligible customer related transactions without the approval of the Regulator to test the efficacy of the Regulation and by so doing restricting the Regulator from enforcing compliance.[843] It also stated that some prospective eligible customers are only interested in buying power from the hydro Gencos because of the comparative cheaper rate of their energy and since the hydro Gencos have contracted all their capacity to NBET through the PPA, it can only sell to the eligible customer if they renegotiate their agreement for deliverable capacity to NBET. On the other hand, NBET is unwilling to renegotiate the capacity contracted with the Gencos because it operates the market by a basket price (including thermal and hydro), and that any exclusion of the cheaper energy coming from the hydro will lead to a general increase in the average price of energy in the privatized market.[844]

NBET's argument seems to be disconnected with market realities giving that the available capacity of the hydro Gencos are not completely evacuated leaving stranded capacity, a similar situation with the thermal Gencos, and so its refusal to renegotiate

842 Sections 28 of Electric Power Sector Reform Act, 2005 CAP A77 Laws of the Federation of Nigeria of 2005.

843 Transcript of interview with Nigeria Electricity Regulatory Commission, Market Rate and Competition unit NERC Office, Abuja (6 December 2019) 15 – 16.

844 Transcript of interview with Nigeria Electricity Regulatory Commission, Market Rate and Competition unit NERC Office, Abuja (6 December 2019) 16.

capacity contracted with these Gencos is questionable. Overall, these issues are left unaddressed by the drafters of the Regulation which invariably have led to the implementation failure of the Regulation.

(b) Nigerian Electricity Regulatory Commission Mini-Grid Regulation 2017

The Regulation defines a Mini-Grid as any electricity supply system having its own generation capacity, supplying electricity to more than one customer and which can operate in isolation (Isolated Mini-Grid) or connected to a Disco (Interconnected Disco) and generating between 0KW and 1MW of capacity. It provides for two classes of Mini-Grid namely; isolated and interconnected Mini-Grid.[845] This Regulation is in furtherance of the FGN's policy on increasing access to electricity in areas with existing Disco but poorly supplied (underserved) and areas within a Disco's network but without an existing distribution system (un-served).[846]

The Regulation requires a Mini-Grid to have a generator in its network. The Regulator may upon request to it grant a Mini-Grid Developer permit to construct, own, operate and/or maintain an isolated Mini-Grid in a designated un-served area. The Regulator can also approve a tripartite contract between a connected community, Disco and a Mini-Grid Developer (Interconnected Mini-Grid) to construct, operate and/or maintain an interconnected Mini-Grid in an underserved area within a geographical location.[847]

In practice, the Isolated Mini-Grid Developers have tied into renewable source of energy generation (solar), while some of the Interconnected Mini-Grid Developers have formulated business modules which combine the use of both on-grid power and off-grid power generated through renewable (solar) method for power supply to their customers.[848] The business arrangement of a Mini-Grid Developer with a Disco for power supply by alternating grid power with off-Grid power with the Disco is relished as a viable power supply mechanism. The Abuja Discos explained the process as follows:

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845 Paragraph 5 of Nigerian Electricity Regulatory Commission Mini-Grid Regulation (2017) of 2017.

846 Federal Republic of Nigeria Power Sector Recovery Programme 2017 – 2021 (January 2018) online: https://mypower.ng/wp-content/uploads/2018/02/PSRP-Master-Document-January-2018.pdf (Date of use: 12 February 2020) 41.

847 Paragraphs 5(2) and 6(1)(2) of Nigerian Electricity Regulatory Commission Mini-Grid Regulation (2017) of 2017.

848 Solar as a renewable energy is increasingly becoming an effective and accessible alternative to fossil fuel and water as source of energy considering that it does not generate waste or contaminate water (carbonization). It will in the long term become an efficient way of tackling the climate change for the future of the NESI.

"The mini grid developer who is a solar generator with the solar panels and the batteries, the battery needs electricity to stay charged which can come from the solar panel or the grid and it is during the day time when there is sunlight that the solar panel can charge the battery. When the sun is down, the grid can power the battery so the developer is better off in the sense where it is interconnected with the grid, because two things; if you have to supply say 100 kilowatts throughout the day and also at night there are two implications for you. During the day the customer is also using 100 kilowatts so your system must be sized for more than 100 kilowatts because you can't be using 100 kilowatts and charging 100 kilowatts battery as well, that increases your cost. However, if during the day you serve your 100 kilowatts, at night the utility is able to serve the customer. In the event that the utility is not able to, you have your battery, so you can reduce significantly the cost of your storage. So to the developer, it reduces its cost in order to spend much money in a location they can spend less"[849]

The Discos also seem to be willing to work with the Mini-Grid Developers although a Disco who believed that the Regulation will work best for un-served areas[850]may be insensitive to the effect of the Discos' performance crisis on the customers in an underserved area within their network. The Regulator also confirms the efficacy of the Regulation.[851] The claim by a Disco that some usurpers ring-fenced some of their customers by taking them out of their network, signing agreement with them to build a mini-grid network for them should be dealt with by the Regulator who is responsible for ensuring compliance with the Regulation. On the other hand, the focus of this Regulation should be to encourage new businesses in the distribution segment of the market in both served and underserved areas to reduce the task of the Discos in service delivery, an area the Discos are largely underperforming.

4.8 CONCLUSION

The privatized market has being undergoing different challenges arising majorly from the poor performance of the Discos, TCN and the non-effectiveness of the contracts signed by the Gencos. The regulatory interventions of the FGN and the Regulator has

849 Transcript of interview with Abuja Electricity Distribution Company, Financial Services, Strategy and Planning AEDC Office, Abuja (6 December 2019) 10.

850 Transcript of interview with Eko Electricity Distribution Company, Power Procurement and Regulatory EEDC Office, Lagos (5 December 2019) 9.

851 Transcript of interview with Nigeria Electricity Regulatory Commission, Market Rate and Competition unit NERC Office, Abuja (6 December 2019) 16.

largely either being delayed, inconsistent and conflicting, poorly implemented, uncoordinated and in some cases, non-existent.

The effect of the regulatory interventions or absence of it could also be seen from the increasing liquidity squeeze and rising deficit in the market, lack of investment due to inventors' apathy, paucity of funds for investment by the Gencos, TCN and Discos had resulted to poor and lack of electricity supply to the end-users and hampering the country's economic growth. Without considering how to effectively utilize existing regulatory mechanism options new regulatory mechanisms in solving these problems, sustaining the operation of the privatized market will be difficult.

Arising from this crisis, the next chapter will considers specific regulatory mechanism options and lessons from some power reform countries namely; China, Chile, Brazil, Argentina, Australia, U.S.A. and India in dealing with value chain management with respect to the privatized market issues identified in this chapter.

CHAPTER 5

ANALYSIS OF SELECTED REGULATORY MECHANISM INITIATIVES FOR NIGERIA ELECTRICITY SUPPLY SECURITY

5.1 INTRODUCTION

One of the objectives of the study is to analyze regulatory mechanism initiatives of selected electricity supply industries of some electricity reform economies to serve as a guide for the Nigeria Electricity Supply Industry. The intention is to implement one of the objectives of the study in this chapter using the method already stated. The approach is to analyze the application of key regulatory mechanisms within a reform structure, with their downsides if any, adopted for the power markets of these economies with respect to electricity supply along the value chain; generation, transmission and distribution.

In the previous chapters (chapters 3 and 4) of the study, it was established that the primary objective of the privatization exercise carried out in the Nigerian power sector is efficiency and to ultimately introduce competition in the market phase development design. This could be seen in most of the regulatory mechanisms adopted in the post-privatization era of the sector; their main purpose is geared towards achieving an efficient supply of electricity to the consumer, introducing competition in the generation segment, ensuring grid stability and reliability and promoting a performance-driven distribution segment.

Consequently, all the selected regulatory mechanisms are mainly from economies whose reforms are based on efficiency goals. The study recognizes that not only are these regulatory mechanisms designed within the socio-political context of these countries, the framers of the mechanisms equally internalize them whenever it is based on any international model. The analysis of the selected regulatory mechanisms shall be based on identified issues in the distribution, transmission and generation segments of the power sector supply chain as identified in chapter 4.

Apart from U.S.A. and Australia which are developed economies and whose selection is based on their operation of the Independent System Operator (ISO) for the transmission segment of their power sector, the other countries are mainly developing economies according to UN classification, like Nigeria, whose sociopolitical context are not as stable as that of the developed economies. Notwithstanding the macroeconomic challenges of the selected countries and in some situations, significant government participation in the power sector reforms, successes were recorded in different segments of their electricity sectors.

Building from this analysis, this chapter shall draw lessons for NESI with the aim of proposing regulatory mechanisms to solve the identified sector challenges within the Nigerian socio-political background. This shall lay the foundation for the recommendations that the study shall propose in chapter 6. In summary, the identified issues of the NESI's value chain are; the cost and performance crisis of the Discos, the investment planning, execution and governance issues and technical challenges (grid stability and reliability) of the transmission segment as well as the contract ineffectiveness of the Gencos.

While the original objective of the reform in generation segment is to ensure adequacy of supply, experience in the post-privatization era as highlighted in chapter four (4) has shown that the focus of the reform ought to be redirected to ensure the security of energy and Gencos' invoice settlement/payment in order to unlock stranded generation capacity and to effectively utilized the available generation capacity. This will ensure Gencos' recovery of the investment costs and profitability to safeguard expansion plan and further investment in the segment.

In order to guide against the constraints of the power value chain particularly in Nigeria, the study considers selected electricity regulatory mechanisms adopted for the segments of the power market in other jurisdictions. Finally, the chapter draws out the lessons and option open to NESI in view of the regulatory mechanisms considered.

5.2 REGULATORY MECHANISM INITIATIVES FROM SELECTED POWER MARKET: DISTRIBUTION SEGMENT

5.2.1 The Indian Approach to Distribution Segment

Article 246 of the Indian Constitution lists the provision of electricity under the concurrent list which implies that India central Government is empowered to frame policies while it is in the purview of the powers of the State Governments to arrange and supply power to the end-users.[852] The constitutional arrangement in Nigeria differs; while power is listed under the concurrent list, its operation is more centralized for FGN, leaving only areas un-served by the FGN for the state governments. The electricity reform of India was approached within this constitutional framework which encourages a synergy between the central government and State governments.

[852] Srivastava G and Kathuria V "Utility reforms in developing countries learning from the experiences of Delhi" 2014 Utility Policy 2.

The reform of the distribution segment came through the third phase of the Indian electricity reform which was started by the central government in 1991.[853] While the 1991 reform was principally directed by the central government on generation segment to increase the generation capacity through several IPP projects, a second phase of the reform was state-driven. Several states sought to restructure their State Electricity Boards (SEB) which were vertically integrated. During the second phase, one State (Orissa) managed to unbundle its SEB by creating two Gencos, one Transco, and four Discos while some others like Haryana, Andhra Pradesh and Rajasthan also commenced restructuring geared towards commercializing the State-owned enterprises with the ultimate goal of privatizing them. However, none of them achieved the privatization of their Discos.[854]

After a series of recommendations and guidelines which were directed to the failure of the 1991 reforms such as the failure to address the financial health of the SEBs, (prerequisite for the viability of the PPAs and the privatization of the distribution segment), and failure to insulate the SEBs from political influences, a legislation known as the Electricity Regulatory Commissions Act was passed by the central government in 1998.[855] This legislation established the Central Electricity Regulatory Commission (CERC) as an independent regulator and also enabled the States to set up a similar body, the State Electricity Regulatory Commission (SERCs) without necessarily localizing the legislation.[856]

The first rationale for the creation of the independent regulators was the mismanagement of the state power to set tariff as a result of a politically dominated cross subsidization mechanism by which the most influential class of consumer, farmers and domestic consumers secured low tariffs for themselves. The situation forced the SEBs to offset their losses by increasing tariffs on industrial and commercial users.[857] Also, under this framework, the legislation equally separated transmission

853 There are mainly three phases of the reform but sometimes loosely referred to as two phases with the events as the distinguishing factors.

854 Tongia R the political economy of India power sector reforms in Victor D and Heller TC *the Political economy of power sector reform* (Cambridge University Press 2007) 110 – 111.

855 Dossani R "Reorganization of the power distribution sector in India" 2004 Energy Policy 1281.

856 Tongia R the political economy of India power sector reforms in Victor D and Heller TC *the Political economy of power sector reform* (Cambridge University Press 2007) 111.

857 Tongia R the political economy of India power sector reforms in Victor D and Heller TC *the Political economy of power sector reform* (Cambridge University Press 2007) 111.

from distribution networks and created the National Power Grid Corporation to own and operate inter-state transmission lines.[858]

The second rationale was largely driven by the state governments who could not achieve much arising from their failure to increase tariff because of politically motivated cross subsidy issue and power theft. With limited revenue, investment was impossible and investors could not repose confidence in a system that cannot guarantee cost-reflective tariff. Such failure served as an impetus for the third phase of the reform with the enactment of the Electricity Act of 2003 through which the central government sought to converge the reform process.[859]

However, before the third phase commenced, two states had gone ahead with the privatization of their distribution segments, Orissa and Delhi. The issues surrounding the privatization of the distribution segment of the SEBs in these two states present the most relative point for the performance and tariff challenges of the Discos in the Nigerian post-privatization era. After the transmission and distribution segments of the Orissa Electricity Board (OSEB) was further unbundled into a transmission company (Gridco) and four distribution companies, the controlling shares in the four distribution companies were sold to private investors whose financial situation worsened after they took over.

The main reason for the negative financial situation was the lack of accurate information on the actual loss level of the sold assets. Investors had developed their bids on the basis that the actual loss level of the assets was 39.5 percent but soon realized after take-over that actual loss level was 49.4 percent[860] or even 51 percent in some zones.[861] Consequently, market failure ensued because the investors' expectation for profit by improving operational efficiency and reducing theft became operationally impossible. The Orissa government also failed to supply expected subsidy to offset losses, failed to pay its debt/bill to the distribution companies and politically ensured that the Regulator (OERC) keep tariff below cost-reflective level.[862]

858 Dossani R "Reorganization of the power distribution sector in India" 2004 Energy Policy 1281.

859 Tongia R the political economy of India power sector reforms" in Victor D and Heller TC *the Political economy of power sector reform* (Cambridge University Press 2007) 112.

860 Tongia R the political economy of India power sector reforms" in Victor D and Heller TC *the Political economy of power sector reform* (Cambridge University Press 2007) 147.

861 Ruet J "Optimal timing in the privatization of a utility in an emerging country the case of electricity distribution in Delhi" 2006 Energy Policy 2703.

862 Tongia R the political economy of India power sector reforms" in Victor D and Heller TC *the Political economy of power sector reform* (Cambridge University Press 2007) 146 – 147.

It was not surprising that one of the investors formally abandoned its distribution company in 2001.

The Delhi State government learnt from Orissa's failure and introduced a new mechanism to ensure the efficiency of the Discoms after privatization, by reconfiguring its bidding process. The reduction of the Aggregate Technical and Commercial losses which covers both technical and non-technical losses was introduced as the new bidding parameters for Delhi's distribution companies. Relying on business valuation, the distribution assets were valued at a level at which the company would be able to earn a suitable return based on assumptions of three factors namely; reasonable tariff increase, the bid schedule of loss reductions and gradually declining government support provided over a five-year transition period.[863]

Amongst the profound elements of the process was the treatment of liabilities. The Distribution companies (Discoms) were presented with a clean balance sheet; the transmission company was made to be the single buyer of energy to the distribution companies with a predetermined bulk supply tariff decided on the basis of the paying capacity of the Discoms[864]and at a subsidized rate by the State Government. This enabled the Discoms an opportunity to augment revenues by bringing the very high levels of losses to manageable levels by 2006 – 2007 (five years target period).[865]

This process was carefully implemented by the State Government's policy directive. First, to attract private participation by the introduction of the AT&C, and secondly, to ensure that retail tariff which will be kept below cost reflective level is subsidized[866] and identical till the end of the policy direction period. The period between 2002 – 2007 was described as the transition period for the Discoms. The Regulator (DERC) using an annual tariff adjustment mechanism kept tariff hike at least 50 per cent below the allowed levels. During the transition period, the Regulator's first tariff review revised the retail tariffs increasing by an average of 14.5 per cent, the domestic consumer tariff was increased at 22.5 per cent, industry was increased by 9.4 per cent and railway

863 Ahuja HK *Reforming power sector reforms multiple conflicts democratic solution1st ed* (Excel Books 2010) 40 – 41.

864 Srivastava G and Kathuria V "Utility reforms in developing countries learning from the experiences of Delhi" 2014 Utility Policy 6.

865 Dalei NN and Gupta A "Performance of electricity distribution companies in Delhi an evaluation study" online: file:///C:/Users/HP-PC/Downloads/DelhiDiscoms.pdf (Date of use: 20 May 2020) 4.

866 This was achieved through government provision of loan of Rs. 34.5 billion to the Transco since its revenue collection was not sufficient to cover its power purchase and other expenses because the Discos were in transition phase.

traction by 8.5 per cent. The high increase rate of the domestic consumer was an attempt to curb the heavy cross-subsidization issue of the Discoms.[867]

The designers of the Nigerian Electricity Supply Industry (NESI) drew a lot from the Delhi's approach to the distribution segment but implemented the model poorly. First, as noted earlier in the study, the bidding process assumptions of the ATC&C in Nigeria were too aggressive and without basis.[868] The BPE and the Nigerian Regulator failed to appreciate the impeccability of the appraising process of similar bodies; the Delhi Vidyut Board (DVB) and DERC that led to the determination of the 54% loss level of the Discoms in Delhi. It took a long time to establish transparency, prior to 2000, DVB had consistently declared 23% energy losses and gradually raised the figure to 43% initially in 2001 before it admitted a loss of 54% at the time of privatization.[869] This process was necessary because of the negative impression the Orissa's crisis left on the investors and so it was imperative to appropriately determine the loss level before inviting bids from the private companies.

Secondly, the treatment of the transition period of the Delhi's Discoms was fundamental in achieving the long-term goal of financial efficiency. The transitional subsidy support was similarly adopted by Nigeria but was poorly implemented. Owing to the degree of certainty of the AT&C loss level in Delhi and the fact that DVB was dealing with four privatized Discoms, it was easier to conclude the bidding process. However, the BPE in Nigeria was dealing with the privatization of about seventeen firms out of which were eleven Discos and so the privatization was not uniformly concluded which led to the introduction of separate rules for the interim period between the completion of the privatization process and the start of TEM.

The AT&C was also at the center of DERC's tariff determination. DERC's determination of the retail tariff increase and computation of Discoms' cash flow in the transition period was based on the realization of the expected units. The unit to be purchased from the Transco was calculated on the basis of the AT&C loss to which a Discom has agreed. DERC also approved the costs of the Discom including 16 per cent return on equity and reserves. Cash flow to the Discom, minus the approved costs, minus the approved payment on capital (for the Discom to keep) was the funds

867 Dalei NN and Gupta A "Performance of electricity distribution companies in Delhi an evaluation study" online: file:///C:/Users/HP-PC/Downloads/DelhiDiscoms.pdf (Date of use: 20 May 2020) 18 – 20.

868 Please see chapter 4 pages 146 - 149.

869 Ruet J "Optimal timing in the privatization of a utility in an emerging country the case of electricity distribution in Delhi" 2006 Energy Policy 2704.

transferred by the Discom to pay the Transco.[870] On the other hand, the single buyer model operated in Nigeria ensures that whatever happens in the wholesale generation cost (gas cost) immediately reflects on the bill of the Discos[871] regardless of the ATC&C loss level.

The performances of the Delhi's Discoms in AT&C reduction in the policy directive or transition period (2002 – 2007) was sterling. Although, no Discom achieved the 17% per cent government stipulated target loss reduction, but all the Discoms achieved their stipulated target of system loss reduction as shown in Table 23[872]during their transition period. The introduction of Multi-Year Tariff (MYT) Regulation in line with the Electricity Act 2003 provision on tariff regulation in 2007 also helped in ensuring a proper transit from the annual tariff adjustment regulatory mechanism that was previously in use. The aim is to provide predictability and reduce regulatory risk that could inhibit investments.

The tariff consists of two parameters, the controllable and uncontrollable. The uncontrollable parameters such as sales and power purchase costs qualify for truing-up and passing to consumers in the event of variation in revenue. Any deviation in controllable costs such as AT&C losses, distribution losses, collection efficiency, return on capital, operation and maintenance expenses, depreciation and quality of supply is borne by the Discoms in the event of variation in revenue.[873] This is in sharp contrast to the regulatory decision by the Nigerian Regulator to remove the collection loss component of the ATC&C as a cost the Discos cannot pass to the consumers on the basis that it is their responsibility to recover such cost,[874]given the inadequacy and poor implementation of the transition support to the privatized Discos in Nigeria.

The Multi Year Tariff regime enabled the Delhi's Regulator to timely introduce a new element of Fuel Price Adjustment (FPA) surcharge in order to offset the changes in variable cost levied by the generating companies in the power purchase bills of

870 Ruet J "Optimal timing in the privatization of a utility in an emerging country the case of electricity distribution in Delhi" 2006 Energy Policy 2704.

871 Transcript of interview with Abuja Electricity Distribution Company (Financial Services, Strategy and Planning) AEDC Office, Abuja) 2.

872 Dalei NN and Gupta A "Performance of electricity distribution companies in Delhi an evaluation study" online: file:///C:/Users/HP-PC/Downloads/DelhiDiscoms.pdf (Date of use: 20 May 2020) 8 – 9.

873 Srivastava G and Kathuria V "Utility reforms in developing countries learning from the experiences of Delhi" 2014 Utility Policy 9.

874 Please see chapter 4 page 155

Discoms and to pass it to the consumers.[875] The Regulator had consistently made use of this mechanism to enable the Discoms recover any variation over the approved tariff for the year since the Act only allows one amendment to tariff in a year.[876]

There are other innovative provisions of the Act regarding the distribution segment such as the creation of the offence of electricity theft covering different elements and the establishment of special courts to try offenders. The Act provides for mandatory imprisonment and penalties for offenders and it recognizes connivance by utility employees as an offence. The Government of India equally launched the Restructure Accelerated Power Development and Reform Programme (RAPDRP) aimed at reducing high AT&C losses by adopting IT applications which provide grants to renovate, strengthen and modernize operational, technical and service delivery mechanism for distribution.[877]

The Electricity Act also introduced open access[878] and distribution franchise[879] although with limited implementation in practice but with great potential for increasing competition in the Indian electricity market. Open access ensures that a number of licensees can reach a consumer through a network operated by a Discom and a consumer can equally enter into an agreement with any person for the supply or purchase of electricity on such terms and conditions as may be agreed by them.[880] While franchising enables a distribution licensee to authorize a franchisee to distribute electricity on its behalf in a particular area within its area of supply. The distribution franchise model has been deployed efficiently in the State of Maharashtra by subjecting freely executed Franchise Agreement between the distribution licensee and franchisee to Regulator's (MERC) tariff approval and other regulations.[881]

In summary, the commitment of the Government of India and Delhi to the privatization of the distribution segment using the bidding methodology, transition support and a pre-determined tariff path provided a basis for the improved performance of the

875 Dalei NN and Gupta A "Performance of electricity distribution companies in Delhi an evaluation study" online: file:///C:/Users/HP-PC/Downloads/DelhiDiscoms.pdf (Date of use: 20 May 2020) 20.

876 Section 62(4) Electricity Act No. 36 of 2003.

877 Sharma T et al "Of pilferers and poachers combating electricity theft in India" 2016 Energy Research & Social Science 44.

878 Agrawal A and Tripathi GC "Amendments in Electricity Act 2003 where the gap lies?" 2019 Energy Policy 799.

879 Thakur T et al "A critical review of the franchise model in the electricity distribution sector in India" 2017 The Electricity Journal 16.

880 Thakur T et al "Impact assessment of the Electricity Act 2003 on the Indian power sector" 2005 Energy Policy 1192.

881 Totare NP and Pandit S "Power sector reform in Maharashtra India" 2010 Energy Policy 7088.

Discoms in the post-privatization era. The AT&C continues on a downward trend in post privatization, while the market continues to evolve towards competition with the introduction of various tariffs and regulatory mechanisms adopted by DERC to stimulate the reform in the distribution segment.

5.2.2 The Chinese Approach to Distribution Segment

China's reform of her distribution utilities was achieved largely through restructuring and corporatization of existing state-owned enterprises as against partial privatization in India and Nigeria. This approach is situated within the Chinese Government's policy of driving market reform to achieve efficiency by privatizing small state-owned enterprises at the country level, mass lay-off of state-owned enterprises workers at the city level and mergers, groupings/conglomerations, corporatizations of some large state-owned enterprises.[882]

The electricity assets were part of the large state-owned enterprises which were organized as vertically integrated utility whose prices were not based on allocating resources or on real cost of power. The retail side was steered by catalogue prices which were kept low to support economic growth while investments were circumscribed to the central government excluding any other sources.[883] The power market challenge was the inadequacy of investment in the generation and transmission assets, and the rapid growth in electricity demand driven by economic growth which resulted in a serious power shortage.[884] The growth in demand was occasioned by the Chinese government's huge industrialization strategy that required an enormous expansion of power generation[885] but was hindered by power shortage.[886]

China's regulatory mechanisms adopted in cross subsidizing tariff for the industrial consumers while introducing flat tariff system for the residential consumers in the post-reform era is quite instructive. To ensure the large supply of electricity for industrialization, the central government allocated large amounts of un-priced capital

882 Cao Y et al "From federalism Chinese style to privatization Chinese style" 1999 Economics of Transition 104 – 105.

883 Wang Q and Chen X "China's electricity market oriented reform from an absolute to a relative monopoly" 2012 Energy Policy 145.

884 Wang Q and Chen X "China's electricity market oriented reform from an absolute to a relative monopoly" 2012 Energy Policy 145.

885 Victor D and Heller TC Reform of the Chinese electric power market economics and institution in *the political economy of power sector reform* (Cambridge University Press 2007) 83.

886 Wilson S et al China's electricity sector powering growth keeping the lights on and prices down in *China's domestic transformation in a global context* (ANU Press 2015) 180.

and set a low coal charge for the power sector. The government set favourable low end-user tariffs for high priority industries, with higher prices for less important sectors such as services.

Through a series of progressional reform phases that commenced from 1979, power utility was largely disintegrated by the promulgation of a regulation (the decentralization of the management of electricity).[887] The regulation[888] encouraged investment in the power sector by regional, corporate and foreign economic entities. It provided guidelines for separating responsibilities of government and business enterprises, making provincial power bureaus into operating entities and interconnecting power grids.[889]

Following the enactment of the Electric Power Law of the PRC in 1996, the central government separated business operations and management from government oversight and guidance. The business and administrative functions of the Ministry of Electric Power (MEP) were divided between the State Power Corporation of China (SPC) and the State Economic and Trade Commission (STC) respectively.[890]

With the new structure, all previous regional and provincial subordinates to the MEP became subsidiaries of the SPC thereby consolidating a quasi-federal structure of electricity regulation in which the central government makes policies and initiates reforms while provincial governments take primary responsibility in providing electricity supply and tailoring reforms to local circumstances.[891] This structure ensured that the transmission and distribution (T&D) segments of the Chinese power sector became fused. Further reforms ensured that the SPC was dismantled; its assets were regrouped into two grid companies, five generation companies and four engineering consulting companies. These new generation and transmission companies established regional and provincial subsidiaries that absorbed the corresponding grid and generation assets of the SPC within their jurisdictions.

887 Yu Z "Beyond the state/market dichotomy institutional innovations in China electricity industry reform" 2020 Journal of Environmental Management 4.

888 Provisional Regulations on Promoting Fund Raising for Investment in the Power Sector and Implementing Different Power Prices of 1985.

889 Xu S Chen W "The reform of electricity power sector in the PR of China" 2006 Energy Policy 2459.

890 Wilson S et al China's electricity sector powering growth keeping the lights on and prices down in *China's domestic transformation in a global context* (ANU Press 2015) 180.

891 Yu Z "Beyond the state/market dichotomy institutional innovations in China electricity industry reform" 2020 Journal of Environmental Management 4.

The electricity law enacted for the previous phase of the reform sets the principle of a centralised electricity pricing policy, tariff-setting and hierarchical management, which required that on-grid electricity tariffs reflect the fair sharing of project costs, compensate for cost, incorporate related taxes and surcharges and allow for reasonable profits.[892] On the other hand, administratively determined wholesale prices and catalogue retail tariffs were benchmarked by government during this phase of reform.[893] One of the goals of the reform during this phase was to rationalize tariff system and optimize resource allocation.[894]

The Chinese central government through the State Council sought to achieve this by the issuance of Notice on Reform of Electricity Tariff in 2003 to amongst other things implement market-based pricing systems for generation, transmission and distribution and retail, and enhance transparency of tariff setting processes.[895]

The Chinese government, through the National Development and Reform Commission (NDRC), introduced the benchmark for on-grid electricity tariff by its rules of implementation of tariff reforms in 2003. The benchmark for on-grid tariff was based on the average social costs of power generation, which were province specific and determined by the performance of advanced generation units in the province. One of the objectives was to provide an incentive for power producers to control costs of power projects and simplify tariff principle geared towards a more uniformed tariff for each province. A province benchmark for on-grid tariffs were to reflect the difference in social and economic development across the region, situation of fuel (mainly coal), and supply in different provinces.[896]

The principle was implemented in line with province-based catalogue retail electricity tariffs which were set low in the western and inland provinces compared to those in the east and along the coastline. These tariffs were adjusted for subsequent plants considering the source of project financing, those investments from central government with low or no finance costs had lower on-grid tariffs while those from

892 Ma J "On-grid electricity tariffs in China development reform and prospects" 2011 Energy Policy 2639.

893 Yu Z "Beyond the state/market dichotomy institutional innovations in China electricity industry reform" 2020 Journal of Environmental Management 4.

894 Xu S Chen W "The reform of electricity power sector in the PR of China" 2006 Energy Policy 2461.

895 Ma J "On-grid electricity tariffs in China development reform and prospects" 2011 Energy Policy 2636.

896 Ma J "On-grid electricity tariffs in China development reform and prospects" 2011 Energy Policy 2636.

local, private and foreign sources had higher financing costs.[897] In effect, the regulatory pricing mechanism introduced by the NDRC requires the grid companies to purchase power from generation plants at on-grid price and sell power to users (retail tariff) at the price of electricity. The gap between the on-grid price and the retail price is the transmission and distribution price and government funds which were all determined by the NDRC.

The fused system of transmission and distribution ensures that the revenue stream of the grid companies comes from electricity sales to consumers which are divided into industrial and commercial, residents and agricultural (distribution segment). The revenue stream also comes from the transmission business calculated by adding capacity charges and volume charges.[898] The selling prices to the consumers (retail prices) is divided into direct-supplied prices and wholesale prices,[899] which vary across the regions depending on the type of users that are grouped according to five voltage grades connections namely; 500KV, 220KV, 110KV, 10KV and less than 1KV.[900] The industrial users comprise of general commercial/industrial electricity (small and medium enterprises) charged according to cost per unit based on three voltage levels, 1KV, 10KV and 35KV and large scale industry users charged according to cost per unit based on four voltage levels, 10KV, 35KV, 110KV and 220KV with a fixed charge based on maximum demand or transformer capacity.[901]

Since the last phase of reform described above, the Chinese government through the NDRC has introduced a number of market-oriented regulatory mechanisms for pricing reform for two principal reasons. First, the NDRC flat pricing mechanism for the various prices (on-grid, T&D and retail) had distorted the market, while generation companies got a high on-grid price after negotiation; users were paying for the disparity. Secondly, the cross-subsidization of agricultural users by industrial users, and residential users by industrial users became an issue that required regulatory solution. Noteworthy amongst these mechanisms utilized for solution is the introduction of Direct Power-

897 Ma J "On-grid electricity tariffs in China development reform and prospects" 2011 Energy Policy 2636.

898 He Y "The optimization of Chinese power grid investment based on transmission and distribution tariff policy a system dynamic approach" 2018 Energy Policy 113 – 114.

899 Deng C et al "Analysis of technological progress and input prices on electricity consumption evidence from China" 2018 Journal of Cleaner Production 1397.

900 He Y "The optimization of Chinese power grid investment based on transmission and distribution tariff policy a system dynamic approach" 2018 Energy Policy 113.

901 Zhang ZY "China electricity prices for industrial consumers" (23 April 2019) China Briefing online: https://www.china-briefing.com/news/china-electricity-prices-industrial-consumers/ (Date of use 24 May 2020).

Purchase for Large Users (DPLU) which encouraged bilateral negotiation between large users and generating plants to determine lower on-grid price than was obtainable under the former regime.[902]

The DPLU was further amended by the replacement of on-grid price with transaction price which is to be decided by generation plants and users (large users or group of retailers) leaving only the transmission and distribution tariff to be decided by the NDRC.[903] Arising from the high cross-subsidization of the residential users and its attendant imbalance in pricing which led to revenue loss (exit of some consumers), cross subsidizing high income earners and lack of utilization efficiency of power by some users (overload during peak period and idle devices during off peak period),[904] NDRC reformed its tiered electricity price (TEP) mechanism by fusing it with time of use (TOU) mechanism, a kind of hybrid of step tariff[905] and dynamic pricing.[906]

Residential TEP in China also known as increasing block electricity pricing, divides electricity consumption into three tiers; the first tier guarantees the most basic electricity demand for family life, the second tier increases 50 – 140 per cent from first tier, the third tier is about 150 – 230 per cent of the first tier. The first and second tiers' price is largely unchanging in most of the provinces which represent about 80% of the consumption, the prices for the second and third tier increase 0.05 CNY and 0.3 CNY from the basic price. There is also a free tier set up for low-income families using 10 – 15KWH every month.[907] In implementing this, the NDRC introduced Price-based Demand Response (PBDR)[908] and Demand Side Management (DSM)[909] mechanisms

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902 Zeng M et al "The power industry reform in China 2015 policies evaluations and solutions" 2016 Renewable and Sustainable Energy Reviews 98.

903 Zeng M et al "The power industry reform in China 2015 policies evaluations and solutions" 2016 Renewable and Sustainable Energy Reviews 101.

904 Yang C et al "Residential electricity pricing in China the context of price-based demand response" 2018 Renewable and sustainable Energy Reviews 2871.

905 Step tariff refers to charge with different standards according to the amount of consumption. There could be increasing block tariff and decreasing bloc tariff and it is able to reflect the marginal cost of electricity and the power demand elasticity of residents so that it can improve the efficiency of energy usage, increase benefits of all producers and consumers, and reduce energy waste.

906 It divides a day into peak; valley and flat periods with different price standards according to the demand of consumers and the actual load of power grid to encourage consumers optimize their behaviors and improve efficiency of power grid.

907 Wang C et al "A review of residential tiered electricity pricing in China" 2017 Renewable and Sustainable Energy Reviews 536.

908 It is a technique of DSM that sets different prices on different periods to encourage consumers reducing peak electricity usage or shift peak electricity usage to off-peak periods. The rate is told in advance or real time.

909 It is a kind of electricity management activity that includes a series of technologies, measures, projects on the demand side to improve efficiency of energy use, reduce cost and reduce emissions. It includes demand response (DR) which focuses on shifting load by pricing strategies or other incentives.

to effectively incorporate TOU pricing strategy (which recognizes peak, flat and valley periods to charge consumers) into the tariff mechanism. TOU in China divides a day into peak period (08:30 – 11:30, 18:00 – 23:00), flat period (07:00 – 08:30, 11:30 – 18:00) and valley period (23:00- 07:00 the next day).[910] An empirical study conducted demonstrated that more than half of the respondents affirmed that TEP had encouraged them to save electricity in the fourteen (14) cities of Guangxi province.[911]

5.2.3 The Brazil Approach to Distribution Segment

The privatization of the distribution segment of the Brazil Electricity Industry (BEI) can be said to have been executed in two rounds. The first commencing from 1995 to 1999 while the second commenced from 2002 after the drought that affected the hydro-generation capacity leading to nationwide energy consumption rationing. Unlike the efficiency objective which drove most of the distribution sector reforms discussed earlier in this study, the focus on the first round of the reform in Brazil was to secure significant revenue for the government and so not much attention was paid to potential post-privatization issues. However, the government approach to getting the best sale value for the assets also had a tremendous positive impact on the financial viability of the Discos after privatization.

Because the distribution companies were largely state-owned given the electricity sector legal framework that was in existence, the Brazilian Federal Government leveraging on Constitutional amendment and the financial difficulties of most of the government at the state level, offered soft loans in exchange for the state governments' consent to the privatization of their distribution assets by the Federal Government. While reform analysts have expressed mixed opinions about the success of the privatization of the Brazilian distribution companies in this period, this study considers certain elements both in the privatization process and post-privatization era that guaranteed the performance of the Discos in terms of the financial position of the seller (Brazilian government) and the Discos (buyers) for the post-privatization operation before other macroeconomic issues stampeded the growth of the Brazilian Electricity Industry (BEI) all together.

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910 Yang C et al "Residential electricity pricing in China the context of price-based demand response" 2018 Renewable and sustainable Energy Reviews 2872 – 2873.

911 Zhang S and Lin B "Impact of tiered pricing system on China's urban residential electricity consumption survey evidences from 14 cities in Guangxi Province" 2018 Journal of Cleaner Production 1404 – 1412.

First, prior to the privatization, access to electricity in Brazil was 89 per cent in 1992 (moved to nearly 96% in 2001), a clear indication that minimal amount will be required by the Discos for network expansion as compared to a situation of steep requirement in Nigeria.[912]Secondly, there was an existing law (Law 8631/93) that allowed utilities to charge customers a realistic price that reflects the cost of generation including interest payments and other costs. This is also a sharp contrast to the non-cost reflective tariff in Nigeria before and after privatization. The law equally abolished the cross-subsidy mechanism of using the gains of efficient utilities to subsidize inefficient utilities.[913] This laid the basis for the adoption of the price cap mechanism for the privatized Discos that ensured that non-controllable costs such as wholesale electricity prices, taxes, surcharges were passed-through automatically to retail tariff (the consumers) while other costs such as services and personnel were indexed to inflation minus a factor X.

Thirdly, these Discos and large consumers were allowed to choose their suppliers (Gencos) thereby introducing competition in the wholesale market through the establishment of 'Initial Contracts' for the PPAs between the Discos and Gencos lasting eight (8) years. The fear of the financial inadequacy of the Nigerian Discos before the reform led to the adoption of a single buyer model for the privatization which is clearly stifling the market progress from competition in the post-privatization era. The Brazilian approach ensured that generation costs account for approximately 40% of the final tariff of the Discos as against the 60% of electricity prices in most power markets,[914]while the distribution margin was increased from the usual 40 percent to 60 percent.[915]

Fourthly, there were other potential profit making measures built into the Discos' concession contracts. For example, they were allowed to generate up to 35 percent of their power need by themselves, allowed to explore related business opportunities such as the internet and telecommunications, almost non existing condition on minimum investment or service expansion conditions, the price cap X factor was set

912 Goldenberg J "Expanding access to electricity in Brazil" 2004 Energy for Sustainable Development 88.

913 Tovar B et al "Firm size and productivity evidence from the electricity distribution industry Brazil" 2011 Energy Policy 828.

914 Mendonca AF and Dahl C "The Brazilian electrical system reform" 1999 Energy Policy 77 – 79.

915 Tankha S "Lost in transition interpreting the failure of privatization in the Brazilian electric power industry" 2009 Journal of Latin American Studies 76.

at zero for the first five years allowing benefits arising from efficiency improvements to be appropriated.[916]

Arising from the above government approach, the sale of the assets was said to have generated about $19 billion[917] while the Discos profit also rose from about US$100 million to about US$2 billion[918] within two years of privatization.[919] The Brazilian government's deliberate action to make these Discos profitable may be attributed to the government's desire to have maximum revenue gain through the sale of the assets. But the underpinning advantage the reform benefitted from is the low political resistance to tariff increase which has been the major stumbling block for distribution utility reforms in most countries including Nigeria. Therefore, the subsequent failure of the post-privatization market in this round of privatization was not as a result of the inefficiency of the Discos but attributable to some exogenous factors.

The second round of the privatization commenced in 2004 with the aim of designing new mechanisms for risk reduction in connection with contracts settled at electricity auctions (wholesale market) and those related to investments in new generation plants,[920] considering the power shortage experienced in the preceding years and the failure of the lack of investors' interest in the generating segment. The government approach to the remaining six (6) Discos were rejected by investors for their poor quality of service, high level of losses and lack of commercial management[921] was to introduce a mechanism by which it established a rehabilitation project with the financial assistance of the World Bank to address the performance issues of these Discos in preparation for another round of sale. The result of this rehabilitation project helped to

916 Tankha S "Lost in transition interpreting the failure of privatization in the Brazilian electric power industry" 2009 Journal of Latin American Studies 77.

917 Tovar B et al "Firm size and productivity evidence from the electricity distribution industry Brazil" 2011 Energy Policy 829.

918 Although some reform analysts are of the view that this could not be as a result of efficiency since only three Discos had been privatized within that period. However, it was a government deliberate policy to make the Discos profitable to attract investors with guaranteed income from the tariff rates which continued to increase after the privatization.

919 Tankha S "Lost in transition interpreting the failure of privatization in the Brazilian electric power industry" 2009 Journal of Latin American Studies 76.

920 Resende M and Cardoso V "Mapping service quality in electricity distribution an exploratory study of Brazil" 2019 Utilities Policy 42.

921 The World Bank "Improving performance of electricity distribution in Brazil" (24 April 2019) online: https://www.worldbank.org/en/results/2019/04/24/improving-performance-of-electricity-distribution-in-brazil (Date of use: 28 May 2020).

address the operational, commercial and financial performance of all the Discos in question.[922]

The Regulator introduced a number of regulatory mechanisms with regards to tariff and efficiency since the commencement of the second round of privatization for various reasons. First, the government policy to encourage upstream investment in thermal generation and the increased challenges of the hydro-generators arising from low level of rain meant that the Discos will have more need for thermal generated energy with varying generation cost. Since it is a pass-through cost, the retail tariff has been unstable and finally increased by way of extraordinary tariff adjustment in 2015.[923]

For instance, in reaction to the 55 percent increase in residential class consumers' tariff, the Regulator implemented tariff flags, a regulatory mechanism aiming to adjust tariffs according to power generation costs and ensure sufficient revenues for utilities to cover operating costs and investments in generation capacity expansion and also signaling to consumers their current cost of service.[924] The Regulator also leveraged on an existing regulatory mechanism to improve electricity affordability, Low-Income tariff/Social Tariff to provide discounts according to consumption. The Low-Income Tariff is granted up to the consumption of 220KWH/month, for consumption lower than 30KWh, the discount is 65 percent, for consumption between 30 and 100 KWH, the discount is 40 percent, while the discounts drop to 10 percent if consumption rises between 100 and 220 Kwh.[925]

With respect to quality and efficiency, the regulator introduced quality incentives in 2011 with a set of basic incentives such as minimum quality standards with payment of penalties for no compliance and a peer-pressure mechanism. Best and worst performers are identified and classified in four groups according to compliance with regulatory limits. Best performances are awarded/allowed higher operating costs at the time of tariff adjustments for cost efficiency,[926]while monetary penalty is awarded against Discos who failed to meet regulatory performance target.

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922 The World Bank "Improving performance of electricity distribution in Brazil" (24 April 2019) online: https://www.worldbank.org/en/results/2019/04/24/improving-performance-of-electricity-distribution-in-brazil (Date of use: 28 May 2020).

923 Resende M and Cardoso V "Mapping service quality in electricity distribution an exploratory study of Brazil" 2019 Utilities Policy 42.

924 Paiva JCP et al "Mapping electricity affordability in Brazil" 2019 Utility Policy 2.

925 Paiva JCP et al "Mapping electricity affordability in Brazil" 2019 Utility Policy 2.

926 Corton ML et al "The low cost of quality improvements in the electricity distribution sector of Brazil" 2016 Energy Policy 488.

Non-technical losses limits are set reasonably considering each particular company and the peculiarities of its concession area, the low-tension network, and socioeconomic complexity of its service area and continuity of improvement through regulatory periods. Incentive is founded on setting the level of non-technical losses with an ex-post evaluation at the end of the regulatory period so if regulatory values are not attained, energy purchases will not be recognized as allowed costs which automatically will reduce the level of allowed revenues.[927]

The Brazilian approach has shown that regulatory financial models such as the ATC&C for Discos' reform may not necessarily be the most pragmatic solution considering peculiar socio-political and economic circumstances of a reforming country. Since the most critical challenge bedeviling most Discos in electricity markets before reforms was usually the operational non-cost reflective tariff put in place based on political considerations, Brazil leveraged on its political will to make tariff cost-reflective for the Discos prior to the privatization to attract investors and preserve advantage for the Discos after the privatization. While this accounted for high electricity tariff in the country, it certainly improved the financial situation of the assets.

Again, there is a great presence of government action at play in stimulating the reform, rather than adopt the usual government intervention funds for the Discos during their transition period, a great deal of attention was paid to improving their revenue prior to the reform and during the privatization process, by providing different kinds of inbuilt mechanisms into their Concession Agreement in order to attract investors and guarantee a steady source of income. Lastly, in the post-privatization era, the focus on ensuring steady revenue for the Discos did not change; the government ensured that generation cost and other costs always reflect in the retail tariff and at the same time introduced regulatory mechanisms to cushion the effect of tariff increases on the consumers and to ensure efficiency from the Discos.

5.2.4 The Chile Approach to Distribution Segment

In Chile, physical bypass of distribution network is allowed. It is practicable where large customers can be connected directly to the transmission network. This is made possible by the 1982 Electricity Law which defined large customers as those that consume more than 2MW and small customers as those that consume less than 2MW.

927 Corton ML et al "The low cost of quality improvements in the electricity distribution sector of Brazil" 2016 Energy Policy 488 – 489.

The concept required large customers to execute wholesale contracts with the Gencos and bargain supply terms and tariffs. On the other hand, small customers were required to pay regulated capacity and energy prices to a distributor with a monopoly in the market who buys energy and capacity under a regulated wholesale contract and pays transmission charges on behalf of the customers.[928] A government agency, National Energy Commission (NEC) fixes transmission charges every four years while the charges are partly paid for by the generators and the customers according to their expected use of the grid.

In effect, there are two types of prices to the end users in Chile, the unregulated prices to the large customers and the regulated prices to the small customers. The distribution companies have a nonexclusive public service concession over a geographic area and are mandated to serve the electricity demand at a regulated price called distribution value added or VAD[929]. The VAD is a multi-part tariff for using the distribution and it is formed by a fixed fee for managing, billing, and servicing the consumer; average energy and power losses and a fixed fee per unit of power to pay for the operation, maintenance and investment costs.[930]

Large customers using more than 2MW buy their electricity directly from the Gencos and pay unregulated market prices for energy and capacity and also pay transmission charge. No distribution charge is paid by the large customers. Small customers using 2MW or less pay regulated prices for energy and capacity and also pay a share of the value added of distribution and transmission charges.[931] This regulated price to the small customers has two components; a node price, at which distributors buy energy from Gencos and a distribution charge. The Regulator (CNE) computes the regulated price to be equal to the sum of the marginal cost of energy, the marginal cost of peak power and the marginal cost of transmission. The distribution charge is recalculated every four years by a procedure that determines the operating costs of an efficient firm and setting rates to provide a 10% real return on the replacement value of assets, which rates are then applied to existing companies so as to ensure that the industry-

928 Galetovic A Munoz CM "Regulated electricity retailing in Chile" 2011 Energy Policy 39 6454.

929 In VAD estimates annual investment costs are calculated considering the replacement cost of efficient facilities for a projected demand, the facilities' lifetime and a 10% real return on assets. VAD is determined every four years by CNE, for each distribution company based on a yardstick completion model where tariffs are defined according to an efficient model company that distributes electricity in the distribution company's geographic area.

930 Raineri R Chile:Where it all started in Electricity Market Reform in Sishansi FP and Pfaffenberger Electricity Market Reform: an International Perspective (Elsevier Limited, Oxford 2006) 96.

931 Galetovic A Munoz CM "Regulated electricity retailing in Chile" 2011 Energy Policy 39 6454.

average return on the replacement value of assets does not exceed 14% or fall below 6%.[932]

With the adoption of this pricing mechanism, between 1992 and 2002, average electricity prices in Chile fell by almost 30% in real terms which reflects the drop in regulated value added in distribution and in the regulated node price of energy. In the Central Interconnected System (SIC),[933] the node price (including energy and capacity charges) of power delivered to Santiago fell from $30.93 per KWh in October 1982 to $23.97 per Kwh in October 2003, a fall of 22%. In the Northern Interconnected System (SING),[934] the node price of power delivered to Antofaqasta fell from $105.3 per KWh in October 1984 to $24.24 per KWh in October 2003, a fall of 77%. The VAD for Chilectra[935] fell by 18% in the rate setting process of 1992, 5% in 1996 and 18% in 2000.[936]

The above improvement was largely attributed to the pricing mechanism utilized which was based on a principle that ensured that prices were close to long-run marginal costs, prices were not varied by end use and that prices should depend on the nature of the location (CNE used only three types of distribution size: high, medium and low distribution density as part of the factors in computing prices).[937] However, technical studies identified several problems with this pricing mechanism. Ambiguities regarding transmission pricing rules, the fact that node price was defined as a mechanism for price smoothing that prevented consumers from facing the actual cost of energy, noticeable incentives for each party to bias the estimates of the simulated efficient firm in the calculation of VAD for regulated distribution prices because it was based on a weighted average between the estimates of CNE and providers' consultants and uncertainties regarding the fee for transmission paid by unregulated customers in the

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932 Bitran E and Serra P "Regulation of Privatised Utilities: The Chilean Experience" 1998 World Development 949.

933 One of the interconnected power markets in Chile. It is the largest electric system in the country with 31 distribution companies, where 60% of its consumption corresponds to small regulated end users.

934 One of the interconnected power markets in Chile, consisting of a predominantly mining/industrial load, in the order of 90%. It serves a number of large and isolated copper mines, some with individual loads as large as 300 MW.

935 Chilectra is a power utility company which had been privately owned until 1970 and controlled distribution in Santiago was split by the reform into 3 firm; a generation company and two distribution companies.

936 Pollit M "Electricity Reform in Chile Lessons for Developing Countries" 2004 Center for Energy and Environmental Policy Research 9.

937 Spiller PT and Martorell LV How should it be done? Electricity regulation in Argentina, Brazil, Uruguay and Chile in Gilbert RJ and Kahn EP *Electricity regulation in Argentina, Brazil, Uruguay and Chile* (Cambridge University Press 1996) 114 and 117.

franchise area of distribution firms.[938] There were also other governance challenges bedevilling the sector which led to the initiation of certain reforms but the 1998 – 1999 electricity crisis arising from major drought quickly accelerated the process of a thorough reform in the sector.

The policymaker responded by the introduction of some sector wide reforms and introduction of specific regulatory mechanisms to address the challenges. For example, the reform strengthened the regulator's sanctioning power by increasing fines on companies for failing to comply with quality and information demands, obligation on companies to provide Regulator with information in the form demanded. It also established Regulator's right to require companies to hire and pay an independent auditor when it had doubts about information provided, provision of Regulator's power to limit electricity consumption which was a direct response to the cause of the crisis (drought). It established even rationing for all users (large and small) and compensation for users in cases of both authorized (rationing) and unauthorized electricity cuts with support of legislators.[939]

In 2005, the Chilean government further introduced a regulatory mechanism for pricing by incorporating in consumer prices auction mechanism. Long term supply contract replaced contracts under price regulation. By this mechanism, Discos are to contract their entire power demand in advance, Gencos bid for the right to supply a distributor's contract[940] while the Discos are expected to be contracted at all times, at least for a period of three (3) years. Discos can auction contracts up to 15 years at a fixed price[941] and the prices will remain fixed during the entire length of the contract but their value is adjusted with indexes of input prices chosen by CNE to keep their real value. A price cap is set for the auction by the Regulator prior to the auction.

While this mechanism is of great advantage to the Gencos, it also benefits the Discos and investors generally as it enables them to obtain project finance with sufficient time to build infrastructure (3 – 15 years), the regulated customers are equally provided with the assurance of stability of price for the same period of time. For the electricity supply industry, this mechanism has been argued to be akin to a partial liberalization

938 Murillo MV and Foulon CL "Crisis and Policymaking in Latin America: The Case of Chile's 1998 – 99 Electricity Crisis" 2006 World Development 1584.

939 Murillo MV and Foulon CL "Crisis and Policymaking in Latin America: The Case of Chile's 1998 – 99 Electricity Crisis" 2006 World Development 1588 – 1589.

940 Salvagno JB "Bidding behavior in the Chilean Electricity market" 2015 Energy Economics 290.

941 Moreno R et al "Auction approaches on long term contracts to ensure generation investments in electricity markets: Lessons from the Brazilian and Chilean experiences" 2010 Energy Policy 38 5763.

of the retail market which increases the total welfare of the consumers, particularly the residential consumers according to data obtained from 2009 – 2016 for the main electricity distribution company in Chile (Chilectra) that serves more than six million people.[942]

Much of Chile's electricity reform's progress is based on the ability of the policymaker and regulator to respond to any challenge in the sector using regulatory and political institution and not based on any particular endowment of energy resources (such as gas) and any macro-economic difficulties which usually is an impetus for change.

5.3 REGULATORY MECHANISM INITIATIVES FROM SELECTED POWER MARKETS: TRANSMISSION SEGMENT

5.3.1 Chilean regulatory approach to transmission

The 1982 reform legislation in the electricity supply industry in Chile makes transmission an open access regime allowing all Gencos a non-discriminatory use of available transmission capacity. To coordinate the operations of competitive Gencos in an open access transmission network is an independent system operator, Centro de Despacho Economico de Carga (Economic Load Dispatch Center, CDEC) while the Gencos in an interconnected system are responsible for organizing an Economic Load Dispatch Center (ELDC). The objective of this arrangement is to achieve the minimum total operating cost for the system as a whole and ensure equitable market access to all Gencos.[943]

Power generation in Chile is organized around four grids[944] which are isolated from each other, owing to the thin and long size of the country. Chile is reputed to have approximately 32,221 kilometres of high voltage transmission lines occupying approximately 88,000 hectares.[945] Within each of the distinct and isolated grid/power market, Gencos are required to declare availability and plant marginal operating cost every hour. These declarations are used to dispatch power plants and to set the basic

942 Eduardo P and Sebastian PM "Alternatives policies for the liberalization of retail electricity markets in Chile" 2017 Utilities Policy 73.

943 Bitran E and Serra P "Regulation of Privatized Utilities: The Chilean Experience" 1998 World Development 949.

944 Sistema Interconectado del Norte Grande (Greater North Interconnected System, SING) in the North, Sistema Interconectado Central (central Interconnected System, SIC) covering the central part of the country including the country's capital city, Santiago, Sistema de Aysen (Aysen System) and Sistema de Magallanes (Magallanes System).

945 Gurtierrez DM "Transmission Lines in Chile" 2018 Lincoln Institute of Land policy 2.

marginal energy price or spot price. The price is used by the Gencos to trade electricity among themselves to meet contracts.[946]

By law, Gencos may own transmission assets while open access is guaranteed to any Genco that wishes to interconnect through the transmission system provided the Genco accepts to finance possible installation extension. Gencos pay for transmission rights depending on the part of the system that belongs to their influence area (set of lines, substations and other facilities that are located between the generating station and the reference node). Gencos also pay in proportion to their capacity in transmission wheeling, which must be equal to the annualized investment of equipment involved. Transmission owner companies receive a basic transmission income in this way which represents investment recovery with a fixed discount rate of 10%.[947]

The Chilean government approach to the governance structure of the CDEC, the transmission usage, expansion plan and open access system in operation were all contributory factors to the initial growth of the power reform undertaken by the government. Initially, the governance structure of the CDEC consists of a board with representatives from Gencos, transmission companies, and co-generators. The board is responsible for agreeing the bye-laws that complement the reform law, required to accomplish the objectives of the CDEC. The board is also guided by an Executive Direction which runs the system and determines electricity transfers and prices between the Gencos.[948]

Regulatory shortcomings such as conflicts between the Generators and transmission companies with respect to pricing, energy and capacity transfers, the deficient information that exists with respect to the CDEC's criteria to dispatch the electric system and the influence that some agents can exert on CDEC's decision, led to the introduction of a number of mechanisms through law reforms.[949] The Decree-Law 327 was introduced to improve the CDEC governance structure amongst other things. It increased the number of firms with representation in the CDEC board to those with capacity for generating higher than 9 MW (from 60 MW before the reform) as well as

946 Pollit M "Electricity reform in Chile lessons for developing countries" 2004 Center for Energy and Environment Policy Research 4.

947 Moya OE "Experience and new challenges in the Chilean generation and transmission sector" 2002 Energy Policy 578.

948 Raineri R Chile:Where it all started in Siohansi FP and Pfaffenberger W *Electricity market reform: An international perspective* (Elsevier Limited, Oxford 2006) *85.*

949 Raineri R "Chile:Where it all started" in Siohansi FP and Pfaffenberger W *Electricity market reform: An international perspective* (Elsevier Limited, Oxford 2006) *87.*

to transmission companies. It made the operation of its board independent of firms by establishing a professional board whose majority decisions were binding until the Ministry of the Economy issued a decision. It reduced the time allotted to the Ministry of the Economy for resolving conflicts between Gencos and transmission companies from 120 days to 60 days.[950]

With respect to transmission usage, Chile initially chose to allocate transmission payments solely to Gencos on the basis that the Gencos required transmission services to reach consumers. Transmission access payment were based on negotiated tariffs coupled with compulsory right of access if capacity was available, new connections and lines were paid for by the Gencos who were free to negotiate terms with transmission companies or build their own, there was no planning of transmission expansions, incumbent transmission companies were not allowed to pass on costs of new transmission wires to existing customers, and transmission charges were not regulated.[951]

The entire transmission usage was liberalized in the true spirit of achieving a free market economy perhaps as a result of the peculiarity of the transmission segment giving the significant investment required to stimulate growth and the long period of time it takes to achieve the necessary development. However, there are some difficulties in practice for the Chilean ESI, the transmission companies and Gencos often times fail to agree to transmission charges (tariff revenue, basic toll and additional toll) and the arbitration mechanism provided to resolve the conflict also sometimes fails to resolve it. This problem disincentivized investment in transmission expansion required for system growth.[952]

To resolve this inadequacy, a new law in 2004 (Law No. 19, 940) was enacted to introduce a new transmission usage mechanism. A regulated transmission fee was introduced ending the era of negotiated fee with its attendant Gencos and transmission companies' conflict. The law also provides that the value to be paid for existing transmission facilities is to be determined every four years by the CNE. The law introduced a market for ancillary services to allow for active trading of reactive power and voltage control services. It mandates transmission investments defined in an

950 Murillo MV and Foulon CL "Crisis and Policymaking in Latin America: The Case of Chile's 1998 – 99 Electricity Crisis" 2006 World Development 1584.

951 Pollit M "Electricity reform in Chile lessons for developing countries" 2004 Center for Energy and Environment Policy Research 6.

952 Raineri R "Chile:Where it all started" in Siohansi FP and Pfaffenberger W *Electricity market reform: An international perspective* (Elsevier Limited, Oxford 2006) *95.*

electricity transmission expansion study supervised by CNE which recognizes two types of expansions, new facilities and extensions of existing facilities (for the purpose of determining new tariff).[953]

The new regulated transmission charge is designed to incentivize investment in transmission expansion because of the lack of investment in new transmission facilities due to the low node price[954] and the problems with agreeing payments for the new transmission lines.[955] The Chilean government further introduced another law, Transmission Law (law 20.936), to mandate CNE to expand segments of the transmission system that previously were left to private initiative and to consider spare capacity when planning transmission lines, to stimulate the rate of transmission capacity expansion.[956]

The constant reviews, amendments and enactment of new laws to introduce regulatory mechanisms to stimulate the transmission segment of the electricity supply industry in Chile since the commencement of the reform law in 1982 is an indication of an understanding of the sector challenges in its power reform. This is evident in the growth of its transmission line which is said to have expanded from 4310 Km in 1982 to 8555 Km in 2002 in the main SIC system while in the SING system; it grew from 363 Km and 5093 Km in the same period. Grid losses are also stated to be very low (around 5%) compared with other countries in the South America.[957]

5.3.2 China regulatory approach to electricity transmission

The provincial roots of the China's original power industry led to a system comprising of large number of separate, high voltage transmission grids. In the fourth phase of China's power sector reform, it restructured the State Power Corporation (SPC) by separating generation from transmission, it set up eleven (11) new companies which include two power grid operators namely the State Power Grid and China South Power

953 Raineri R "Chile:Where it all started" in Siohansi FP and Pfaffenberger W *Electricity market reform: An international perspective* (Elsevier Limited, Oxford 2006) *95.*

954 The sum of transmission costs and energy and power costs are called node prices, because they are the prices at which transactions between generating and distribution companies take place. The node charges computed by the CNE are adjusted every six months (April and October) in such a way that they equal the average of the anticipated marginal costs over the following three years (Spiller PT and Martorell LV "How should it be done? Electricity regulation in Argentina, Brazil, Uruguay and Chile" in Gilbert RJ and Kahn EP *Electricity regulation in Argentina, Brazil, Uruguay and Chile 114).*

955 Pollit M "Electricity reform in Chile lessons for developing countries" 2004 Center for Energy and Environment Policy Research 8.

956 Gurtierrez DM "Transmission Lines in Chile" 2018 Lincoln Institute of Land policy 4.

957 Arango S et al "Lessons from deregulation: Understanding electricity markets in South America" 2006 Utility Policy 201.

Grid.[958] The Chinese government also set up a Regulator (State Regulatory Commission) which exists in the absence of any Independent System Operator, the industry responsibilities of an ISO remains that of the transmission companies as we shall soon point out.

These two grid companies are the only designated buyers of electricity from generators, they also distribute and sell electricity as monopolies in their respective areas.[959] From the initial number of separate 18 grids operated in China in 1980, through the government rearrangement and emphasis on interconnection mechanism, it was reduced to six (6) main regional based grids by 2004.[960] Apart from managing the grid assets in their areas, the two grid companies also control inter-regional system operation (a method similar to the Nigeria single transmission company), each company is divided into smaller management areas, which have delegated responsibility for local network development, maintenance, system control and dispatch, and system security.[961]

These grid companies operate the regional grids, regional system dispatch and the development and operation of the regional power markets (similar to the SO and MO functions under the Transmission Company in Nigeria). System dispatch is managed at regional and provincial levels. The dispatching centre within the South Grid Company is in charge of all the interregional transmission lines and facilities, the regional dispatching centres manage transmission dispatching within each region, provincial dispatching centres oversee scheduling to implement yearly contracts and to conduct real-time balancing to control provincial power systems.[962]

Due to the supply and demand situation in China that varies greatly and forms part of its transmission constraints, an enormous amount of time and energy has been dedicated to interconnecting the regional grids across China to alleviate the physical deficiencies in the network. In this regard, trans-regional power transmission and interconnection projects have played an important role to alleviate the power shortage

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958 Wilson et al "China's Electricity Sector Powering growth, keeping the lights on and prices down" in Song L et al China's Domestic Transformation in a Global Context (ANU Press 2015) 183 – 185, 187.

959 Zhang Z "Energy price reform in China" in Garnaut R et al China's 40 years of reform and development: 1978 – 2018 (ANU Press) 519.

960 North China grid, Northeast China grid, East China grid, Central China grid, Northwest China grid and South China grid.

961 OECD/IEA China's Power Sector Reforms (Head of Publication Service International Energy Agency (IEA) 2006) 44 – 45.

962 OECD/IEA China's Power Sector Reforms (Head of Publication Service International Energy Agency (IEA) 2006) 44 – 45.

in some areas and also promote the optimal utilization of power resources in different grids, different seasons or different hours.

Five (5) of the six main grids are now interconnected, a 500 KV AC transmission backbone (4,600 Km in length) links Northeast China with North China and North China with Central China, tying together almost 200 GW of generation capacity. Central China is now also connected with the East China and South China grids through 500 KV DC lines. In July 2005, the Northwest China grid with a lower maximum voltage of 330 KV was linked with North China Grid although some provinces are still lagging behind in the interconnection process.[963]

The above development is a reflection of major grid investments in the transmission segment which was previously lacking in the system prior to the reform. The growth has been on a steady rise arising from proper system planning, power supply and demand forecast for effective allocation of resources.[964] In the course of the 11th five-year period (2011 – 2015), and 12th five-year period, tremendous expansion was achieved such as the construction of the world first 1000 KV ultra-high voltage AC transmission line and accelerating the construction of a modern grid system and a smart grid.[965]

The government also carried out a reform of the transmission and distribution tariff on the 15th of March, 2015. The Chinese government issued 'Some Opinions about the Further Deepening of the Reform of the Electric Power System' which includes some adjustments to the transmission and distribution tariff[966] such as calculating the T&D tariff according to the principle of allowable cost with a reasonable profit, sale of electricity open to non-governmental investment and changing the profit model of power grid companies to two parts.[967]

Prior to the T&D reform, the income of power grid companies depended primarily on the income from sales of electricity with a single structure of income cash flow but

963 OECD/IEA China's Power Sector Reforms (Head of Publication Service International Energy Agency (IEA) 2006) 41.

964 OECD/IEA China's Power Sector Reforms (Head of Publication Service International Energy Agency (IEA) 2006) 99.

965 Ming Z et al "Trans-regional electricity transmission in China: status, issues and strategies" 2016 Renewable and Sustainable Energy Reviews 577 – 578.

966 This refers to the general price of services provided by power grid companies, including access system, networking, power transmission and sales. The tariff is the T&D cost included in the electricity selling price and is an economic indicator of the electricity market, which plays an important role in power-grid investment and economic operation.

967 Wang et al "Chinese power-grid financial capacity based on transmission and distribution tariff policy: A system dynamics approach" 2019 Utility Policy 2 – 3.

since the reform, the income has been divided into two parts, income from the sale of power and income from transmission and distribution.[968] The pricing mechanism under this new reform means that transaction price has replaced the former on-grid price and same is now determined by the market between Gencos and users (the market is only open to large users while other retailers are encouraged to be organized to a larger group for participation). Gencos are to sell power to grid companies at transaction price which is decided by negotiation between Gencos and users. The transmission and distribution price are also separated under the new mechanism, NDRC is to determine the T&D price according to the investment and operation cost of power grids in an open and transparent process.[969]

The power system planning mechanism retained the local government as the authority to carry out power system planning according to local conditions. The Chinese government is not showing any sign of reducing the state power in the operation and management of the transmission segment of its power sector giving the government persistence in promoting grid development.[970] Also, the fragmented government supervisory mechanism deployed in the power sector has more than ensured that state-owned power companies have greater power over government and are able to exploit their unique status to influence government decisions to their advantage. For example, the SGC has strengthened its monopoly by persuading the NDRC to establish an ultra-high voltage system and has obstructed the further separation of the transmission and distribution segments.

Although, some economists have canvassed the argument that since retailing and distribution of power are two different kinds of business, there is no need to continue with an integrated business model in China but the Energy Law had set up good principles for dealing with the boundary between competition and monopoly elements of the electricity sector.[971]

5.3.3 The Australian and U.S.A.'s System Operator regulatory mechanism approach to electricity transmission

968 He YX et al "The optimization of Chinese power grid investment based on transmission and distribution tariff policy: A system dynamics approach" 2018 Energy Policy 113.

969 Zeng M et al "The power industry reform in China 2015: Policies, evaluations and solutions" 2016 Renewable and Sustainable Energy Reviews 101.

970 Yeh ET "State power and the logic of reform in China's electricity sector" 2004 Pacific Affairs, University of British Columbia 458.

971 Xu J et al "Energy Law Draft and the Reform of its Electricity Supply Sector" 2020 Energy Policy Research Group, University of Cambridge 15.

The transmission segment of any electricity supply industry exhibits a high degree of natural monopoly features such as economies of scale and high sunk costs. Arising from these, the reform regulation mechanisms for this segment must be understood very differently from that of the generation and distribution segments. Ownership of transmission fused with system operation still presents some challenges even within an unbundled market.

A System operator is a critical participant of a power system, it can take different forms based on the functions it undertakes, the type of area served (local or regional), and the type of assets it operates. Traditionally, there are the vertically integrated utilities (VIU), an electricity provider in charge of generation, transmission, distribution and retailing, the legally-unbundled transmission system operator (LTSO) which is a separate company responsible for both ownership and operation of the transmission grid, usually a subsidiary of a parent company that also holds subsidiaries involved in generation, distribution and/or retail segments. There is also the Independent transmission system operator (ITSO), a separate company solely responsible for both ownership and operation of the transmission grid. Lastly, there is the Independent system operator (ISO) which requires a clear distinction between organizations that are responsible for operating the transmission grid in real-time and those that own and maintain it.[972]

The Australian government adopted the ISO as a way of driving competition in their electricity industry given the centralized power pool system adopted. The Australian National Electricity Market (NEM) formally commenced operation in 1999 and it is primarily an interconnected power system joining together five formerly state-based electricity systems stretching from Queensland to South through NSW and Victoria to Tasmania (via an undersea link), and west to South Australia.[973] There are two privately owned and three state-owned regional transmission network[974]

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972 Chawla M and Pollitt M. "Global Trends in Electricity System Operation: Where does the future lie?" online: http://www.eprg.group.cam.ac.uk/wp-content/uploads/2014/01/Draft-Working-Paper-MC.pdf (Date of use: 29 May 2021) Table 1.

973 Macgill I and Esplin R "End-to-end electricity market design – some lessons from the Australian National Electricity Market" 2020 The Electricity Journal 1.

974 Australia Energy Market Commission (AEMC) "Transmission: who does what?" online: https://www.aemc.gov.au/sites/default/files/content/0290ca88-4f87-4539-8aba-caf06cbe5a64/Transmission-Frameworks-Review-Fact-Sheet-Transmission-who-does-what.PDF (Date of use: 29 May 2021).

(Transmission Network Service Providers) with cross border interconnectors linking the grid at state borders to allow electricity flow from one state to another.[975]

The Australia Electricity Market Operator (AEMO) was established by the Council of Australian Governments (COAG) on the 1st of July, 2009 to manage the National Electricity Market (NEM) in the eastern and south-eastern states and Australian gas markets. Its responsibility grew to include that of an independent power system operator. Its ownership is shared between government and industry with members representing federal and state governments as well as generation and production, distribution, retail and resources businesses across Australia. It operates a user-pays cost recovery basis and recovers operating costs through fees paid by industry participants.[976]

AEMO's market responsibilities are set out in the National Electricity Rules which includes operating and administering a spot market for the sale and purchase of electricity, market ancillary services, power system operation, billing and clearing for all market trading. AEMO manages the day to day operation of the power system, using its reasonable endeavours to maintain power system security.[977] It operates the gas markets. The AEMO's effective management of the transmission network accounts for the high rates of reliability in the electricity market given that it only accounts for 5% of the outages (most outages are on the distribution network).[978] The rationale for the creation of the ISO in this market is to guide against conflict of interests and to stimulate performance growth.

Similarly, the regulatory driver for the adoption of the ISO in US is the stimulation of competition in the electricity industry to minimize the risk of discriminatory access to the network. The emphasis is to ensure that users of the grid have equal access to the grid. The transmission grids of the United States and Canada are divided into three giant networks; the Western interconnection which begins east of the Rocky Mountains and extends throughout the Western United States and Western Canada, most of Texas has its own interconnection and the rest of United States and Ontario is part of one giant grid (the Eastern Interconnection).[979] In the US electricity industry,

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975 Nepal R and Foster J "Electricity networks privatisation in Australia: An overview of the debate" 2015 Economic Analysis and Policy 15.

976 Australia Electricity Market Operator (AEMO) "Who we are" online: https://www.aemo.com.au/about/who-we-are (Date of use: 29 May 2021).

977 Rule 3.2 of National Electricity Rules (Version 165)71 – 72.

978 Nepal R and Foster J "Electricity networks privatisation in Australia: An overview of the debate" 2015 Economic Analysis and Policy 18.

979 Bosselman F "The future of electricity infrastructure" 2010/2011 The Urban Lawyer 119.

vertical separation of transmission control was achieved through the establishment of Regional Transmission Operator (RTO) or Independent System Operator which took over the transmission control from previously vertical integrated utilities (not necessarily government-owned).

The basis for this regulatory measure could be found in the challenges experienced by entities, who prior to the establishment of RTO/ISO, had difficulties seeking transmission services. In resolving issues that arose from such request for transmission services, the initial approach of the Regulator (Federal Electricity Regulatory Commission, FERC) was to order the prior owners of the transmission facilities to provide transmission service to other entities generating electricity on a case-by-case basis. This approach facilitated competition in the power market until the Regulator decisively in its Order No. 888 required open access and non-discrimination.[980] While the Regulator by this Order requires all public utilities that own, control or operate facilities used for transmitting electric energy in interstate commerce to file open access non-discriminatory transmission tariffs that contain minimum terms and conditions of non-discriminatory service, it also introduced the ISO's concept and set out the principles to be used in assessing ISOs proposals. These principles were reaffirmed in the Regulator's ruling issued in March 4, 1997[981] wherein the following were set out:

1. The ISO's governance should be structured in a fair and non-discriminatory manner

2. Its employee should have no financial interest in the economic performance of any power market participant.

3. It should allow open access to the transmission network and other services within its control at reasonable rates pursuant to a single, unbundled, grid-wide tariff that applies to all eligible users in a non-discriminatory manner.

4. An ISO is expected to have the primary responsibility in ensuring short-term reliability of grid operations. Its role in this responsibility should be well-defined

980 Promoting Wholesale Competition Through Open Access Non-discriminatory Transmission Services by Public Utilities; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities, 61 Fed. Reg.21540 (10 May 1996) of 1996.

981 United States of America Federal Energy Regulatory Commission 18 CFR Part 35 (Issued 4 March 1997) of 1997.

and must comply with applicable standards set by FERC and the regional reliability council.

5. It should have control over the operation of interconnected transmission facilities within its region.

6. It should identify constraints on the system and be able to take operational actions to relieve those constraints within the trading rules established by the governing bodies. The rules should promote efficient trading.

7. An ISO should have appropriate incentives for efficient management and administration and should procure the services needed for such management and administration in open competitive market.

8. Its transmission and ancillary services pricing policies should promote the efficient use of power and investment in generation, transmission, and consumption. An ISO or an RTO of which the ISO is a member should conduct such studies as may be necessary to identify operational problems or appropriate expansions.

9. An ISO should make transmission system information publicly available on a timely basis via an electronic information network consistent with the Commission's requirements.

10. An ISO should develop mechanisms to coordinate with neighboring control areas.

11. An ISO should establish an alternative dispute resolution (ADR) process to resolve disputes in the first instance.

Furthermore, in the Ruling, the Regulator (FERC) emphasized that principles 1 – 3 on independence of an ISO should constitute the bedrock upon which the ISO rest to build stakeholders' confidence in the Regulator's pro-competitive goals. Sequel to Order 888, several ISOs were established but the Regulator still observed that vertically integrated utilities still held significant market power. Consequently, the Regulator issued Order 2000,[982] wherein it sought to correct discriminatory behaviour by promoting the voluntary creation of Regional Transmission Organizations

[982] United States of America Federal Energy Regulatory Commission 18 CFR Part 35 (Issued 20 December 1999) of 1999.

(RTOs)[983]as new business entities responsible for the operation of transmission grids.[984]

These RTOs were designed to be independent grid-operating organizations which are required to satisfy certain minimum requirements such as independence from transmission owners and market participants, sufficient size and scope, management of transmission congestion and monitoring of wholesale power markets.[985] Several RTOs have emerged[986] from the US power markets and not only to independently operate the transmission system but also administer markets for wholesale electricity and related services like ancillary services and generating capacity. They are also structured to accommodate stakeholders like transmission and generation owners, load-serving utilities, state commissions, consumers, and environmental parties which all work with the Regulator to play key role in planning, operation and proposal of new initiatives that promotes a more efficient operation of the system.[987]

This approach to system and market operation has helped to develop the operation of the markets in the jurisdiction of the RTOs and has through the engagement of stakeholders promoted transparency in decision making and sharing of information.[988]

5.4 UNLOCKING INVESTMENT FOR THE GENERATION SEGMENT OF NESI

The primary challenge of most reform electricity supply industries is to secure investment to recover lost generation/energy capacity, energy capacity expansion in the utilities and to sustain energy capacity growth. The approach to it varies from jurisdiction to jurisdiction but the important and common thread to all the various steps taken by these power markets has been to secure financial investment locally and internationally. For example, Brazil has stimulated public enterprise investments in different ways such as direct government investment, encouraging private investment

983 Sowinski M "Practical Legal and economic barriers to optimization in energy transmission and distribution" 2011 Journal of Land Use & Environmental Law 511.

984 Figueiredo M "A regulatory framework for investments in electricity transmission infrastructure" 2008 Virginia Environmental Law Journal 449.

985 Dennis J "Twenty-five years of electricity law, policy and regulation: a look back" 2010 Natural Resources & Environment 36.

986 California ISO (CAISO), Electric Reliability Council of Texas (ERCOT), Southwest Power Pool (SPP), Midcontinent Independent System Operator (MISO), PJM, New-York Independent System Operator (NYISO), New England ISO (ISO-NE).

987 Anaya K and Pollit M "Regulating the electricity system operator: lessons for Great Britain from around the world" 2017 Energy Policy Research Group University of Cambridge 17.

988 Anaya K and Pollit M "Regulating the electricity system operator: lessons for Great Britain from around the world" 2017 Energy Policy Research Group University of Cambridge 17 – 19.

through reduction of cost of capital and incentive, exchange rates and tariffs designed to protect domestic industries, and liberal rule for profit remittances.[989]

In some cases the reform approach and designs may sometimes create more issues and challenges than solve the initial problem the reform country was determined to solve by privatization. In some cases, both the approach and design, and other inherent factors combined, may lead to the success or partial success of the reform. Brazil adopted a phased downstream to upstream privatization process in its power market, while there was remarkable financial progress with the distribution segment, investment ceased for its Gencos arising from the Asian and Russian financial crisis[990] of the period and the subsequent 2001 crisis arising from drought due to over reliance on hydro- power.[991] These developments compounded problems for Brazil and investors became disinterested particularly in the generation segment of the market.

Therefore, subsequent reform mechanisms adopted by Brazil in the power sector were geared towards encouraging investments. There is no restriction on foreign investments in the sector or on participation of foreign companies in indigenous companies. The government had also by way of incentives, initiated policies promoting the use of renewable or low carbon energy.[992]

In India, most of the projects proposed by international power companies and large indigenous groups for the third phase of its power reform fell through due to inconsistent policies and government instability.[993] The preference for larger units of generators (1,000 MW) was not successful, government decision to provide fast-track approval for Enron project raised issues of transparency and frequent attempts to renegotiate power purchasing agreements (PPAs) due to change in government at Federal and State levels more than combined to create investors' apathy.[994]

On the other hand, China made remarkable progress in attracting foreign investments in increasing generating capacity. The consistency in the control of government by the

989 Trebat T Brazil state owned enterprises A case study of the state as entrepreneur (Cambridge University Press 1983) 117 - 118.

990 Tankha S "Lost in translation: Interpreting the failure of privatization in the Brazilian Electric Power Industry" 2009 Journal of Latin American Studies 64.

991 Lock R "The new electricity model in Brazil: an institutional framework in transition" 2005 the Electricity Journal 56.

992 Schmidt G et al "Electricity regulation in Brazil: overview" 2021 Thomas Reuters Practical Law.

993 Shukla U and Thampy A "Analysis of competition and market power in the wholesale electricity market in India" 2011 Energy Policy 2703.

994 Rufin et al "The Changing role of the state in electricity industry in Brazil, China and India: Differences and explanations" 2003 The American Journal of Economics and Sociology 654 and 650.

Communist Party ensured policy stability particularly because of leadership discipline. It embraced technology, it gradually moved from series of small units' generators to larger projects, sought Greenfield investment in the generator segment, learned from experiences in other sectors before allowing foreign investment in power sector.[995]

The generation segment of NESI initially benefitted from improved investment in the generation segment of the market which was non-existent prior to the reform. This was largely due to the government approach to the reform at inception which placed more emphasis on increasing power generation capacity than expanding transmission and distribution capacities. While power generation has relatively improved post-privatization as shown by the available capacity of the generating plants in chapter four (4) of the study, investment has stalled and necessarily so, arising from lesser capacity to wheel available power and distribute the power down the value chain of the supply industry. Therefore, it will amount to placing the cart before the horse at this stage of the reform of the industry to be seeking for more investments in the generation segment when the installed capacity of the various generation plants is yet to be fully utilized due to transmission and distribution constraints.

5.5 LESSONS AND OPTIONS FOR POWER DISTRIBUTION SEGMENT OF NESI

5.5.1 *The Indian lesson and option*

The BPE had emphasized that the experiences of other nations and the opinion of critical stakeholders were incorporated into the design of the bidding process of the Discos in Nigeria and that all transaction documents such as request for proposal (RFP), draft contracts, evaluation criteria were all endorsed by the Regulator (NERC) before they were issued to bidders. It equally emphasized that critical evaluations of the technical bids were carried out by various reputable institutions. However, post-privatization experiences in this segment of the supply industry as shown in chapter 4 of the study indicate that there might have been an inherent flaw in the bidding process.

Drawing from the New Delhi, India experience, it will appear that the historical background leading to the bidding process adopted in New Delhi was lost on the

995 Rufin et al "The Changing role of the state in electricity industry in Brazil, China and India: Differences and explanations" 2003 The American Journal of Economics and Sociology 659.

reform actors in Nigeria. First, the reform trajectory in India recognized that there was the need to improve on the financial viability of the SEBs, particularly the Discos, and also to insulate the SEBs from political influence, before privatizing them. These concerns arose from the inability of the state assets from increasing tariff due to politically motivated cross subsidy issue and loss of revenue prior to the reform undertaken.

Secondly, before the commencement of the third phase of the India reform process by its central government, the central government also learnt valuable lessons from the failure of the Orissa's privatization of its distribution segment. The Orissa's privatization of the Discos failed because of the lack of accurate information on the actual loss level of the sold assets. Investors in Orissa had developed their bids on the basis that the actual loss level of the assets was 39.5 percent but later realized after take over that the actual loss level was 49.4 percent and even 51 percent in some cases. The Orissa government also failed to provide support to offset losses, failed to pay its debt to the Discos and ensured the Regulator kept the tariff below cost reflective level. Similarly, these summed up all the undoing of the reform in the distribution segment of the NESI.

The resulting effect is that there arose a negative financial situation that eventually led to the exit of one of the investors. The Delhi's government learnt from this and made necessary adjustments in its design by introducing a new mechanism for efficiency in its bidding parameters, the reduction of the Aggregate Technical and Commercial losses. This ensured that the assets were valued at a level at which the investor would be able to earn a suitable return based on assumptions on reasonable tariff increase, the bid schedule of loss reductions and gradually declining government support provided for a transition period. The investors were presented with a clean balance sheet; power was sold to the Discos at a predetermined bulk supply tariff on the basis of each Disco's capacity and at a subsidized rate by the State Government. This was carefully implemented to attract the investors and to ensure that tariff was kept below cost-reflective level and was properly subsidized in the transition period. The Regulator using an annual tariff adjustment mechanism kept tariff hike at 50% below the allowed level during the transition period.

The careful implementation of the transition period in New Delhi is in sharp contradistinction to the Regulator's implementation of the transition period of the new power market in Nigeria. In the face of serious economic crisis during the transition

period in Nigeria, the government support only came at the time the Discos' indebtedness was almost unmanageable. The removal of collection losses as a pass-through cost from the Discos in Nigeria was misconceived when compared with similar act of the Regulator in New Delhi. A lot of decisions of the Regulator in New Delhi were based on the certainty of the AT&C losses. While the Discos were still trying to grapple with the realities of the assumed value of ATC&C in the transition period in Nigeria, the Regulator further compounded the problem by removing collection losses as a pass-through cost when in actual fact, most of what amounted to the collection losses were accumulated debt owed by government institutions to the Discos.

Other reform innovations in India such as the creation of the offence of theft of electricity, establishment of special courts to try offenders, use of IT applications and devices for ensuring efficient operations were also made possible because of the stable financial situation of the New Delhi's Discos in the privatized market. The reform also introduced open access and distribution franchise to facilitate market competition. The distribution franchise model has been deployed efficiently in the State of Maharashtra by subjecting freely executed Franchise Agreement to Regulator's tariff approval and other regulations. The Nigerian Regulator is currently working on a regulatory framework for distribution franchising in Nigeria,[996] although, the Abuja Electricity Distribution Company has commenced the implementation of a variation of the models adopted in Maharashtra,[997] but under a contractual framework, by which a mini grid developer interconnects with the Disco, takes over a particular Disco's franchise areas and sells its generated power as well as on-grid power.[998]

The Regulator in Nigeria had envisaged that there will be the FGN's subsidy to make up for the expected shortfall between actual and cost reflective tariffs for the first two years of the Discos' operation after privatization owing to the low tariffs of certain classes of consumers, but arising from the Interim Rule imposed by the Regulator and a systemic delay, the FGN's intervention/subsidy came in 2015, two years after the market became operational. At the time, the Discos' indebtedness had gone up to

996 Nigerian Electricity Regulatory Commission (NERC) Consultation paper on the development of a regulatory framework for electricity distribution franchising in Nigeria of 2019.

997 Totare NP and Pandit S "Power sector reform in Maharashtra India" 2010 Energy Policy 7088.

998 Transcript of interview with Abuja Electricity Distribution Company (Financial Services, Strategy and Planning) AEDC Office, Abuja 10.

N213 billion (N196 billion arising from tariff and market shortfall[999] and N14 billion legacy gas debt of the Gencos).

This subsidy was similar to the Delhi's post privatization subsidies to its Discoms to secure cash flow rights of the companies in design only but not in implementation. Delhi's subsidy was an advance on early actual Discoms' losses against future benefits while the NEMSF (N213 billion) cater to historical debts against future benefits subject to assumed ATC&C.

5.5.2 *The China lesson and option*

At the initial phase of the Chinese reform, the electricity law sets principle of a centralized electricity pricing and tariff setting that required that on-grid tariff reflects the fair sharing of project costs, compensate for cost, incorporate related taxes and surcharges and allowed for reasonable profits and also administratively determine/benchmarked wholesale and catalogue retail tariffs. Through the Notice on Reform on Electricity Pricing 2003, the benchmark on on-grid tariff was based on social costs of power generation which were province specific but based on the most efficient power plant. The principle was also implemented in line with province-based catalogue retail electricity tariffs which were set low in western and inland provinces compared to others.

The regulatory pricing mechanism introduced by the NDRC requires the grid companies to purchase power from generation plants at an on-grid price and sell power to users (retail tariff) at the price of electricity. The gap between the on-grid price and the retail price is the transmission and distribution price and government funds which were all determined by NDRC. The fused system of transmission and distribution makes the revenue stream of the grid companies to come from electricity sales to consumers and from transmission business. Consumers are divided into industrial and commercial, residents and agricultural. Prices to consumers vary across the regions depending on the type of users who are grouped into five voltage grades namely; 500KV, 220KV, 110KV, 10KV and less than 1KV.

Further pricing reforms sought to bring about market-oriented pricing mechanism such as the Direct Power Purchase for Large Users (DPLU). DPLU encourages bilateral

[999] Federal Republic of Nigeria Power Sector Recovery Programme 2017 – 2021 (January 2018) online: https://mypower.ng/wp-content/uploads/2018/02/PSRP-Master-Document-January-2018.pdf (Date of use: 12 February 2020) 24.

negotiation between large users and generating plants on one hand and organized group of retailers and generating plants on the other hand, to determine on-grid price. Tiered electricity pricing mechanism was fused with Time of Use mechanism to encourage the saving of electricity. The Chinese model provides an option outside of the privatization model undertaken by the Nigerian government and the key lesson is that efficiency can equally be achieved with phased reform towards market-oriented principles.

5.5.3 *The Brazil lesson and option*

The Brazilian approach to the distribution segment reform shows that it is possible to gain optimum financial benefit from sale of assets and at the same time ensure financial viability for the Discos in the privatized market. First, the government leveraged on two inherent factors in the system before the reform. There was in existence a high rate of access to electricity (89%) and so the expansion/infrastructure requirement was considerably low compared to that of Nigeria with a very poor access to electricity deficit prior to the reform. Secondly, there was also in existence a law that allowed the prices to reflect cost of generation and other costs, a situation different from that of most jurisdictions prior to reform. The low resistance to tariff increase after privatization also assisted in the implementation of the reform design.

Non-controllable costs like wholesale electricity price, taxes, and surcharges were pass-through to retail prices for the privatized Discos while other costs were indexed to inflation. Competition was encouraged by allowing the Discos and large consumers to choose their energy suppliers in the wholesale market by executing contract, 'Initial Contract', which is to last for a period of eight years. Discos are allowed to generate up to 35% of their power, they are also allowed to explore related business opportunities (Information Technology). No condition was placed for minimum investment or service expansion like the service level agreements that were signed by the Gencos and Discos in Nigeria (Performance Agreement).

The Brazilian government changed its approach for the second phase of the reform that targeted the unsold Discos at the initial phase of the privatization. The Government sought financial assistance from the World Bank through its rehabilitation project which addressed the performance issues of the unsold Discos in preparation for sale. Tariffs were adjusted according to generation costs in order to guarantee revenues for the utilities including the Discos, to cover operating costs and investment

in generation capacity expansion. Some mechanisms were introduced to improve electricity affordability and to introduce discount according to power consumption. Incentives such as allowing higher operating cost for best performing Disco was introduced while penalty was introduced for the worst performer. Non-technical losses limits were set putting into consideration each Disco's strength and the peculiarity of its area of service.

5.5.4 *The Chile lesson and option*

Chile allowed a physical bypass of distribution network by large users to the transmission network. Large users execute wholesale contracts with Gencos while small users pay regulated capacity and energy prices for energy supplied by a Disco with monopoly in its area of service. Transmission charges are fixed every four (4) years and paid for by Gencos and customers. Energy prices are unregulated for the large users but regulated for the small users.

The Discos have a non-exclusive concession over a geographic area and are mandated to sell electricity at regulated price (Distribution value added also known as VAD). Large users only pay transmission charges and not distribution charge while small users pay both transmission and distribution charges. Distribution charges is recalculated every four (4) years by a procedure that determines the operating costs of an efficient firm and setting rates to provide a 10% return on the replacement value of assets. The rates are applied to existing companies to ensure industry average return does not exceed 14% or fall below 6%.

The Regulator's sanctioning power to penalize companies for failure to comply with quality and information supplied is strengthened and the Regulator's right to require companies to hire and pay independent auditors when there is doubt about information supplied was established. Discos are allowed to contract their entire power demand in advance within a minimum of three (3) years and maximum of fifteen (15) years, the prices are to remain fixed during the entire length of the contract. This enables the Discos to obtain project finance with sufficient time to build infrastructure (3 – 15 years) with the assurance of price stability for the same period of time. Can this work in Nigeria in view of high currency flunctuations etc

5.6 LESSONS AND OPTIONS FOR POWER TRANSMISSION SEGMENT OF NESI

5.6.1 *The Chile lesson and option*

The Chile transmission network shows that open access regime can be achieved by allowing Gencos a non-discriminatory use of available transmission capacity under an Independent System Operator who coordinates the transmission network while the Gencos in an interconnected system organized themselves and control dispatch (Economic Load Dispatch Center). This approach guarantees minimum total operating cost and also ensures equitable market access to all Gencos. The mandatory requirement of the Gencos to declare availability every hour is used to dispatch power plants, set energy price or spot price.

Gencos are allowed to own transmission assets and to interconnect the network through its transmission system provided the Genco accepts to finance installation extension. The transmission right paid for by the Gencos depends on the part of the system that belongs to their influence area (lines and substations) and also pay in proportion to their capacity in transmission wheeling which is equal to the annualized investment involved. This expansion mechanism helps to achieve dual structure of transmission system ownership in Chile and an expansion growth.

In terms of governance structure, the inclusion of Gencos, transmission companies in the board of CDEC (responsible for bye-laws to complement reform laws) helps to ensure equitability and neutrality. Charges for transmission use were solely allocated to Gencos on the basis of the principle that Gencos require transmission services to reach consumers. Payment for the transmission use is based on negotiated tariffs. New connections and lines were paid for by the Gencos who were free to negotiate terms with transmission companies or build their own. Incumbent transmission companies were prevented from passing on costs of new transmission wires to existing customers. This approach ensures that transmission usage was liberated to achieve free market economy.

Arising from the difficulties between Gencos and transmission companies over negotiation of charges and failure of the arbitration mechanism put in place to resolve it, a new transmission usage mechanism was introduced to regulate charges/fee that is determined every four (4) years by the CNE. The regulated charge is directed at incentivizing investment in transmission expansion because of the previous negotiation issues for new transmission lines. Where private initiative fails to develop expansion, the CNE was required to carry out expansion.

5.6.2 *The China lesson and option*

China allows only the two grid companies to buy electricity from Gencos and to solely distribute and sell the electricity in their service areas. The companies also control inter regional system operation (regional grid operation, regional system dispatch, regional power markets). Arising from the regional based supply and demand structure, China utilized the trans-regional power transmission and interconnection projects to interconnect the grids for effective allocation of resources. Trans-regional trading mechanism was introduced to manage the power market.

Transmission companies charge transmission and distribution tariff which is the price difference between the purchase and sale of electricity. The reform ensured that grid companies' income is in two parts; income from sale of power and income from transmission and distribution. The reform also introduced transaction price of electricity which is determined by the market between Gencos and large users, other retailers are allowed to participate as organized larger group. Power system is left in the hands of local government authorities while there is an increase in government participation in transmission operation and management.

5.6.3 *The Australia and U.S.A. lesson and option*

The two countries operate an Independent System Operator (ISO) system responsible for system operation, a key component of an efficient transmission network. Australia operates an ISO (AEMO) system whose ownership is shared between government and industry participants. The ISO operates a user-pays cost recovery system and recover operating cost through fees paid by industry participants. AEMO manages the day-to-day operation of the power system in accordance with Market Rules (National Electricity Rules). This approach ensures that power market operation is free from conflict of interest and to stimulate performance growth.

In the U.S.A., the adoption of ISO ensures that competition is attained and that the risk of discriminatory access to network is minimized. U.S.A achieved the vertical separation of transmission control with the creation of RTO and ISO that took over transmission control from previous vertical integrated utilities. The creation was as a result of the market challenge from prior owners of transmission facilities; the regulator had cause to intervene in access issues by ordering the said owners to provide transmission service on a case by case basis until the issuance of Order No.888 which required open access and non-discrimination.

The principles of the ISO concept ensure independence, fairness, smooth operation of the transmission system. The RTOs created also guarantees certain standards such as independence from transmission owners and market participants, sufficient size and scope, management of transmission congestion and monitoring of wholesale power markets.

5.7 CONCLUSION

From the selected examples of power markets identified above in our study, it is clear that there is no standard solution to power market challenges particularly in the transmission and distribution segments. Each market has evolved in accordance with its peculiar situation which influenced its reform approach. From the analysis, while the markets are yet to find their Eldorado, it is clear that with the ability to understand critical challenges, adopt and implement well thought out reforms through the use of regulatory mechanisms in these markets, the power markets reform are being stimulated in achieving the performance of the utilities in the post-reform era.

NESI must be creative, innovative and bold enough in finding a lasting solution to the numerous challenges of the generation, transmission and distribution of electricity in the privatized market. The Regulator as well as the market participants ought to be able to anticipate and promptly respond to market challenges. The highlights of the various approaches of the above selected power markets mechanism will serve as a useful guide to stimulate the Nigerian power market reform. Chile (the pioneer), India and Brazil have all demonstrated that it is possible to find a solution that is unique to their circumstances particularly with the distribution segment.

It is not impossible for a trade-off between the various approaches of these power markets and the Nigerian situation. China has not only demonstrated that privatization is not the only useful reform approach, the constant restructuring and rearrangement of its utilities for efficiency with a gradual movement towards competition and liberalization has helped to shape it transmission and distribution segments. Brazil also prioritized efficiency for its distribution utilities in order to insulate its price increase from political consideration which has been one of the most limiting factors for NESI.

The next chapter will summarize the findings made in this study and will make recommendations taking into consideration the options available in the above selected power markets.

Chapter 6

FINDINGS AND RECOMMENDATIONS

6.1 SUMMARY OF FINDINGS

One of the aims of the study in this Chapter is to recapitulate the answers to the research questions posed in Chapter 1 which were already answered during the course of the discourse in Chapter 2 through to 5 of the study. The findings made in each of the Chapters are reduced as follows:

Chapter 2 explained the theoretical basis and the conceptual framework of the study. Three established theories of regulation were identified namely; public interest theory, private interest group theory and institutional theory of regulation. However, it was found that the diversity of the privatized power market in Nigeria underscores the need

to view and consider regulatory options that draw from a variety of the elements of these established theories of regulation using a hybrid theory that informed on the other theories and also allows for a consideration of the political, economic and institutional arrangements of the reform environment. This theory is utilized to serve as a basis to fashion out, amend and adjust implementable regulatory mechanisms to stimulate the ongoing power sector reform in the country.

The argument for the public interest theory of regulation is based on the allocative efficiency of state resources, the absence of which creates market imperfections such as monopolies/natural monopolies, anti-competitive behaviours, scarcity, and rationing. It was found that the theory supports the view that market imperfection justifies regulation presumably on the basis of a state's altruistic nature towards public good. The private interest group theory on the other hand, was found to explain why some regulations are not necessarily defined by public interest but are made to promote private interest or group interest which is otherwise explained as the capture theory. The institutional theory of regulation focused on the institutional framework of the society such as system of government, and mode of administration of justice, to determine what drives regulatory development.

The hybrid theory was utilized in this study for the consideration of certain elements necessary for initiating and adopting regulatory interventions namely; (i) phased efficiency goal, (ii) the benefits and interests of the drivers of the efficiency goal (producer, government or consumer) (iii) reform of institutional arrangements to reduce transaction cost and increase credible commitment (iv) contextualized applicability. It was found that each of these elements best explains the context of the issues specific regulatory mechanisms were designed to solve in Chapter 4 of the study.

Furthermore, it was also found in Chapter 2 that the rationale for regulation of electricity industry is traceable to the natural monopolistic nature of the utility. As a result, state intervention was justified to stem the tide of abusive market power of vertically integrated utilities. This was achieved by different methods such as public ownership, price control/entry regulatory mechanisms, and imposition of service obligations. However, public ownership of the vertically integrated production, transmission and distribution of electric utilities became unpopular in the course of time for various reasons such as political interference in decision making, investment planning, tariff setting and general inefficiency.

The above finding provided the basis for the argument for the policy shift by governments from public ownership of vertically integrated utilities to private ownership and control (China is an exception in this regard that adopted a reorganization and rearrangement regulatory intervention as against privatization and was successful as shown in Chapter 5). To achieve this, privatization was introduced in Chile and United Kingdom because the desired efficiency result did not occur through public ownership. It was found that the state's inability to efficiently manage business operation of the utilities was more evident in developing economies where available data shows that state-owned enterprises were generally not profitable in Africa. Therefore, the increasing reliance on foreign loans by these countries which came with the attached condition of reform through reduced public sector role brought about the introduction of privatization to improve the efficiency of the utilities.

Lastly, it was also argued and found that since electricity reform is a long-term process, privatization alone may not necessarily be the panacea to the noticeable post-privatization market imperfections in the developing economies. There is the need to focus on the regulatory structure, the degree of competition and deeper regulation mechanisms in the privatized market with regards to tariff-setting, freedom of capital budgeting and operations of privatized entities, market operations, clearly spelt out laws, competent and consistent Regulator, in order to achieve market efficiency. The findings in chapter 2 are mainly directed to provide a theoretical and conceptual basis for regulatory intervention in power sector reform. It seeks to provide an answer for the first sub-question and objective of the study by explaining the rationale behind the current regulatory regime of the Nigerian power sector.

The information provided and the analysis carried out in Chapter 3 was designed to deconstruct the regulatory regime of the power sector in Nigeria which is necessary to answer the research sub-questions b and c and objective 1.3.2 in Chapter 1 of the study. It was found that electricity was introduced as a form of energy and because of its importance in the course of history, it was harnessed for industrial and developmental growth. It was also found that the development of electricity extended to Africa and eventually to Nigeria, in the colonial era which ultimately led to the establishment of the electricity supply structure of the country and its evolution between the colonial and post-independence era of the country.

From the analysis, it was found that the historical experiences of the colonial era and the geographical nature of the country post-independence, accounted for the

centralized electricity regulatory structure adopted and the investment in hydro-dam to increase power generation capacity. The centralized electricity supply structure was adopted by the government and was designed to operate with hydro-stations in the North and thermal plants in the South (arising from the discovery of oil and gas in the South) interconnected by a national transmission grid.[1000] It was equally found that while there was a need for expansion in power generation due to the growing rate of electricity demand, after the initial investments of the post-independence era, the government owned institution responsible for such undertaking had been poorly managed by the government. Therefore, it was included as part of the assets for sale alongside other utilities in the first attempt of the Nigerian government at liberalization and privatization in 1988.

While the first attempt at liberalization and privatization failed, the government owned enterprise's infrastructures continued to deteriorate and no attempt was made by the government to invest in infrastructure until 1998 when the government enacted the Public Enterprises (Privatization and Commercialization) Act, CAP P38 Laws of the Federation of Nigeria (LFN) 2004. This paved way for the sector reform, the law provided a framework for the sale of the assets of the vertically integrated government-owned enterprise (NEPA) and equally provides a background for the privatization exercise of the power sector that was kick started by the formulation and implementation of the National Electric Power Policy (NEPP) in 2001, a precursor to the Electric Power Sector Reform Act.

In this chapter, it was found that the quality of the political institution was demonstrated in the ability of the President of the country to fast-track a reform process through the Roadmap policy in 2010. The policy became necessary arising from factors such as ill-conceived power projects, successive governments' ideological differences, infrastructural decay, industrial labour issues, lack of appropriate electricity pricing regime and functional metering gap[1001] that characterized the power sector in the critical period of the reform leading to the policy.

Moreover, the reform framework designed by the policy was based on the five recommended principles for power sector reform in developing countries propounded by the World Bank. These principles were included as one of the conditions for

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1000 The recently passed Electricity Act 2023 is a gradual step towards decentralizing the electricity market in Nigeria.

1001 Olalere P.O. "Privatisation of Electricity Industry in Nigeria: Lessons from Europe and United States of America" 2014 (5) Renewable Energy Law and Policy 141.

obtaining financial assistance to the country from World Bank for the reform. It was found that while the government' intervention is consistent with the public interest theory, the elements of the hybrid theory were absent in the failure of the government to consider the economic and political reality of the country in terms of foreign exchange volatility, inflation rate, contract enforcement challenges of the Gencos, nature of transmission network businesses and peculiar technical, commercial and collection of revenue challenges which contributed to the tariff issues of the privatized market in chapter 4.

Chapter 4 of the study analyzed the regulatory mechanisms initiated in response to the market situations in the privatized market. It was observed that the operation of the power market design created a value chain problem from the downstream distribution segment through the transmission to the power generation segment. It was found that the Regulatory interventions in the ensuing market situations from the value chain issues have not been satisfactory. The analysis of the market situations and regulatory interventions drew from opinions expressed in the interview with some of the market participants and the Regulator. The opinions expressed in the interview provided useful insights into the performance and cost-reflection crisis of the Discos from the inception of the reformed market in 2013 and it equally shows the extent of the impact of the crisis on the Discos. The inadequacies of the regulatory interventions made to solve some of the issues were pointed out drawing extensively from the interview conducted.

It was found that economic indices which also constitute the tariff components such as inflation rate, gas prices (which was unstable before the advent of the Domestic Supply Obligation), inflation rate, and foreign exchange of the country, used for the computation of electricity tariff by the regulator were largely based on assumptions. The volatility of these tariff components in the country contributed largely to the operational problems of the privatized market. The reform process clearly failed to take into cognizance the compounding nature of this critical elements of the hybrid theory before the market became operational. The failure of an aspect of the bidding process of the Discos relating to the absence of an actual determination of the ATC&C loss value of each of the assets before their sale accounted for serious performance issues in the privatized market. This development begs the question of whether the investors would have purchased the Discos had they known the real loss value of each of the

assets or the knowledge of the real loss value would have helped in reducing the aggressive notional value adopted for the bidding process.

While it has been shown that both government and investors' decision on the distribution assets were unfounded, it was found that a thorough consideration of the real financial situation and the capability of the Regulator to manage it would have likely averted the crisis. Therefore, the regulatory outcome has become increasingly debilitating for the entire power market because of the Discos' collection inadequacy.

The constraints of the transmission segment were equally analyzed, pointing out the challenges of its three major areas of constraint namely; investment planning, execution and governance issues, technical issues and unbiased System Operator. The opinions expressed in the interviews with the transmission company, the Discos and Gencos provided useful insights in understanding the market issues bedeviling the transmission company and the nature and impact of the regulatory mechanism adopted in response. It was found that the change of government approach to the management of the TCN, from concession to direct control must have been responsible for the success recorded in obtaining international funding for some of its major expansion projects needed to bridge the infrastructure gap but it is also the finding that private sector discipline will be ultimately required to make the Company viable.

It was found that the discipline of the private sector will shield the TCN from political interference through budgetary control such as the political system in the country that encourages a situation where legislators lobby for project execution in places that are not technically viable for the power system. Ultimately, it was found that investment in the transmission segment will not yield any positive result except there are commensurate investments in the distribution segment. The need for these concurrent investments in the distribution segment is made manifest in the technical issues between the two segments; load balancing, equipment failure and disequilibrium, frequency and voltage control issues. It was also found that the efficacy of the Grid Code and Market Rules designed to take care of these issues is hampered by the lack of implementation, enforcement, compliance and administrative inefficiencies of government institution while there will be need for additional regulatory mechanisms to the Free Governor Mode and Spinning reserves mechanism targeted at solving some of the issues.

The neutrality of the two arms of the TCN, SO and MO was equally called into question in addressing system and market operational issues in the electricity market giving the dual role they play in the market (regulatory role and market participants). It was found that there is the need to insulate both the SO and MO from government interference to instill market confidence and to also ensure that the required expertise required for efficient system operation is utilized by the SO. Chapter 4 also analyzed the power generation constraints arising from the ineffectiveness of some Gencos' Power Purchase Agreements with NBET and gas contracts with the gas suppliers. The ripple effects of the ineffectiveness were identified as gas constraint, expansion/performance disincentive, lack of funds and cash flow and lack of verifiable data. It was found that the Regulator and NBET's misinterpretation of the available capacity of the Gencos for payment purposes equally serve to further compound the issue of Gencos' payment by NBET while the Regulator's perception that the Gencos should seek solution to their contractual issues within the contractual framework has also not been very helpful giving the reliability of the judicial system in Nigeria.

Furthermore, it was found that the transmission and distribution segments also present some technical and operational challenges for the Gencos such as grid instability and inability to evacuate available capacity of the Gencos resulting into load rejection, causing damage to the Gencos' machines that require huge maintenance costs. It was found that the Free Governor Mode regulatory mechanism directed at solving grid instability has not taken into consideration the losses incurred by the Gencos during grid instability while the introduction of the Spinning Reserves mechanism is yet to materialize in the market. Unless the issues around the payment of the Gencos' available capacity and the issues around the effective wheeling and utilization of the said available capacity by the transmission and distribution segments are resolved, all expansion discussions in power generation will be a moot point.

Generally, the implementation of some independent regulatory mechanisms such as the Eligible Customer Regulation and the Nigeria Electricity Regulatory Commission Mini Grid Regulation targeted at effective utilization of power and access to both grid and non-grid power respectively was analyzed. It was found that these mechanisms presents practicable solutions to the market problems identified but their implementation has been weak.

Chapter 5 analyzed the regulatory mechanism initiatives in India, China, Brazil and Chile in the distribution segment of their electricity markets. Chile, China, U.S.A. and

Australia were analyzed for the transmission segment. The Chapter analyzed the lessons Nigeria can learn from these initiatives and the regulatory mechanism options available for the Nigerian Electricity Supply Industry in solving the intractable value chain issues in the privatized market. It was found that within India, New-Delhi learnt from the failure of Orissa's privatization of its Discos and improved on the reform strategy by ensuring that the efficiency mechanism of the bidding parameters for the Discos are adequate. The reform also introduced open access and distribution franchise to facilitate market competition, creation of the offence of theft of electricity, establishment of special courts to try offenders, use of IT applications and devices for ensuring efficient operations.

It was found that the internalization reform mechanism in China helped to rebuild its pricing structure and efficiency to the consumers. Brazil centers its distribution reform on the initial building of the financial viability of the Discos and allows for cost – reflective tariff. Chile allows for a physical bypass of the distribution network by the large users who are also allowed to negotiate electricity prices with the Gencos while only the small users pay regulated prices. In the transmission segment, Chile operates a liberalized structure that allows for open access regime and creates allowance for any Genco to own transmission assets. With two grid companies in China, it utilized the trans-regional power transmission and interconnection projects to interconnect the grids for effective allocation of resources and expansion of network. U.S.A. and Australia were identified as the model initiatives for Independent System Operation of the grid which allows for neutrality as against government owned System Operation in Nigeria.

6.2 RECOMMENDATIONS OF REGULATORY MECHANISM INITIATIVES AND PRACTICAL SOLUTIONS FOR ISSUES OF THE NIGERIAN ELECTRICITY MARKET INDUSTRY

In addressing the issues identified in the research problem, Chapters 3, 4 and 5 of the study, this section will make three (3) recommendations in the areas that are central to the efficiency of the power market in Nigeria namely; the distribution, transmission and generation. These recommendations are addressed to the Nigerian government and its relevant agencies in the power market, the market participants, prospective investors and the consumers.

The unique contribution herein to the body of knowledge is the adoption of practical solutions to electricity market issues. The focus of the recommendations is to internalize the solution within the existing structure and situation for the short term and externalize the solution for the long term in line with the hybrid theory of regulation. The rationale for this approach is that within the existing framework and situation, there is a need to proceed from what can be done internally to solve the problems given that the reverse approach has not been helpful. There is the need to further liberalize power supply, find use for the underutilized available capacity of the Gencos by the transmission and distribution segments before expansion while also ensuring that the available capacity is not compromised by technical and operational issues and deemphasize the overreliance on the existing transmission network.

Therefore, it is recommended that:

6.2.1 Power Supply be Decentralized in Nigeria:

The rationale for this recommendation can be found in Chapters 3 and 4 of the study. While the underlining assumption of any power sector reform is that the reform must bring about efficiency, in reality, the path to efficiency may be unclear given peculiar challenges of each reform economy. In pre and post-privatization power market in Nigeria, the daunting challenge is achieving efficiency, either as a monopoly or a privatized monopoly. It was thought that privatization is the key to efficiency; however, the intractable issues of the privatized market in Chapter 4 have shown otherwise. In view of the enormity of the financial investments required particularly for the transmission and distribution segments, to unlock the unutilized available energy capacity in the country and to improve on power supply, it is preferable to create regulatory mechanisms to decentralize power supply.

This recommendation is built on two grounds; first, that the dearth of funds for investment in the sector will continue, in the absence of measures to guarantee investment returns. Secondly, without introducing more participants particularly in the distribution segment, the Discos and the current licensees are not capable of delivering efficient power supply. The motivation for this recommendation is in the fact that already in existence are pockets of models for both off-grid and on-grid small scale power production and distribution in the country as well as the emerging states' participation. Most households already cater to their power needs through diesel or petrol generators (gas generator is a new innovation) as alternative power. In scaling

up the concept, several residential estates and businesses have developed their private off-grid power while some areas under the Discos are pulling resources together to revamp or purchase new infrastructures for the Disco serving them in order to have uninterrupted access to on-grid power.

The contextualized applicability of these power supply models is in the fact that consumers (industrial, residential and government) are providing alternative practicable solutions to unstable or lack of grid power. Although these solutions are expensive but are sustainable and efficient. Therefore, there is a need for the convergence of some of the regulatory mechanisms already put in place by the Regulator for easy implementation of their objectives in promoting these models. Two Regulations stand out in this regard; Nigerian Electricity Regulatory Commission (Embedded Generation) 2012 and Nigerian Electricity Regulatory Commission (Independent Electricity Distribution Networks) 2012 issued by the Regulator prior to privatization which were designed to facilitate electricity supply by power generators and distributors outside of Gencos and Discos. Power generators of less than 20MW are issued license and are allowed to dispatch power outside of the grid,[1002] allowed non-discriminatory access to the distribution network of a Disco[1003] and also to a transmission network if need be.[1004] The Distribution licenses are also issued to qualified operators to engage in electricity distribution independent of the distribution system operated by the Discos.[1005]

The provisions of the Nigerian Electricity Regulatory Commission Regulation for Mini Grids 2016 discussed in Chapter four (4) dealing with power distribution by both isolated and interconnected mini grids ought to be tied with the above Regulations to streamline access to electricity supply by independent participants. The implementation issues of the Eligible Customer Regulation designed to promote competition in electricity supply, third party access to transmission and distribution infrastructure and utilization of un-contracted capacity by the Gencos, discussed in Chapter four (4) of the study, can be resolved by adopting a decentralized mechanism that will encourage electricity trading in smaller capacity outside of the grid power. With this approach, the regulator will be required to adopt a willing buyer and willing seller

1002 Paragraph 5 Nigerian Electricity Regulatory Commission (Embedded Generation) 2012.
1003 Paragraph 6 Nigerian Electricity Regulatory Commission (Embedded Generation) 2012.
1004 Paragraph 11 Nigerian Electricity Regulatory Commission (Embedded Generation) 2012.
1005 Paragraph 1 Nigerian Electricity Regulatory Commission (Independent Electricity Distribution Network) 2012.

mechanism that will discourage the Discos' concern about customers exiting their network due to alternative power supply options.

It is also noted that while the Regulator is still consulting on the development of a framework for electricity distribution franchising in Nigeria, the customers (in areas where group of customers are engaging the Discos to provide support) and some of the Discos (Abuja Distribution Company in chapter four) are already adopting models analogous to distribution franchising as envisaged by the Regulator in its Consultation Paper.[1006]Distribution franchising will ease the financial pressure on the Discos' for mandatory network improvement by encouraging them to open up their network for third party participation. In a similar breadth, the attempt by the FGN through PPI to increase the capacity of the distribution network by on-lending the project cost (both sourced from third party international finance entities and self) to the Discos, is laudable but the sustainability of the method is questionable, considering government's poor performance in undertaking utility investment and management.

The reality of the Nigerian electricity market shows that a single power market is unreliable and cannot guarantee efficient power supply.[1007] It also shows that within the single power market, the current licensees particularly the Discos are incapable of providing efficient power supply. Therefore, any attempt at consolidating the Discos' position through the PPI will be counterproductive and may not yield the desired result. Rather than the unstable approach of the government, a holistic approach must be taken to encourage more participants including government at state levels[1008] (the constitutional and Reform Act Act amendment will provide the basis for this). For example, since distribution franchising will require the Discos to authorize third parties to provide distribution services on their behalf within their concession areas, the plausible thing to do for the Regulator is to take advantage of the willingness of the customers to engage with the Discos to provide support for distribution services by designing business models that can best serve the interest of the parties. This will ensure that issues surrounding the provision of fund by customers for the purchase and repair of transformers and wire lines while the Discos still insist that the equipment belongs to them, will be laid to rest.

1006 Nigerian Electricity Regulatory Commission (NERC) Consultation Paper on the Development of a Regulatory Framework for Electricity Distribution Franchising in Nigeria of 2019.

1007 The Electricity Act 2023 which was assented to in June 2023 by the President is a step towards decentralizing the electricity market.

1008 Lagos, Edo, Ondo States have enacted laws to create an alternative electricity market from the single market operated centrally.

Expectedly, the Discos will be averse to any solution that will disturb the monopoly they enjoy in their franchise areas, however, distribution franchising will protect their interest as well as ensure that willing and competent distributors are allowed to use their network for efficient distribution of power. In the absence of distribution franchising, mutual exit strategies must be pursued by the Discos and BPE to do away with non performing existing contracts so as to pave way for other participants.

6.2.2 Overreliance on the transmission network be deemphasized and transmission operation restructuring:

As the electricity demand in the country continues to grow without the commensurate investment in distribution network capacity so will the strain on the transmission network increase. It is no surprise that with the significant number of transmission projects and committed funds, the impact of the transmission expansion projects of the TCN has not been felt across the country.[1009] It is also doubtful that the required funds will continue to be accessible by the government (TCN is state-owned) in the face of the general economic challenges of the country. Therefore, the need to look inward for short to long term solution has become more compelling and necessary in line with the hybrid theory of regulation.

It is recommended that the overreliance on the on-grid transmission network in Nigeria be deemphasized. The transmission system in Nigerian centrally dispatch power to the entire country but due to the factors identified in chapter four (4), the network has become severely unstable and inadequate to wheel the available power produced by the Gencos. While the government managed TCN has managed to secure some international funding for improvement and transmission expansion, the enormity of the challenges of the segment has remained daunting. A decentralized power system will encourage smaller power production facilities (preferably renewables) to consumption areas thereby reducing the pressure on the long range transmission network.

In deemphasizing the on-grid transmission network, two key aspects ought to be considered. First, maintaining the current momentum in transmission expansion projects only to the extent that the wheeling capacity reasonably surpasses the energy generation capacity of the Gencos. This will ensure that power produced is evacuated adequately for the downstream while the distribution segment keys into the

1009 The transmission expansion projects and the attempt through the Presidential Power Initiative to increase the transmission network capacity using Siemens have not shown the desired result regardless of the huge fund committed.

decentralized approach earlier prescribed. Based on the decentralized approach, development in off-grid power (achievable by a further liberalization of the industry) will serve as an alternative to the overreliance on the on-grid power and will help sustain any improvement in the transmission network by reducing the pressure on the overstretched network. However, translating this into efficient power supply requires the corresponding capacity expansion and network improvement by the Discos. Therefore, giving the paucity of fund for huge power projects, the proliferation of smaller units of power producers and distributors (both Discos and other new participants) and the encouragement of electricity trading amongst them within a decentralized market will help reduce the overreliance on the transmission network.

Secondly, the fundamental role played by the TCN in the power supply chain underscores the rationale for most of the transmission expansion projects and execution carried out by the government. Deemphasizing the reliance on the network will help save cost and free up funds for other aspects of the value chain that can stimulate the power reform. To reduce the operational and capital costs of the TCN, the adoption of the regulatory mechanism in Chile will be readily useful for operational adjustments.

This requires an open access regime allowing the Gencos a non-discriminatory use of available transmission capacity under an Independent System Operator (ISO) who coordinates the transmission network while the Gencos in an interconnected system organized themselves and control dispatch (Economic Load Dispatch Center). The Gencos are allowed to own transmission assets and to interconnect the network through the transmission system provided they accept to finance installation extension. The transmission right to be paid for by the Gencos will depend on the part of the system that belongs to their influence area (lines and substations) and will be made to pay in proportion to their capacity in transmission wheeling which should be equal to the installation extension involved to reach consumers. In terms of governance structure, the inclusion of Gencos, transmission companies and Discos and any other participant that may be determined by the Regulator in the board of the ISO (responsible for transmission network excluding dispatch) will help ensure equitability and neutrality in system operation.

This approach guarantees minimum total operating cost and also ensures equitable market access to all Gencos. The mechanism will help to achieve a participatory transmission system ownership through which participants will develop the network

thereby taking the financial burden away from the government. It is recommended that the Regulator in following through with its desire to establish an Independent System Operator[1010] should consider a very robust and inclusive governance structure that includes members representing the Federal and State governments, Gencos, TCN, Discos, end-users' representatives and other industry participants as demonstrated by the Australia ISO type based on a user-pays cost recovery basis and to recover operating costs through fees paid by industry participants.

The aim of the approach is not to eliminate government interference in the transmission segment since the Regulator is a government set up, but the focus is on a participatory role for industry participants in the transmission of on grid power considering the peculiarity of this segment as discussed previously. The long term benefit of this approach will ensure that participants have firsthand information about needed investment and can facilitate the investment so long as it can co-own the assets. However, any form of regulatory capture of the ISO may be addressed by the retention of similar performance agreements signed with the Gencos for capacity expansion of the power plants sold to them, for the operation of the ISO.

The Regulator should also consider the fundamental principles forming the bedrock of the adoption of the ISO in America namely; fair and non-discriminatory governance structure, absence of conflict of interest, and allowing open access to transmission network based on reasonable rates. This approach will ensure that transmission usage is liberated and operated on a willing user basis free from the current operational challenges.

6.2.3 Underutilized available capacity of the Gencos be utilized before energy capacity expansion:

The Gencos' primary concern is in two folds; first, the underutilization of the available capacity of the Gencos which they claim to have made available but cannot be fully utilized and paid for due to value chain challenges identified in Chapter four (4). According to the Gencos, this resulted into revenue loss (capacity payment loss) and a hindrance to their financial ability to pay for gas. Secondly, since the capacity

[1010] Nigerian Electricity Regulatory Commission (NERC) Draft Consultation Paper on the Terms and Conditions for Establishment of an Independent System Operator (ISO) (May 2015) of 2015.

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payment loss exists, there is no incentive to the Gencos to increase energy generation capacity. Unfortunately, the contracts (Power Purchase Agreement) which are supposed to provide remedy are largely ineffective for the reasons canvassed in Chapter 4. It is recommended that capacity expansion of the Gencos should be suspended until the power system can evacuate and utilize the total installed capacity of the Gencos.[1011]

Taking advantage of a decentralized market, the Gencos can find use for any energy capacity not contracted with NBET and not centrally dispatched, to willing customers that can pay for it. With respect to energy contracted with NBET for the grid, it is only the removal of all transmission and distribution constraints that will ensure that the Gencos suffer no loss of capacity payment. In other words, since the Gencos' revenue is based on the expected revenue from the Discos, it is advisable that the focal point of the converged framework for a decentralized market should the distribution segment.

6.3 SUMMARY OF THE ANSWERS TO THE RESEARCH QUESTIONS AND OBJECTIVES ACHIEVED IN THE STUDY

The research questions have been answered in the course of the study in above. However, to sum up the answers provided in the course of the study, the answers to the main research question and sub-questions are encapsulated as follows:

a. Are there appropriate regulatory mechanisms to stimulate the ongoing electricity sector reform in the privatized market of Nigerian electricity?

   The power sector reform policy of the FGN clearly shows that the public interest theory is the rationale for adopting the regulatory regime for the reform. This is due to the decline of efficiency as shown by the historical experience of the Nigerian power sector in chapter 2. Therefore, it is not surprising that the failure of the state-owned utility will justify any policy formulation for the privatization of the sector to ensure efficiency of power supply. However, such historical experience was shown not to be enough to drive regulatory mechanism that can stimulate the reform without necessarily understanding the country's peculiar situation, and drawing

1011 While phases one and two of the implementation of the Presidential Power Initiative are directed at increasing transmission and distribution network to enable them accommodated generation capacity, centralizing the execution as FGN's responsibility is too restrictive for the electricity market.

lessons from other reform economies that can be implemented in a contextualized approach.

In this study, the phrase regulatory mechanism was used loosely to accommodate regulatory interventions of the government in response to specific market issues in the study. Some of these mechanisms were initiated by the market regulator while others were initiated directly by the government and later incorporated in the regulatory process by the regulator. On the whole, the study has shown that most of the identified regulatory mechanisms in response to market issues are; not appropriate, inadequate and poorly implemented.

With respect to the distribution segment of the privatized market, the tariff adjustment mechanism was found to be inadequate and poorly implemented to adjust the tariff to a cost reflective level in allowing reasonable rate of return for the Discos' investment. The computation of the components of the tariff mechanism (MYTO) was largely based on assumptions while the minor reviews provided by the tariff mechanism regime were not utilized at the inception of the privatized market to correct the financial situation.

The reliance on the Aggregate Technical Commercial and Collection losses (ATC&C) in determining the actual loss level of the Discos as a bidding parameter was flawed in its implementation. The various loss levels arrived at during the bidding process which were computed into the tariff were based on assumptions and negatively impacted the financial position of the Discos as well as the operation of the privatized market. The subsequent various regulatory mechanisms put in place to arrest some of the market situations have also not been able to adequately correct the resulting effect of the market financial crisis.

The implementation of the estimated billing regulatory mechanism put in place by the regulator prior to privatization to improve the collection losses of the Discos could not be sustained in the privatized market. This was largely due to the inability of the Discos to invest in infrastructures such as Feeders and transformers to enable the regulator monitor the Discos' billing and prevent arbitrary billing. The introduction of the Meter Asset Provider (MAP) mechanism in 2018 was to eliminate the estimated billing and close the metering gap in the market by allowing third party investors in the manufacturing and distribution of meter assets. However, estimated billing persisted and occasioned the regulator's directive in 2020 to cap estimated

billing and put a deadline to phasing it out. The regulator's assessment later shows that the MAP mechanism was equally inadequate in bridging the metering gap.

Arising from the inadequacies of these mechanisms, the government intervened with the National Mass Metering Programme (NMMP), a financial regulatory intervention to support the Discos and local manufacturers of Meters in the provision of meter assets. The regulator had since issued the Meter Asset Provider and National Mass Metering Programme Regulation to fuse the mechanisms. While there is a slight improvement in the metering gap as a result of these mechanisms, the Discos weak financial position requires additional and aggressive regulatory mechanisms to liberalize not only the provision of meter assets but the entire distribution segment.

The minimum remittance order of the regulator directed at the Discos to ensure proper remittance of revenue for the market is an indication that the regulator may need to carry out a sector financial audit to determine the financial position of each of the Discos. The energy imbalance mechanism introduced to prevent grid instability and load rejection by the Discos also overlooked the general limitation of the distribution network that requires substantial investment for improvement. For the TCN, there is a clear absence of regulatory mechanisms for ensuring proper investment planning and execution outside of the provisions of the Grid Code, enforcement of the Grid Code and maintaining grid stability. The enforcement of the Grid Code, Distribution Code and Metering Code equally constitute a challenge for the System Operator.

The Free Governor Mode mechanism introduced by the SO to maintain grid stability which incentivizes Gencos by prioritizing dispatch from Gencos operating on the mode has not been effective in preventing system collapse. The regulator is also yet to determine the tariff for the introduction of spinning reserve mechanism to prevent system collapse considering that spinning reserve used to ensure power system security. To ensure the neutrality of the SO, prevent conflict of interest (considering its dual market roles), and guarantee efficiency, the creation of the ISO or a reorganization of the SO by regulatory mechanism is important. Lastly, the removal all transmission and distribution constraints will resolve the contractual issues of the Gencos, therefore, introducing regulatory mechanism will serve no purpose in terms of Gencos' invoice settlement in the absence of the provision of security for the gas supplied to them.

In analyzing the power sector of some selected reform countries namely; India, Chile, China, Brazil, Australia and U.S.A., lessons and options for the Nigeria privatized market were provided as part of means of freeing the privatized market from the identified constraints. The lessons and options were drawn out in the findings above and also reflected in the recommendation for the appropriate power market segment. It is important to state that some of the options are already in contemplation by the regulator in Nigeria. For example, the establishment of ISO for the system operation, distribution franchising which the study further argued should be adopted within a decentralized and liberalized framework, off-grid power as an alternative or complimentary to grid power.

b. The study's objective is to analyze the regulatory regime of the post-privatization era of the electricity sector in Nigeria with a view to drawing out deficiencies and making recommendations where appropriate. Chapters 2 and 3 of the study identified the rationale for the regulatory structure of the privatized market of the Nigeria electricity sector and also deconstructed its regulatory structure. The analysis carried out in chapter 4 helped in identifying and understanding the constraints of the three segments of the power supply value chain. Considering the impact of the regulatory mechanisms and interventions considered in this chapter, it is less likely that efficiency can be achieved with the operation of the privatized market.

   The recommendations made to solve the current challenges are not only based on the lessons and options drawn from the analysis of the selected reform economies in chapter 4 but also on the need to contextualize the market issues and apply a more practicable approach to solution.

6.4 CONTRIBUTIONS TO LAW

6.4.1 Scope

The study has predominantly utilized legal analysis skills but it is a multi-disciplinary exercise that draws from several fields of study such as economics, engineering, political science, social science and law. It has integrated the knowledge derived from these fields of study into a legal analysis for deep appreciation of a developing reform market. The multidisciplinary approach has greatly assisted in making findings and suggesting solutions to intractable issues that do not readily yield to customary and standard regulatory solutions. During analysis, it was found that compliant regulatory

mechanisms adopted by any system for power sector reform is largely dependent on a consideration of its socio-political and economic situation. China, Chile, India, and Brazil have demonstrated this realization in their power sector reforms.

While utility reform regulation, that is, power sector reform by privatization, has been subjected to a fair amount of scholarly inquiry, there seems to be an absence of scholarly literature on how best to ensure that reform method adopted and regulatory mechanism required to stimulate the privatized market operations are consistent with the economic and socio-political reality of the reform country. Existing scholarly literatures on utility reforms in developing countries either build on the reform principles laid down by international financial institutions or seek to justify why private participation is the key to achieving the efficiency goal. Therefore, this study has provided a new approach to understanding the diversity of the issues of privatized market and regulatory mechanism responses.

The study exposed the weakness of the three established theories (public interest theory, private interest group theory and the institutional theory of regulation) of regulation in deconstructing the privatized market issues. The failure of these theories to appreciate peculiar inhibiting factors of the reform environment inspired the research to utilize the hybrid theory of regulation to draw upon the core elements of the three established theories of regulation and to view regulatory mechanism and interventions as necessary impetus to guarantee efficiency goal of the reform. Importantly, one of the core elements of the theory is in the ability to consider the peculiarity of the regulatory environment which is fundamental for critical investment and development. This formed the rationale for the recommendations for solutions.

In other words, it was considered that if efficiency is regarded as the ultimate goal of the reform, a pluralistic approach to regulatory intervention must necessarily factor into consideration the elements of the hybrid theory. The study used these elements to demonstrate the importance of reviewing the phased efficiency goal envisaged by the reform policy in terms of the trajectory of the privatized market development towards competition, an objective that has not been achieved for the reasons stated in chapter 4. In this regard, the study shows that the absence of the consideration of building capacity from the distribution segment gradually to the transmission and generation segment affected the efficiency of the power supply value chain.

The other elements of the hybrid theory were also used to expose the weaknesses and challenges of the identified regulatory mechanisms in the privatized market that would have ordinarily ensure proper tariff adjustment, improved performance, grid stability, energy balance, smooth system operation, prompt payment of energy invoices, capacity utilization, adequate metering and billing system, capacity expansion and others. The theory provides a basis to understand the rationale for most of the regulatory mechanisms designed to address the privatized market issues and their impact.

The theory serves as the basis for providing the recommendation for a decentralized power supply system founded on the distinctive nature of the power supply structure in Nigeria. As against the current centralized approach, the proliferation of energy facilities closer to the site of energy consumption using off grid energy (renewables) is less likely to be a radical approach but constitutes a useful alternative to the overreliance on grid power and a practicable solution in achieving efficiency in power supply system. The practicable solution offered by the decentralized approach may be less attractive for some as it is novel but it has been demonstrated that off grid energy is required for guaranteeing access to electricity in un-served areas mainly as a result of the cost of extending transmission network. However, without serious efforts aimed at exploring this alternative, the privatized market may likely continue to grapple with the difficulties of power supply.

Devoid of any claim to a definitive approach, this study will serve as a theoretical stimulus for future research on general and specific analysis on the direction of regulatory mechanisms best suited for a post-privatized power market. By critically engaging the basis for some of the existing regulatory mechanisms, policies and government approaches to issues, this study provides a valuable and useful insight into an unconventional understanding of the issues of the post-privatized power market, a contribution that will assist related research works.

The study opens up a vista for future researchers who may engage in further empirical analysis in testing the veracity of the suggested decentralized approach to energy supply and how best to converge existing regulatory mechanisms to achieve the model. The result of such studies may provide basis for new regulatory mechanisms for a decentralized power market or to fine tune the current centralized approach to energy supply. In addition, researchers may explore the nuances of the Nigerian

power market within the socio-political, economic and regulatory context of the country with a view to providing useful guide for policy makers in formulating policies best suitable for the Nigerian power market.

It is expected that the study will inject new idea into scholarly research and help stimulate additional debate and research on how to create, adjust, and fine tune regulatory mechanisms in responding to market situations in the electricity market in Nigeria to achieve the efficiency goal of the power supply system.

6.4.2 Positives and Negatives

In this regard, three recommendations are suggested for the Nigeria power market namely; the decentralization of power supply, deemphasizing overreliance on the transmission network, and utilizing underutilized available capacity before further generation capacity expansion. The study considers that it will be best to adopt regulatory mechanisms to encourage power supply that operate independently from the grid considering the plurality and the complex nature of power supply system in the country as well as the enormity of financial investments required to bridge the electricity access deficit, and to improve transmission and distribution service delivery. The nature of the supply value chain has been clearly demonstrated in Chapter 4 of the study with identifiable constraints along the distribution, transmission and generation segments. The mechanisms will take advantage of the existing situation of private power generation and distribution by households, and some industrial and residential estates in the country.

The hybrid theory is a useful tool for understanding the issues of the privatized market and assists in providing practical solutions that will achieve positive outcomes for the regulatory mechanisms. For example, the suggestion that the proliferation of smaller units of power producers and distributors within a converged framework (in a decentralized market) will help reduce the overreliance on the transmission network. This will in turn relieve the System Operator of the technical evacuation challenges and reduce the necessity for the huge capital required for expansion projects and maintenance. The hybrid theory also helps in understanding that until there is an efficient use of energy available in the country, it will be wise to suspend all Gencos' expansion plan. One of the advantages of a decentralized market is the provision of an option for the Gencos in finding customers to utilize energy not contracted with NBET that will not be centrally dispatched while also focusing on resolving

transmission and distribution constraints to enable effective payment for energy centrally dispatched. This mechanism provides an alternative to the single market model of power supply currently in use.

However, the likelihood of initiating any regulatory mechanism that is consistent with the hybrid theory of regulation is typified by the general lack of knowledge of critical sector issues and the absence of the consideration of the regulatory environment in the country as well as the political will to adopt solutions that are not self-serving. Notwithstanding the limitation to the theory, the reality of the current privatized market situation has shown that regulatory mechanisms devoid of contextual consideration will most likely fail.

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G

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L

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Multi Year Tariff Order – 2.1 for the Period 1st January 2015 to 31st December 2018 (Order No. NERC/135)

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(Order No. NERC/139 2015) of 2015

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R

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S

Supplementary Order on the Commencement of the Transitional Stage Electricity Market (TEM) (Order No. NERC/15/0011 March 2015) of 2015

T

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Peik v Chicago & Nw. R.R., 94 U.S. 164 (1877)

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Attorney General Ogun State and 4 others v Attorney General of the Federation (2002)18 NWLR (PT 798) 232

Febson Fitness Centre & Anor v Cappa Holdings Limited & Anor (2014) LPELR-24055 (CA) 18 e- f

United Bank for Africa PLC & Anor v Alhaji Babangida Jargaba (2007) LPELR – 3399 (SC) 19 d – f

8. TRANSCRIPTS OF INTERVIEWS

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Transcript of interview with Association of Nigeria Electricity Distributors conducted via telephone chat (11 December 2019)

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Transcript of interview with First Independent Power Limited, Trans Amadi office, Port Harcourt, (11 December 2019)
Transcript of interview with Gas Aggregation Company of Nigeria GACN Office, Central Area, Abuja (6 September 2019)

Transcript of interview with Nigeria Electricity Regulatory Commission Market Rate and Competition unit, conducted at NERC Office, Abuja (6 December 2019)

Transcript of interview with Transmission Company of Nigeria conducted at Energy House, Abuja (5 September 2019)

9. STATISTICAL TABLES

Years	Energy generated in (GWH)	Peak max demand GWH
1983	8456	12562
1984	8927	13420

1985	10155	15067
1986	10665	15155
1987	11191	16250
1988	11471	15348
1989	12700	17538
1990	13364	19438
1991	14212	19675
1992	15066	20875
1993	14617	20411
1994	14557	21427
1995	15793	21480
1996	15771	21112
1997	15446	21471
1998	16253	21444
1999	16291	21532
2000	15227	24519
2001	17637	25706
2002	21544	28233
2003	22612	30479

Table 1: Energy demand and generated between 1983-2003

Source: Author's compilation based on Transmission Headquarters annual reports, Oshogbo.[1012]

	Power stations	Units/Megawatts
1	Kainji Hydro power station	8 units of 4x80MW, 2x10MW and 2x120MW
2	Jebba hydro power station	6 units of 6x 95MW

[1012] Adoghe A.U. et al "Power Sector Reforms-Effects on Electric Power Supply Reliability and Stability in Nigeria" (International Journal of Electrical and Power Engineering, Vol 3, 2009) 37.

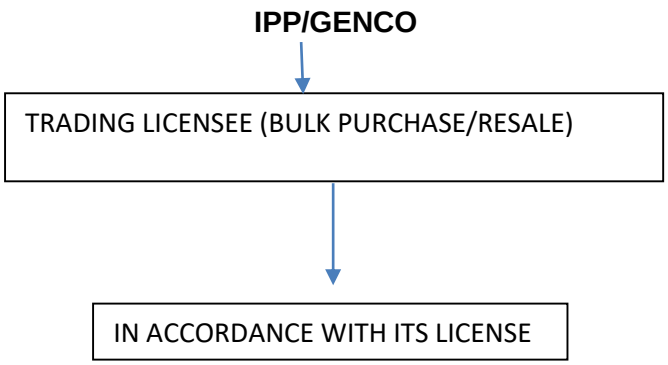
3	Shiroro hydro power station	4 units of 1x150MW and 3x150MW
4	Afam thermal power station	6 units of 2x10.5MW, 2x17MW, 4x23.9MW, 4x27MW and 6x75MW
5	Delta thermal power station	6 units of 2x36MW, 6x20MW, 6x20MW, 1x100MW and 5x100MW
6	Egbin thermal power station	2x220MW, 2x220MW, and 2x220MW
7	Sapele thermal power station	6x120MW and 4x75MW
8	Ijora thermal power station	3x20MW
9	Oji thermal power station	2x5MW and 2x10MW

Table 2. Nine power stations in Nigeria and total installed capacity in 2001

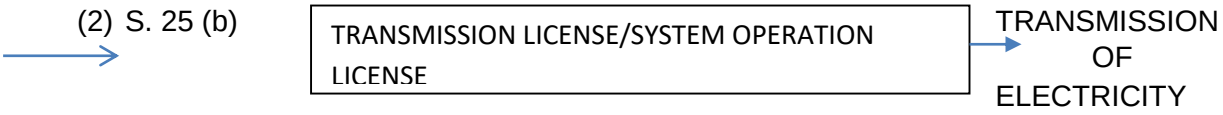
Source: Author's compilation based on the terms of the National Electric Power Policy of 2001.[1013]

[1013] National Electric Power Policy (NEPP) 2001 page 2

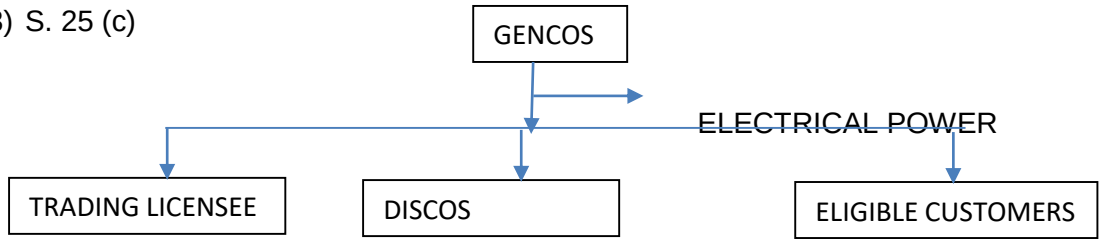
(1) S. 25(a)



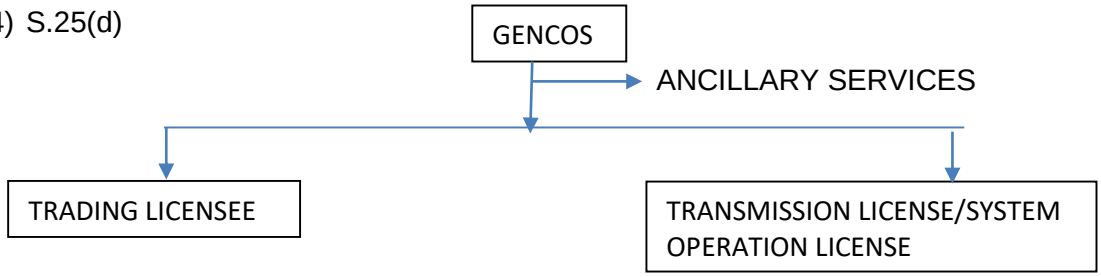
(2) S. 25 (b)



(3) S. 25 (c)



(4) S.25(d)



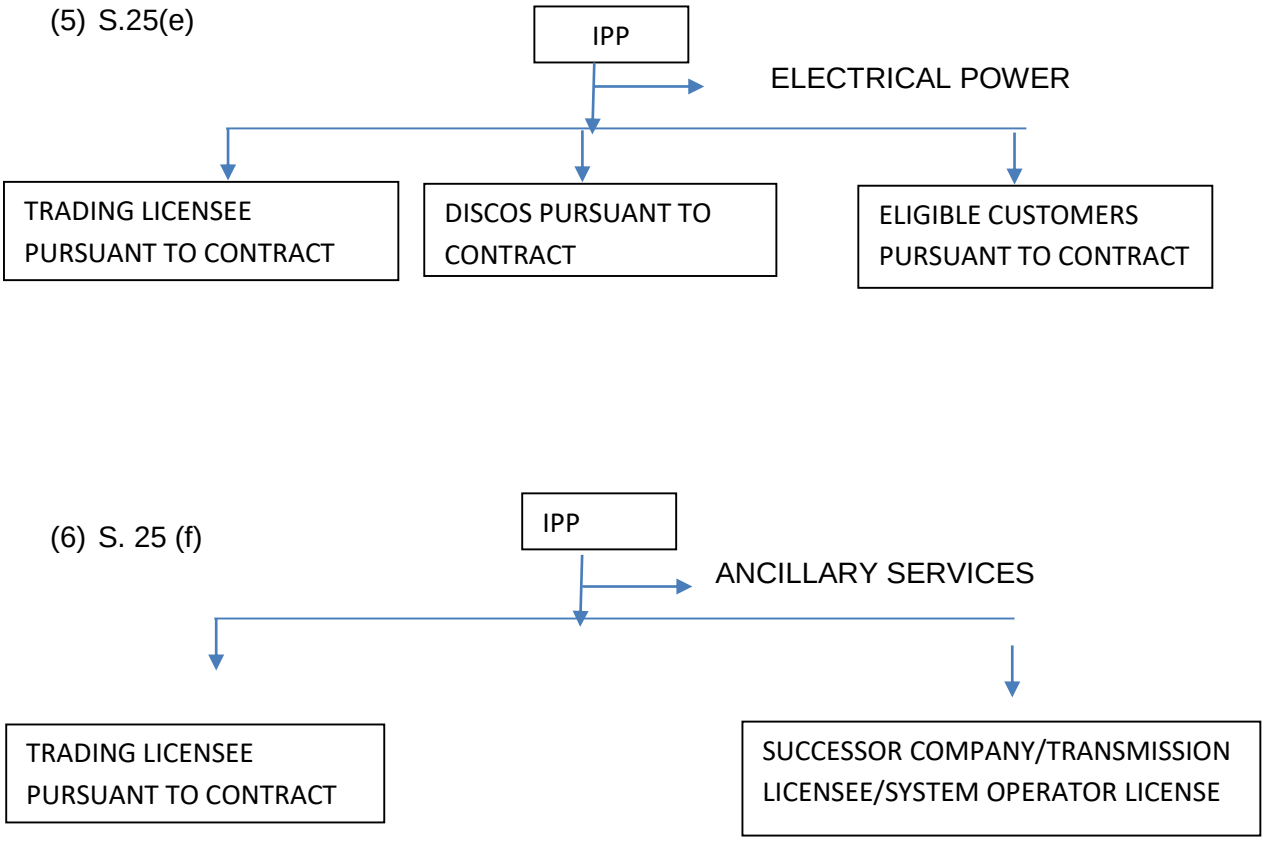


Table 3. Pre-Privatisation Stage energy supply diagram

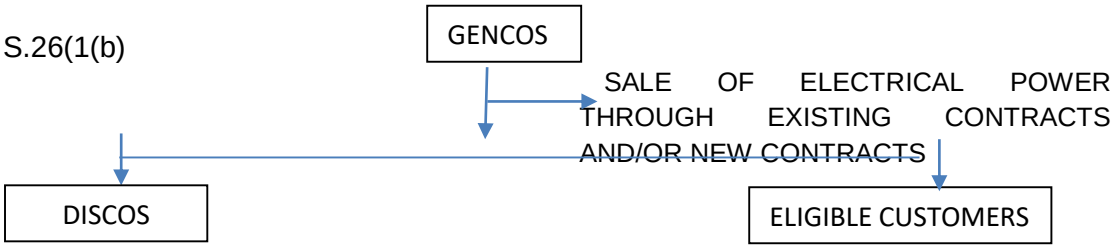
Source: Author's compilation based on the provisions of Sections 25 of the Electric Power Sector Reform Act of 2005.[1014]

[1014] Section 25 Electric Power Sector Reform Act of 2005

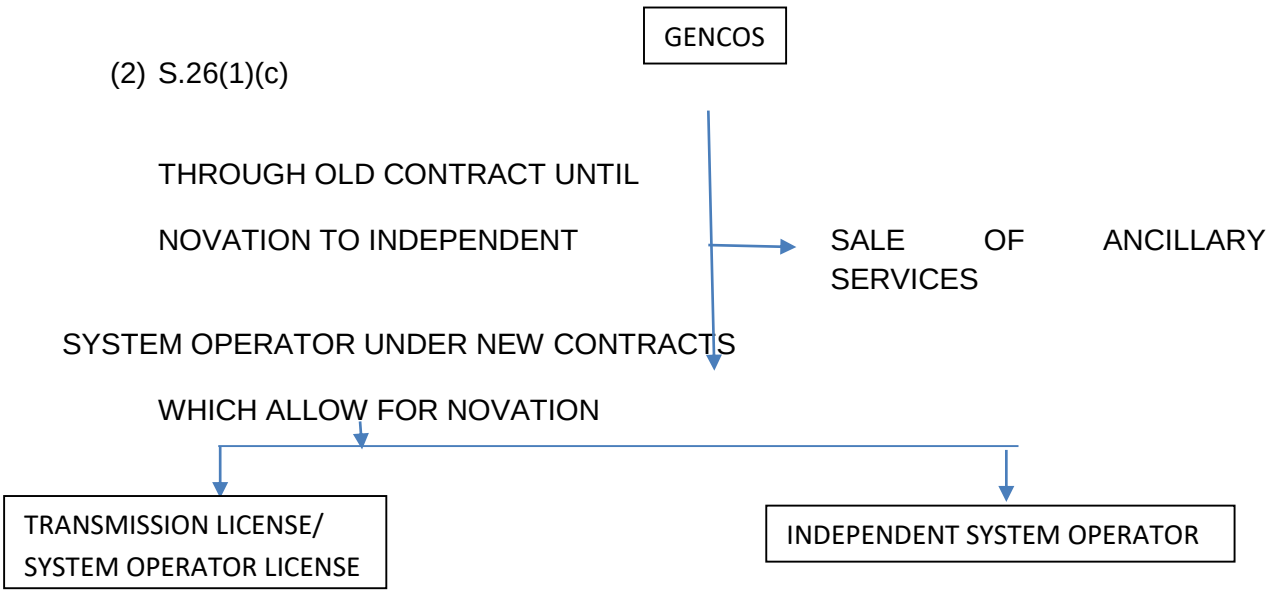
S. 26 (1)(a)

RESTRICTION ON TRADING LICENSEE, ONLY TO NOVATE TO OTHER LICENSEES

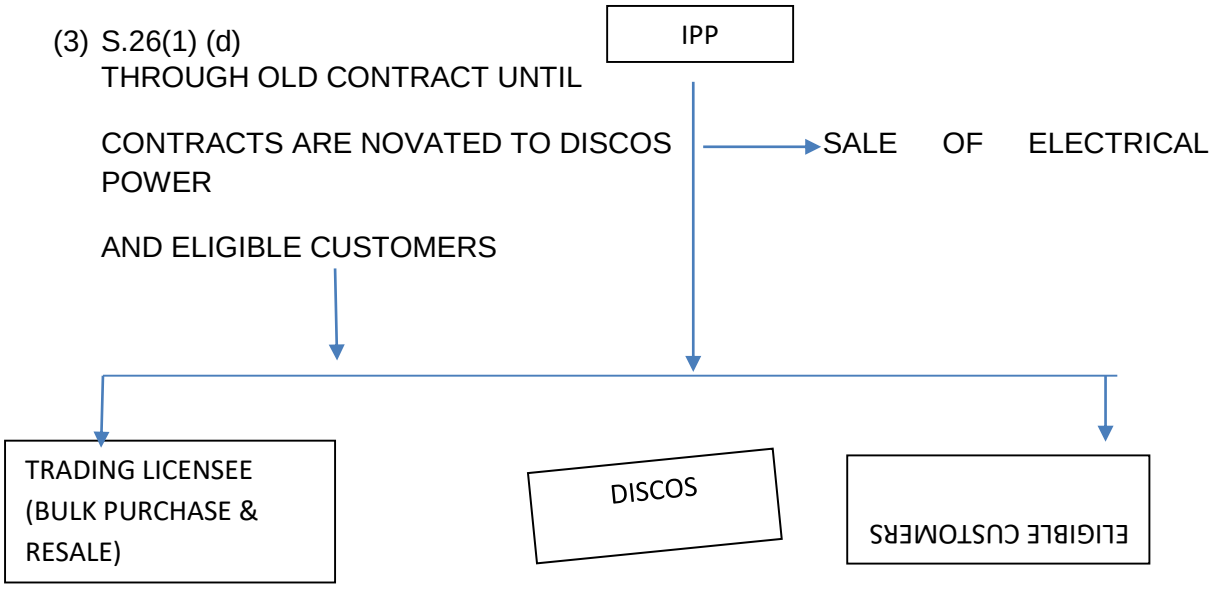
(1) S.26(1(b)



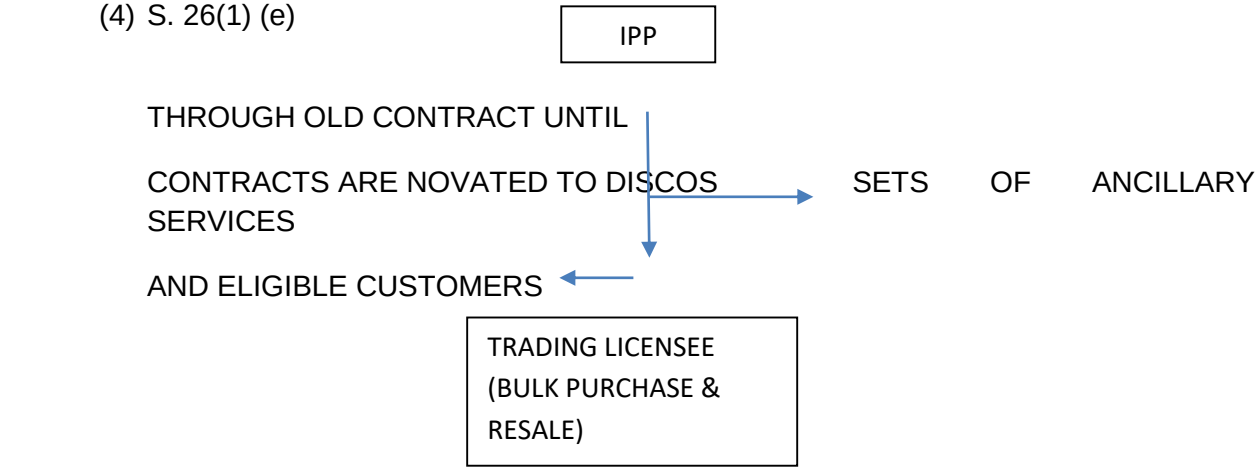
(2) S.26(1)(c)

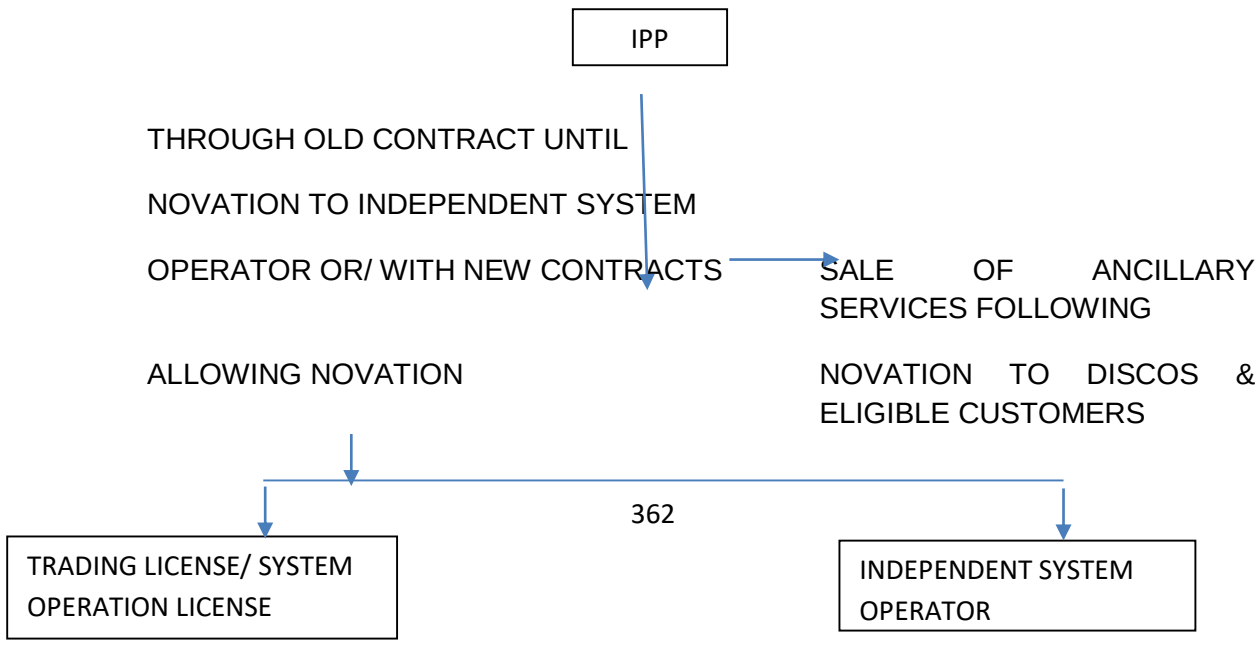


(3) S.26(1) (d)

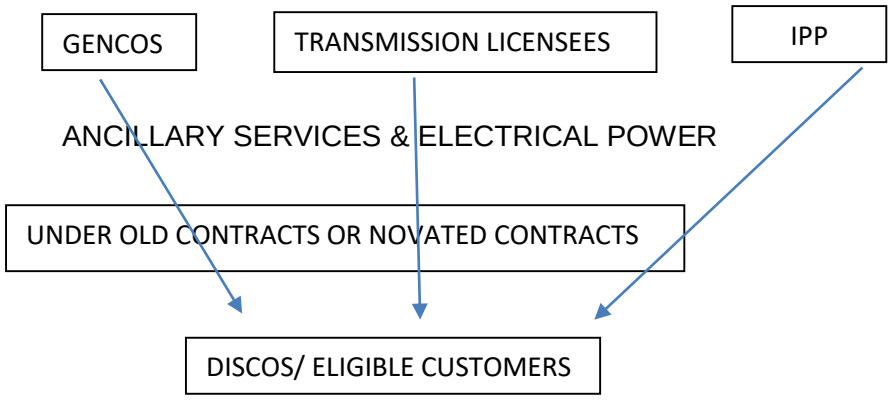


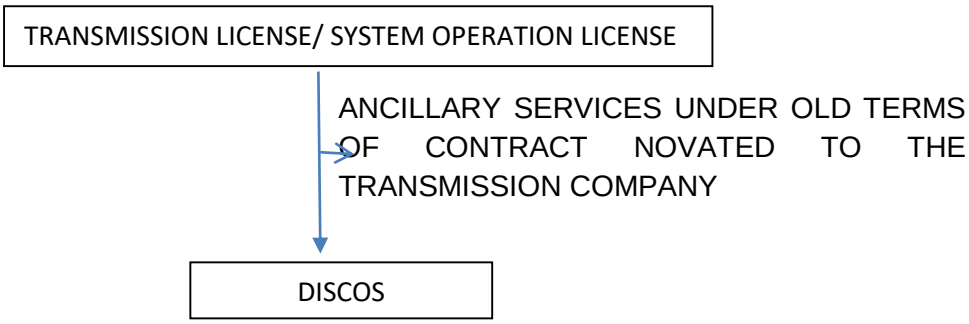
(4) S. 26(1) (e)

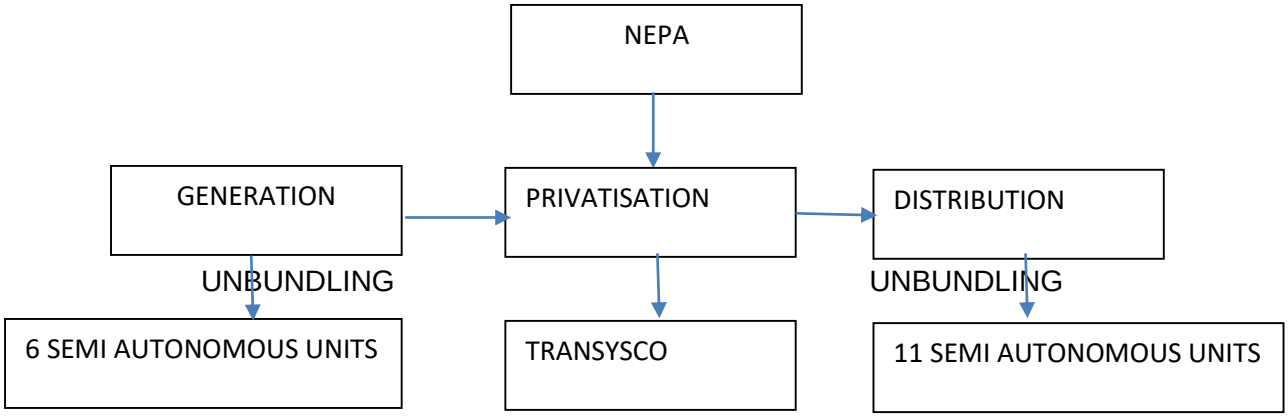


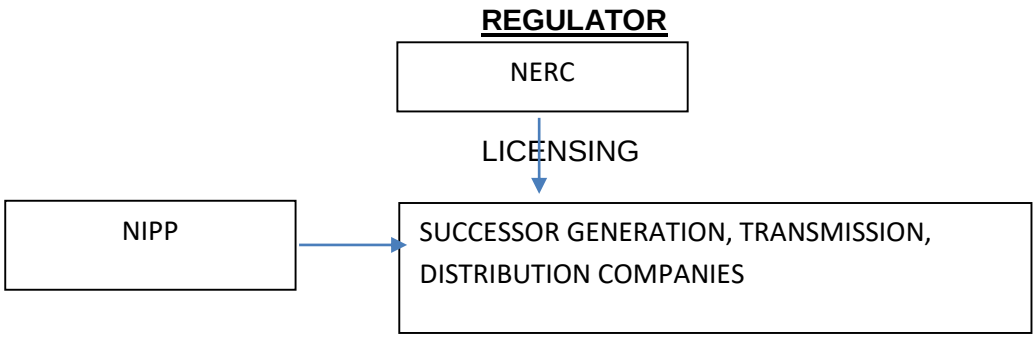


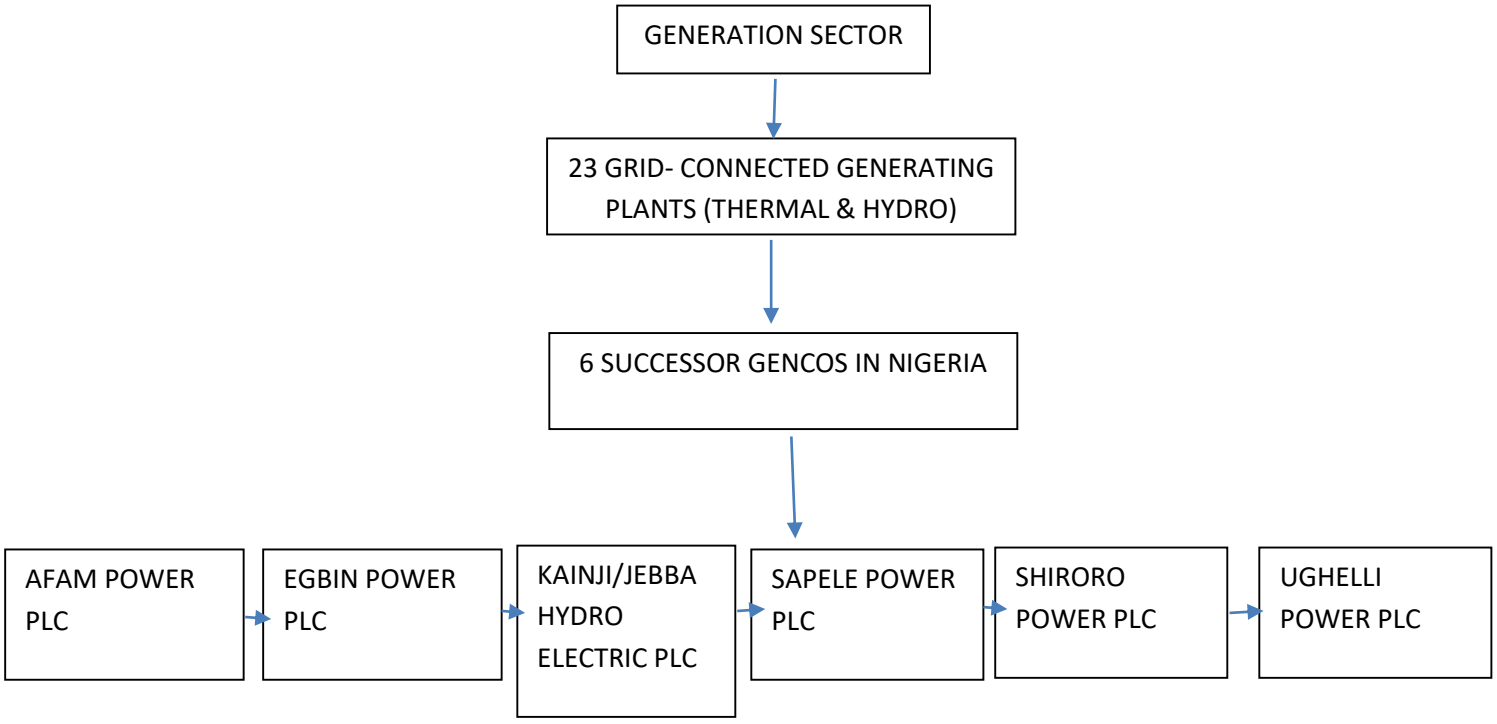
S. 26 (1) (f) (g) (h)

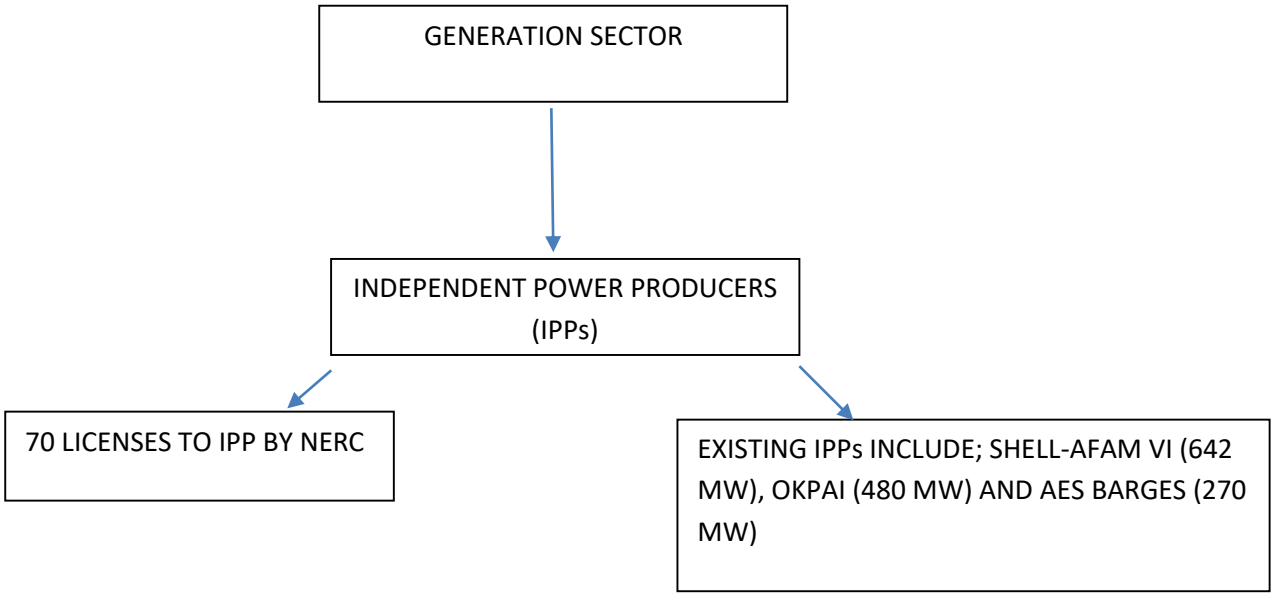

GENCOS
TRANSMISSION LICENSEES
IPP
ANCILLARY SERVICES & ELECTRICAL POWER
UNDER OLD CONTRACTS OR NOVATED CONTRACTS
DISCOS/ ELIGIBLE CUSTOMERS


TRANSMISSION LICENSE/ SYSTEM OPERATION LICENSE
ANCILLARY SERVICES UNDER OLD TERMS OF CONTRACT NOVATED TO THE TRANSMISSION COMPANY
DISCOS


NEPA
GENERATION
PRIVATISATION
DISTRIBUTION
UNBUNDLING
UNBUNDLING
6 SEMI AUTONOMOUS UNITS
TRANSYSCO
11 SEMI AUTONOMOUS UNITS


REGULATOR
NERC
LICENSING
NIPP
SUCCESSOR GENERATION, TRANSMISSION, DISTRIBUTION COMPANIES


GENERATION SECTOR
23 GRID- CONNECTED GENERATING PLANTS (THERMAL & HYDRO)
6 SUCCESSOR GENCOS IN NIGERIA
AFAM POWER PLC
EGBIN POWER PLC
KAINJI/JEBBA HYDRO ELECTRIC PLC
SAPELE POWER PLC
SHIRORO POWER PLC
UGHELLI POWER PLC


GENERATION SECTOR
INDEPENDENT POWER PRODUCERS (IPPs)
70 LICENSES TO IPP BY NERC
EXISTING IPPs INCLUDE; SHELL-AFAM VI (642 MW), OKPAI (480 MW) AND AES BARGES (270 MW)

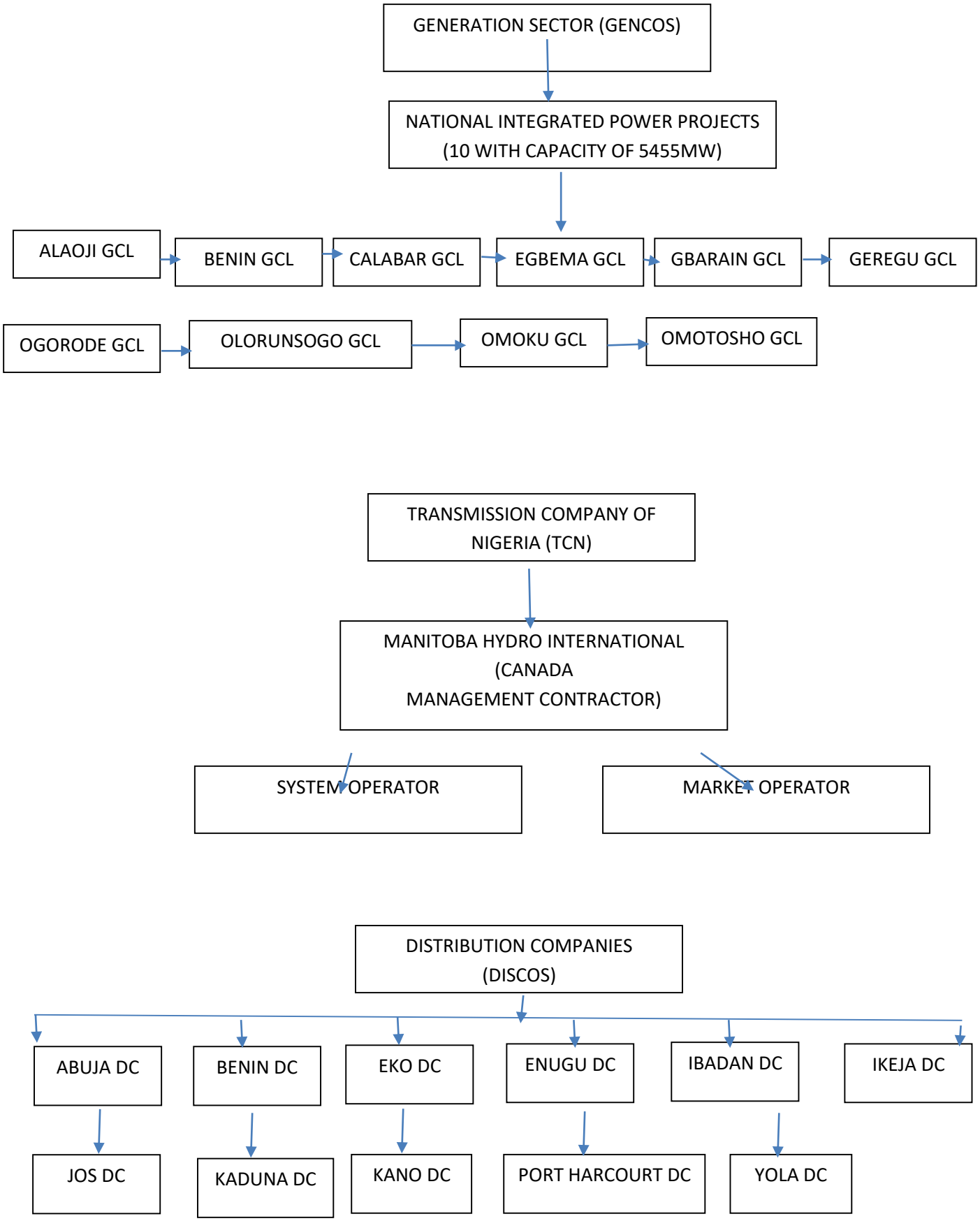


Table 4. Post-privatisation Stage energy supply diagram

Source: Author's compilation based on Section 26 of the Electric Power Sector Reform Act of 2005.[1015]

List of Eighteen (18) Successor companies	
1	Kainji Power Station
2	Jebba Power Station
3	Shiroro Power Station
4	Geregu Power Plant
5	Ughelli Power Plant
6	Sapele Power Plant
7	Egbin Power Station
8	Abuja Electricity Distribution Company
9	Benin Electricity Distribution Company
10	Eko Electricity Distribution Company
11	Enugu Electricity Distribution Company
12	Ibadan Electricity Distribution Company
13	Ikeja Electricity Distribution Company
14	Port Harcourt Electricity Distribution Company
15	Yola Electrcity Distribution Company
16	Jos Electricity Distribution Company
17	Kaduna Electricity Distribution Company
18	Kano Electricity Distribution Company

Table 5. Eighteen successor companies of the privatized market

Source: Author's compilation based on the Presidency Roadmap for power sector reform of 2010.[1016]

1015 Section 26 Electric Power Sector Reform Act of 2005.

1016 The Presidency Roadmap for power sector reform (The Presidency, Federal Republic of Nigeria 2010) 5 - 8

	GENCOS/INVESTOR	CAPACITY	AMOUNT
1	Mainstream Energy Solution/kainji and Jebba		USD$170m
2	North South Power Company/Shiroro		USD$111.7m
3	Amperion Power Distribution Limited/Geregu Power Plant	414MW	USD$132m
4	Transnational Corporation of Nigeria/Ughelli Power Plant	972MW	USD$300m
5	CMC/Eurafric Energy/Sapele Power Plant	1020MW	USD$201 million
6	KEPCO Energy Resources/Sahara Energy Group/Egbin Power Station	1320MW	USD$280 million

Table 6. Gencos sold by BPE, investors and capacity

Source: The Globaldata (2014) Power Holding Company of Nigeria PLC-Power Deals and Alliances[1017]

[1017] The Globaldata (2014) Power Holding Company of Nigeria PLC-Power Deals and Alliances.

	DISCOS/INVESTOR	AREA	AMOUNT
1	Kann Consortium Utility Company Limited/Abuja Electricity Distribution Company	133,000 km^2 in the Federal Capital Territory, Niger State, Kogi State and Nassarawa State	$164 million
2	Vigeo Power Consortium /Benin Electricity Distribution Company	55,770 km^2 consisting of Delta, Edo, Ekiti and Ondo States.	USD$129 million
3	West Power and Gas Limited/Eko Electricity Distribution Company	the license area is segmented into three (3) Circles and ten (10) Districts namely; West Circle comprising of Agbara, Ojo and Festac,Central Circle comprising of Ijora, Mushin, Orile and Apapa and East Circle comprising of Lekki, Ibeju and Island	USD$135 million
4	Interstate Electrics Limited/Enugu Electricity Distribution Company	five (5) South Eastern States of Nigeria namely; Abia, Anambra, Ebonyi, Enugu and Imo State.	USD$ 126 million
5	Integrated Energy Distributing and Marketing Limited/Ibadan Electricity Distribution Company	Oyo, Ogun, Osun, Kwara and parts of Niger, Ekiti and Kogi States	USD$126.75 million
6	Integrated Energy Distributing and Marketing Limited/Yola Electricity Distribution Company	Adamawa, Taraba, Borno and Yobe States	USD$44.25 million
7	New Electricity Distribution Company and Korea Electric Power Corporation/Ikeja Electricity Distribution Company	Abule-Egba, Ikeja, Akowonjo, Ikorodu, Shomolu, and Oshodi	USD$131 million
8	Aura Energy Limited/Jos Electricity Distribution Company	Bauchi, Gombe, Plateau, Benue states and a part of Kaduna state	USD$82 million
9	Sahelian Power SPV Limited/Kano Electricity Distribution Company	67,128 km^2 which consist of Kano, Jigawa and Katsina	USD$137 million
10	4power Consortium Limited/Port-Harcourt	Rivers, Cross River, Akwa-Ibom and Bayelsa	USD$124 million

	Electricity Distribution Company	States of the South/South region of the country	

Table 7. The Discos sold by BPE to core investors

Source: Author's compilation from the Discos' various websites

Abuja Electricity Distribution Company online https://www.abujaelectricity.com/who-we-are/ (Date of use: 31 July 2019)

Benin Electricity Distribution Company online http://bedcpower.com/company-profile/ (Date of use: 31 July 2019)

Eko Electricity Distribution Company online https://ekedp.com/page/our-operations (Date of use: 31 July 2019)

Enugu Electricity Distribution Company online: http://www.enugudisco.com/index.php/2012-04-10-18-56-53/2013-07-10-02-54-11 (Date of use: 31 July 2019)

Ibadan Electricity Distribution Company online: https://www.ibedc.com/about-us/company-profile/ (Date of use: 31 July 2019)

Yola Electricity Distribution Company online: https://www.yedc.com.ng/about/ (Date of use: 31 July 2019)

Nigerian Electricity Regulatory Commission online: https://nerc.gov.ng/index.php/licencees/139-ikeja-electricity-distribution-company (Date of use: 31 July 2019)

Ikeja Electricity Distribution Company online: http://www.ikejaelectric.com/business-units/ (Date of use: 31 July 2019)

Kano Electricity Distribution Company online: https://www.kedco.ng/about.html (Date of use: 31 July 2019)

Port Harcourt Electricity Distribution Company online: http://www.phed.com.ng/our_company_port-harcourt_electricity_distribution_Plc (Date of use: 31 July 2019)

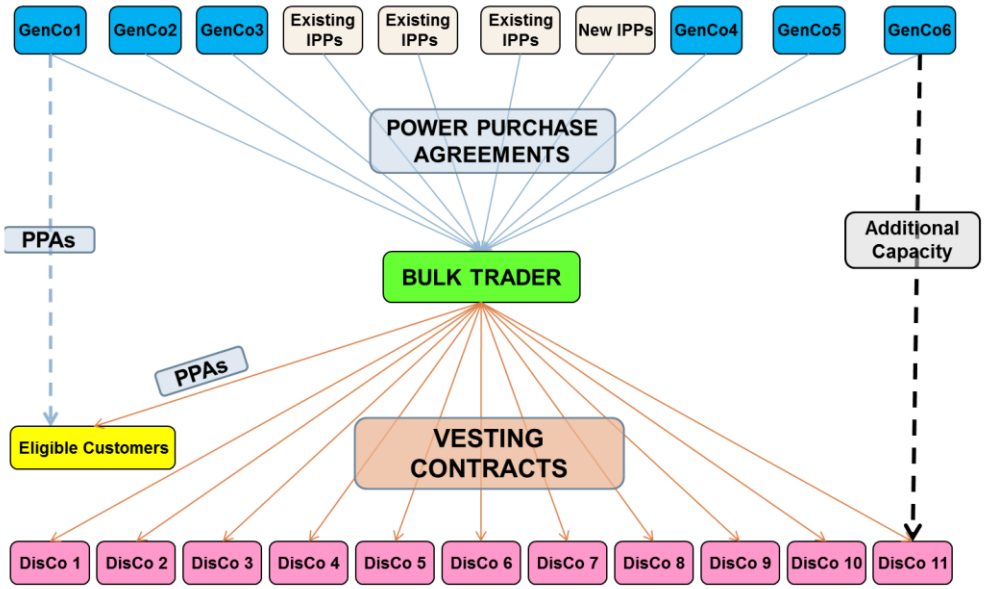


Table 8. The summary of the Nigerian energy supply value chain

Source: Author's compilation based on data supplied by NBET.[1018]

[1018] https://nbet.com.ng/about-us/who-we-are/ (Date of use: October 27 2021).

	UNIT	2012	2013	2014	2015	2016
Sent-out from stations (GWh)	GWh	30,715	41,884	50,601	56,242	59,034
Transmission Losses	% of SO	8.05%	8.05%	8.05%	8.05%	8.05%
Exports	% of Exp	5.0%	5.0%	5.0%	5.0%	5.0%
Delivered to Distribution	GWh	26,830	36,587	44,201	49,128	51,568
Distribution Losses	% of DD	10.0%	9.0%	8.0%	7.0%	7.0%
Delivered to customers	GWh	24,147	33,294	40,665	45,689	47,958
Non-technical losses (non-billed energy)	% of DC	12.0%	10.0%	8.0%	6.0%	5.0%
Billed to Customers	GWh	21,249	29,964	37,412	42,948	45,560
Revenue Collection losses	% of	6.0%	4.0%	2.0%	2.0%	2.0%

Sales where Revenue is collected	GWh	19,975	28,766	36,664	42,089	44,649
Revenue based sales as % of Sent out energy	%	65%	69%	72 %	75%	76%
Total technical and non-technical losses	% of SO	35%	31%	28 %	25%	24%

Table 9. Technical and non-technical losses allowed in the Tariff Order

Source: Author's compilation based on data available in the Multi Year Tariff Order for the determination of the cost of electricity sold by distribution/retail companies for the period 1 June 2012 to 31 May 2017.[1019]

[1019] Multi Year Tariff Order for the determination of the cost of electricity sold by distribution/retail companies for the period 1 June 2012 to 31 May 2017 34.

DISCO	BID BASIS	VERIFIED BASELINE	Year 1	Year 2	Year 3	Year 4	Year 5
Abuja	35	52.77	36.41	26.58	24.72	22.03	18.72
Benin	40	54.20	44.44	35.56	27.56	20.67	16.53
Enugu	35	59.10	58.73	44.05	31.71	20.30	11.57
Ibadan	35	42.60	35.78	29.09	23.15	18.56	15.47
Jos	40	58.00	52.03	47.34	2.145	34.63	26.24
Kaduna	40	48.40	32.43	20.43	12.67	7.83	4.85
Kano	40	48.40	41.40	31.87	23.91	18.65	15.85
Eko	35	29.40	21.46	15.88	12.55	11.22	10.79
Ikeja	35	32.93	24.70	18.05	12.83	10.45	9.49
P/H	35	55.04	46.78	38.60	30.88	24.70	23.77
Yola	40	57.60	43.20	36.23	31.22	27.46	25.03

Table 10. Summary of ATC&C verified baseline.

Source: Author's compilation based on data available in the Multi Year Tariff Order – 2.1 for the Period 1st January 2015 to 31st December 2018.[1020]

[1020] Multi Year Tariff Order – 2.1 for the Period 1st January 2015 to 31st December 2018. 4.

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Abuja	31.50%	23.80%	7.10%	10.90%	15.50%
Benin	18.00	20.00%	22.59%	25.00%	20.00%
Enugu	0.63%	25.30%	28.37%	36.47%	43.33%
Ibadan	16.00%	18.71%	20.43%	19.84%	16.61%
Jos	10.30%	9.04%	11.01%	17.82%	24.21%
Kaduna	33.00%	37.00%	38.00%	38.00%	38.00%
Kano	15.00%	23.00%	25.00%	22.00%	15.00%
Eko	27.00%	26.93%	20.94%	10.16%	3.77%
Ikeja	25.70%	26.90%	28.95%	18.50%	9.20%
P/H	15.00%	17.50%	20.00%	20.00%	17.00%
Yola	25.17%	16.14%	13.81%	12.06%	8.85%

Table 11. Five year loss reduction trajectory on the basis of ATC&C verified baseline. Source: Author's compilation based on data available in the Multi Year Tariff Order – 2.1 for the Period 1st January 2015 to 31st December 2018.[1021]

[1021] Author's compilation based on data available in the Multi Year Tariff Order – 2.1 for the Period 1st January 2015 to 31st December 2018.

	APPROVED BASELINE	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Abuja	28.4%	19.5%	14.8%	13.8%	12.3%	10.4%
Benin	25.2%	20.7%	16.5%	12.8%	9.6%	7.7%
Enugu	18.7%	18.6%	13.9%	9.9%	6.3%	3.6%
Ibadan	12.0%	10.1%	8.2%	6.5%	5.2%	4.4%
Jos	24.8%	22.2%	20.2%	18.0%	14.8%	11.2%
Kaduna	18.1%	12.1%	7.6%	4.7%	2.9%	1.8%
Kano	18.1%	15.4%	11.8%	8.9%	6.9%	5.9%
Eko	17.4%	12.7%	9.3%	7.3%	6.6%	6.3%
Ikeja	12.0%	8.9%	6.5%	4.6%	3.8%	3.4%
P/H	12.0%	10.2%	8.4%	6.7%	5.4%	4.5%
Yola	16.3%	12.2%	10.2%	8.8%	7.8%	7.1%

Table 12. Approved ATC&C losses passed through to consumers.

Source: Author's compilation based on data available in the Multi Year Tariff Order – 2.1 for the Period 1st January 2015.[1022]

[1022] Amended Multi Year Tariff Order (MYTO)- 2.1 for the Period April 1st, 2015 To December 2018. 5 – 6.

Baseline ATC&C losses	Approved Percentages (%)
Bid basis	35%
Verified ATC&C baseline (with full collection losses)	55.04%
New baseline ATC&C (less MDA debts)	52.94%

Table 13. New ATC&C baseline brought forward commencing from year 2015 for Port Harcourt Disco.

Source: Author's compilation based on data available in the Multi Year Tariff Order for Port Harcourt Electricity Distribution Company for the Period 1st January 2015 to December 2024.[1023]

[1023] Paragraph 6 - 7 of Multi Year Tariff Order for Port Harcourt Electricity Distribution Company for the Period 1st January 2015 to December 2024

Discos	MYTO Target For 2019 (%)	Average ATC&C (%)			
		2019 /Q1	2019 /Q2	2019 /Q3	2019 /Q4
Abuja	24	41.96	40.71	41.91	39.64
Benin	31	56.52	49.67	46.22	47.84
Eko	14	29.79	24.96	24.80	24.65
Enugu	29	53.01	50.09	52.42	49.41
Ibadan	25	50.18	46.23	48.45	45.80
Ikeja	15	28.33	22.51	22.76	21.74
Jos	44	60.13	60.94	60.52	60.15
Kaduna	32	73.45	65.06	63.07	62.37
Kano	29	48.50	45.45	41.64	38.39
Port Harcourt	37	63.14	60.85	61.01	61.30
Yola	28	68.64	69.91	62.11	64.16
Overall Discos:					
MYTO Level	26	-	-		
Total Technical Commercial & Collection losses	-	48.72	44.53	43.65	42.63
Technical & Commercial losses	-	20.02	19.81	18.40	17.40
Collection losses	-	35.90	30.84	30.95	30.55

Table 14. The average ATC&C by 2019.

Source: Author's compilation based on the Regulator's Fourth Quarter Report of 2019.[1024]

[1024] Nigeria Electricity Regulatory Commission Quarterly Report (Fourth Quarter 2019) 40.

Discos	Disco collection rate		Disco invoice settlement rate	
	2015	**2016**	**2015**	**2016**
Abuja	64%	67%	53%	29%
Benin	67%	53%	56%	31%
Eko	73%	74%	83%	52%
Enugu	62%	59%	47%	26%
Ibadan	63%	62%	69%	34%
Ikeja	69%	69%	54%	38%
Jos	41%	37%	35%	19%
Kaduna	41%	39%	25%	17%
Kano	54%	51%	38%	17%
Port Harcourt	53%	44%	44%	15%
Yola	57%	51%	30%	19%
Total	61%	57%	53%	29%

Table 15. PSRP review of 2015 – 2016 Discos' cash remittance to NBET.

Source: Author's compilation based on Power Sector Recovery Plan of the Federal Government of Nigeria.[1025]

[1025] Federal Republic of Nigeria Power Sector Recovery Programme 2017 – 2021 (January 2018) online: https://mypower.ng/wp-content/uploads/2018/02/PSRP-Master-Document-January-2018.pdf (Date of use: February 12 2020) 17

Discos	Total Energy Received (GWh)		Total Energy Billed (GWh)		Billing Efficiency (%)	
	2019/Q3	2019/Q4	2019/Q3	2019/Q4	2019/Q3	2019/Q4
Abuja	887	932	684	712	77.11	76.39
Benin	523	552	454	484	86.80	87.57
Eko	838	857	742	765	88.56	89.30
Enugu	541	561	375	422	69.32	75.22
Ibadan	898	940	741	787	82.61	83.74
Ikeja	1,063	1,117	946	1000	89.04	89.50
Jos	303	318	221	232	73.01	72.91
Kaduna	440	417	379	388	86.14	93.05
Kano	397	422	324	354	81.55	83.83
Port Harcourt	473	510	362	379	76.48	74.33
Yola	264	293	178	192	67.42	65.53
All Discos	**6,627**	**6,918**	**5,407**	**5,714**	**81.59**	**82.59**

Table 16**:** Total amount of energy received and billed by Discos in 2019 quarters 3 – 4.

Source: Author's compilation based on the Regulator's Fourth Quarter Report of 2019.[1026]

[1026] Nigeria Electricity Regulatory Commission Quarterly Report (Fourth Quarter 2019) 36.

Discos	MYTO Target for 2019 (%)	Average ATC&C (%)			
		2019/Q1	2019/Q2	2019/Q3	2019/Q4
Abuja	24	41.96	40.71	41.91	39.64
Benin	31	56.52	49.67	46.22	47.84
Eko	14	29.79	24.96	24.80	24.65
Enugu	29	53.01	50.09	52.42	49.41
Ibadan	25	50.18	46.23	48.45	45.80
Ikeja	15	28.33	22.51	22.76	21.74
Jos	44	60.13	60.94	60.52	60.15
Kaduna	32	73.45	65.06	63.07	62.37
Kano	29	48.50	45.45	41.64	38.39
Port Harcourt	37	63.14	60.85	61.01	61.30
Yola	28	68.64	69.91	62.11	64.16
Overall Discos:					
MYTO Level	**26**	-	-		
Total Technical, Commercial & Collection losses	**-**	**48.72**	**44.53**	**43.65**	**42.63**
Technical & Commercial losses	-	**20.02**	**19.81**	**18.40**	**17.40**
Collection losses	**-**	**35.90**	**30.84**	**30.95**	**30.55**

Table 17. Average ATC&C losses by Discos in 2019.

Source: Author's compilation based on the Regulator's Fourth Quarter Report of 2019.[1027]

[1027] Nigeria Electricity Regulatory Commission Quarterly Report (Fourth Quarter 2019) 40.

Discos	**Baseline Remittance (**as percentage of the MO's invoice)
Abuja	**53.50%**
Benin	**37.88%**
Eko	**97.65%**
Enugu	**41.24%**
Ibadan	**65.37%**
Ikeja	**87.55%**
Jos	**20.70%**
Kaduna	**33.16%**
Kano	**62.97%**
Port Harcourt	**62.97%**
Yola	**0%**

Table 18. Stipulated mandatory threshold payments by Discos to NBET.
Source: Author's compilation based on the Rules for the Interim Period between Completion of Privatization and the Start of the Transitional Electricity Market of the Nigeria Electricity Supply Industry 2013 issued by the Regulator.[1028]

[1028] Rules for the Interim Period between Completion of Privatization and the Start of the Transitional Electricity Market of the Nigeria Electricity Supply Industry (2013) 6 – 7

Operating Year		Tariff Shortfall (Naira)
Historical	2015	20,338,627,915
	2016	17,740,547,406
	2017	26,060,794,573
	2018	38,079,094,268
	Sub-total	102,219,064,162
Projected	2019	52,132,166,533
	2020	6,203,329,727
Total		160,554,560,421

Table 19. Abuja Electricity Distribution Company's historical shortfall for 2015 – 2018 and projected shortfall for 2019 – 2020.

Source: Author's compilation based on data available in the 2016 – 2018 Minor Review of Multi Year Tariff Order (MYTO) 2015 and Minimum Remittance Order for the Year 2019 (Order No. NERC/GL/170A) 4.[1029]

[1029] The 2016 – 2018 Minor Review of Multi Year Tariff Order (MYTO) 2015 and Minimum Remittance Order for the Year 2019 (Order No. NERC/GL/170A) 4.

	2012	2013	2014	2015	2016
Abuja	11.50%	11.50%	11.50%	11.50%	11.50%
Benin	9.00%	9.00%	9.00%	9.00%	9.00%
Enugu	9.00%	9.00%	9.00%	9.00%	9.00%
Ibadan	13.00%	13.00%	13.00%	13.00%	13.00%
Jos	5.50%	5.50%	5.50%	5.50%	5.50%
Kaduna	8.00%	8.00%	8.00%	8.00%	8.00%
Kano	8.00%	8.00%	8.00%	8.00%	8.00%
Eko	11.00%	11.00%	11.00%	11.00%	11.00%
Ikeja	15.00%	15.00%	15.00%	15.00%	15.00%
Port Harcourt	6.50%	6.50%	6.50%	6.50%	6.50%
Yola	3.50%	3.50%	3.50%	3.50%	3.50%
Total	100%	100%	100%	100%	100%

Table 20. Discos load allocation formula for 2012 – 2016.

Source: Author's compilation based on the Regulator's Multi Year Tariff Order for the Determination of the Cost of Electricity sold by Distribution/Retail Companies for the Period 1 June 2012 to 31 May 2017.[1030]

GENCOS	GENCO INVOICE (₦)	PAYMENT TO GENCO (₦)	PAYMENT %
KAINJI (Mainstream)	2,329,902,183.07	701,429,613.50	30.11%
JEBBA (Mainstream)	3,075,283,657.20	925,830,724.89	30.11%
SHIRORO (North South Power)	2,307,748,722.05	694,760,194.62	30.11%
EGBIN	7,378,062,793.91	2,221,205,581.73	30.11%
UGHELLI TRANSCORP (DELTA)	3,761,779,176.72	1,132,503,902.17	30.11%
SAPELE (POWER) STEAM	440,466,166.02	132,604,713.98	30.11%
GEREGU	4,526,707,671.75	1,362,789,749.59	30.11%
AFAM IV-V	1,210,852,791.92	364,533,761.12	30.11%
OLORUNSOGO	2,334,162,798.65	702,712,294.79	30.11%
OMOTOSHO ELECTRIC	2,185,885,180.83	658,072,518.53	30.11%
ALAOJI NIPP	71,221,688.01	21,441,673.16	30.11%
GEREGU (POWER) NIPP	1,434,405,090.61	431,835,385.89	30.11%
ODUKPANI (CALABAR) NIPP	3,623,576,994.69	1,090,897,390.18	30.11%
OLORUNSOGO (POWER) NIPP	80,229.28	24,153.46	0.00%
OMOTOSHO GEN CO. NIPP	914,565,793.98	275,334,963.01	30.11%
SAPELE (OGORODE) NIPP	175,265,794.62	52,764,712.39	30.11%
IHOVOR	224,325,922.50	67,534,528.39	30.11%
GBARAIN NIPP	543,892,173.75	163,741,671.21	30.11%
IBOM	155,812,821.43	46,908,289.93	30.11%
OMOKU (FIPL)	1,036,984,536.73	312,189,785.52	30.11%
RIVERS IPP (FIPL)	1,335,697,481.58	402,118,928.03	30.11%
TRANS AMADI (FIPL)	-	-	
AZURA POWER (NAIRA)	10,443,951,270.70	3,144,207,836.91	30.11%
SHELL (AFAM VI)	1,013,247,070.74	305,043,493.40	30.11%

1030 Multi Year Tariff Order for the Determination of the Cost of Electricity sold by Distribution/Retail Companies for the Period 1 June 2012 to 31 May 2017. 34.

AGIP (OKPAI)	1,327,756,061.05	399,728,120.56	30.11%
TOTAL	51,851,634,071.79		15,610,213,986.96

Table 21. January 2020 NBET payment to the Gencos.

Source: Author's compilation based on available data from NBET's website.[1031]

MONTH	Available Generation Capability (MW)	Average Generation (MW)	Stranded Generation (MW)
January	4,301.68	3,199.31	1,102.37
February	6,554.98	3,706.49	2,848.49
March	6,581.13	3,233.52	3,347.61
April	6,699.73	3,261.21	3,438.52
May	6,697.42	3,600.67	3,096.75
June	6,310.57	3,201.42	3,109.14
July	6,022.88	3,150.62	2,872.27
August	6,495.02	3,535.29	2,959.72
September	6,405.14	3,348.71	3,056.43
October	5,993.32	3,546.20	2,447.12
November	5,952.66	3,681.24	2,271.42
December	5,834.02	3,564.52	2,269.50
Average	6,154.05	3,419.10	2,734.94

TABLE 22:
Average available generation capacity of the Gencos from 2014 – 2018

Table 22A. Historical Generation data 2014

Source: Author's compilation based on data supplied by the Gencos

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1031 https://nbet.com.ng/about-us/who-we-are/ (Date of use: 28 October 2021).

MONTH	Available Generation Capability (MW)	Average Generation (MW)	Stranded Generation (MW)
January	6,266.46	3,549.61	2,716.85
February	6,112.39	3,475.18	2,637.21
March	6,374.29	3,411.96	2,962.33
April	6,813.43	3,192.37	3,621.06
May	6,851.82	2,573.06	4,278.75
June	6,991.73	3,441.95	3,549.79
July	6,933.06	3,830.11	3,102.95
August	6,631.70	3,976.75	2,654.95
September	7,008.10	4,007.21	3,000.89
October	6,351.72	3,859.53	2,492.18
November	6,393.65	4,070.53	2,323.12
December	6,667.05	3,884.29	2,782.76
Average	6,616.28	3,606.05	3,010.24

Table 22B: Historical Generation data 2015

Source: Author's compilation based on data supplied by the Gencos.

Table 22C: Historical Generation data 2016

MONTH	Available Generation Capability (MW)	Average Generation (MW)	Stranded Generation (MW)
January	6,677.10	4,104.83	2,572.28
February	6,403.15	3,953.59	2,449.55
March	6,537.09	3,484.43	3,052.65
April	6,988.82	3,140.13	3,848.69
May	7,200.24	2,611.20	4,589.04
June	6,893.05	2,193.23	4,699.82
July	7,304.57	2,842.54	4,462.03
August	7,771.74	3,262.18	4,509.57
September	7,561.48	3,391.39	4,170.10
October	7,744.93	3,509.92	4,235.01
November	7,870.08	3,418.06	4,452.02
December	7,250.76	3,289.94	3,960.82
Average	7,183.59	3,266.79	3,916.80

Source: Author's compilation based on data supplied by the Gencos.

Table 22D: Historical Generation data 2017

MONTH	Available Generation Capability (MW)	Average Generation (MW)	Stranded Generation (MW)
January	6,139.30	3,000.76	3,138.54
February	6,370.70	3,716.05	2,654.65
March	6,950.01	3,831.67	3,118.34
April	6,889.54	3,568.09	3,321.45
May	7,082.69	3,642.97	3,439.72
June	7,146.24	3,514.63	3,631.61
July	7,345.17	3,496.88	3,848.29
August	7,262.83	3,402.66	3,860.17
September	6,735.00	3,483..59	3,251.41
October	7,336.27	3,764.95	3,571.32
November	7,140.77	3,920.73	3,220.04
December	7,545.87	4,128.72	3,417.15
Average	6,995.37	3,622.64	3,372.72

Source: Author's compilation based on data supplied by the Gencos.

Table 22E: Historical Generation data 2018

Source: Author's compilation based on data supplied by the Gencos.

MONTH	Available Generation Capability (MW)	Average Generation (MW)	Stranded Generation (MW)
January	7,689.04	3,733.01	3,956.03
February	7,584.46	4,001.33	3,583.13
March	7,306.39	4,097.62	3,208.77
April	7,484.88	4,051.99	3,432.89
May	7,907.73	3,827.32	4,080.42
June	7,261.12	3,643.09	3,618.03
July	7,485.65	3,684.27	3,801.39
August	7,966.87	3,701.24	4,265.63
September	7,736.53	3,570.67	4,165.86
October	7,691.37	3,810.74	3,880.63
November	7,244.88	4,099.57	3,145.31
December	5,252.26	4,148.94	1,103.31
Average	**7,384.27**	**3,864.15**	**3,520.12**

TABLE 23:

Indian Discoms' AT&C loss reduction during transition period

FY	BYPL (57.2)		BRPL (48.1)		TPDDL (48.1)	
	Target	Achievement	Target	Achievement	Target	Achievement
2002- 03	56.45	61.89	47.55	47.4	47.6	47.79
2003 – 04	54.7	54.29	46.00	45.06	45.35	44.86
2004 - 05	50.7	50.12	42.7	40.64	40.85	33.79
2005 – 06	45.05	43.89	36.7	35.53	35.35	26.52
2006 – 07	39.95	39.03	31.1	29.92	31.1	23.73
2007 – 08	34.77	29.8	26.69	27.17	22.03	18.56
2008 – 09	30.52	24.02	23.46	20.59	20.35	16.74
2009 – 10	26.26	24.32	20.23	20.53	18.67	15.16
2010 – 11	22.00	21.95	17.00	18.82	17.00	13.10
2011 – 12	18.00	22.07	15.00	18.11	13.00	11.49

Dalei NN and Gupta A “Performance of electricity distribution companies in Delhi an evaluation study” online: file:///C:/Users/HP-PC/Downloads/DelhiDiscoms.pdf (Date of use: 20 May 2020) 8 – 9.