Towards Systems Management in the Electric Power Sector for Physical Facilities in Nigeria: Issues, Challenges and New Directions

By Dr. Felix Osita Ikekpeazu

Department of Architecture
Nnamdi Azikiwe University
Awka, Anambra State, Nigeria

ABSTRACT

This paper is an investigation into the application of systems management in the operation of public utilities in Nigeria, specifically, in the electric power sector; towards the effective utilization of electric energy for physical facilities, namely, residential, commercial and institutional buildings, etc. The paper commences with a definition of terms, especially, systems management, system failure and system collapse, in connection with regulation, management and ownership in the electric power sector. It then proceeds to an elaboration of the phases or steps in the historical evolution of the electric power industry in Nigeria and the associated factors which can be isolated in each stage of the historical development of utilities. It then progresses to an examination of the problems of electric power generation, transmission and distribution within the organizational framework of the new Power Holding Company of Nigeria PLC (PHCN), in terms of the Power Sector Reform Act 2005. The paper provides an elucidation of the existing and proposed strategies for policy implementation in the Power Holding Company of Nigeria PLC (PHCN). In this regard, it highlights the operational link between PHCN, management on the one hand and its supervisory board, supervisory ministry (the Federal Ministry of Energy) and the Presidency on the other hand. These strategies set the stage for new directions and management. This paper then reaches the conclusion of the centrality of adequate power supply to family life and business life in the country; that a stable power supply creates a positive multiplier effect in the whole economy. Indeed, that low service delivery in the Nigerian electricity sector is, perhaps the greatest developmental drawback facing the country in the areas of residential development and industrialization.

Keywords: Power disruption, Deregulation, System Collapse/System Failure, National Grid, Power Generation, Transmission and Distribution, Power Sector Reform Act, Organizational Change, Privatization and Stable Power Supply.

INTRODUCTION

The frequency of power disruption and instances of system collapse has created the imperative for organizational change in the operation of electric power utilities in Nigeria. The new appellation, Power Holding Company of Nigeria PLC (PHCN), is a reflection to some extent, of this new organizational change. The impending deregulation of the electric power sector will engender competitiveness in the electric power sector with its attendant economic revitalization.

Indeed, the envisaged role of systems management in the electric power sector in Nigeria, will focus on the general dynamics of system integration, in time as well as in space, of system dysfunction or system collapse/system failure and the dynamics involved in system change and revitalization.

DEFINITION OF TERMS

SYSTEMS MANAGEMENT

According to Klein (1977), in addition to the surveys of the basic social and behavioural sciences, the past thirty years have seen the development and blossoming of several fields of inquiry which, together, may be termed 'system sciences'. They may be characterized, in general, as being more interdisciplinary and holistic in their approach to problems than are the more traditional disciplines. They may also be said to be somewhat more problem-oriented or applied, although this may not characterize every scholar or practitioner. As the interests here relate to the role of management, it seems appropriate to label this last discipline to be reviewed, 'systems management'.

A system may be defined as a network of interacting elements. Man tries to exert controls on those systems of which he is a part or which otherwise affect him in some significant way. He does this in order to reduce or eliminate adverse effects or promote effects favourable to him. In general, he is less than completely successful in this endeavour because he does not adequately understand the workings of the system or because he lacks the power to dominate the system. Both of these conditions must be met for successful control. Those systems that seem to be dominated are likely to be integral parts of large systems.

Klein (1977) enunciated furthermore: "Systems management is a concept through which I attempt to integrate the applied and interdisciplinary visions of regional planning, cybernetics, operations research, management science (which I differentiate from operations research according to the degree to which behavioral theories are

engaged), and the "functional" disciplines of business, public, and social administration. The intent is to adopt a "whole" view of human and organizational behavior which brings in insights from economics, sociology, psychology, and political science and from specific fields of application, systems and subsystems that relate to specific activities or needs are seen as interconnected and interacting with other systems".

AUDIT OF THE POWER SECTOR: AN OVERVIEW OF THE CAUSES OF SYSTEM COLLAPSE/SYSTEM FAILURE

The terms system collapse and system failure are, generally, used interchangeably in the power sector. The power chain starts with the generating stations. In Nigeria, it is either hydro (water) powered or thermal (gas) fired stations and it then moves on to the transmission lines, which evacuate the generated power into the transmission lines where the power is then stepped down and tapped into private or public houses and industries, etc.

The Causes of System Collapse in the Power Sector

The identifiable causes of system collapse in the power sector in Nigeria are as follows:

(a) Poor maintenance of distribution infrastructure due to paucity of funds.
(b) The Radial nature of the National grid
(c) Frequent tripping of critical transmission lines
(d) Redundant transmission lines
(e) Inadequate number of reactors for voltage control in the system.

(a) **Poor maintenance of distribution infrastructure due to paucity of funds:**
With regard to maintenance, the first challenge is from the generation end of the business; that is where the main electricity is supposed to be generated, transmitted and distributed to end users. According to Mr. Mike Uzoigwe, Chief Executive Officer, Egbin Power Plant (qtd. in Daily Sun: 2011), "Station was experiencing hard times, no thanks to lack of funds to rehabilitate and maintain key infrastructure". Mr. Mike Uzoigwe went further to add: "Funding this plant increased in the last six years due to intervention fund and reasonable appropriation from the Federal Government; in the last two years, however, this level of funding has dwindled, making it difficult to sustain what we had achieved. We are on a downward trend and do not want to go down".

According to Mr. Jonathan Ndiagwalukwe, General Manager of the National Control Centre of PHCN (qtd. in Daily Sun: 2011), the nation had, indeed, upped generation close to 4,000 megawatts, sometime around July 2011, but as that

volume of power was pumped into the transmission and distribution system for onward utilization by consumers, the weak state of the later facilities to handle such level of power flow resulted in a collapse of the entire system. Mr. Jonathan Ndiagwalukwe went further to add: "So far, we have recorded 11 system collapses this year".

(b) **The Radial nature of the National Grid:**
According to Mr. Jonathan Ndiagwalukwe, the radial nature of our grid subjects it to instability anytime a critical and heavy loaded line trips. This often results in the dumping of substandard load as there is no alternative supply route to the affected area. It is a major system security issue that can only be addressed by creating loops in the system.

(c) **Frequent tripping of critical transmission lines:**
There is also the problem of frequent tripping of critical transmission lines. This is a major cause of system disturbance. In fact, about 90 percent of the system collapse recorded in 2011 had tripping of transmission line as the immediate cause. Most of the trippings are traceable to fouling of the line conductors by vegetation.

(d) **Redundant transmission lines:**
There is also the fact that most of the transmission lines are redundant. Some critical transmission lines are single circuits. They cannot cater for maintenance needs and their tripping most of the time causes system collapse. The power flows on such lines are, therefore, restricted to what are considered safe by the system controllers. This is the case with the Onitsha – Alaoji and Benin – Onitsha 330 KV lines and the major reason PHCN is unable to evacuate all the available generated power in the Eastern part of the national gird.

(e) **Inadequate number of Reactors for Voltage control in the system:**
Also plaguing the Nigerian power sector is that the number of reactors for voltage control in the system is inadequate. Some high voltage nodes like Birnin – Kebbi and Onitsha have no reactors. Benin and Osogbo each requires an additional reactor to support existing ones. On the other hand, the Northern part of the country suffers from low voltage due to very long distances between the load centres and the generating stations. PHCN has embarked on voltage stability study with a view to providing clues to how the problem can be solved.

THE HISTORICAL EVOLUTION OF PUBLIC OWNERSHIP OF POWER GENERATION COMPANIES IN NIGERIA

Electricity power generation in Nigeria has come a long way. When it started more than a century ago, government was in full control. Now, the talk is on involving the private sector in power generation. There are those who attempt to explain public ownership of utilities by rather abstract references to the "public nature" or 'essentiality" of the services performed, or even by reference to "social welfare". Answers of this type are actually more in the nature of ideological justifications than explanations, however, and are often presented in the "inadequacies and abuses" explanation.

Electricity power generation in Nigeria began in 1896 with development of a 20 megawatt power station established in Ijora in Lagos. This was followed by a two megawatt hydro plant in Kuru falls for the tin mines in Jos. It was established by a private company named Nigeria Electricity Supply Company, NESCO. With the rise in demand for electricity power, the Electricity Corporation of Nigeria (ECN), was formed to oversee the electricity sector in 1950. It was mostly into the building of generator plants to serve the administrative centre and individual areas in the country. At Nigeria's independence in 1960, only a few generating stations were in place and the sector was under ECN.

The first 132KV line was constructed in 1962 to link Ijora, Lagos and Ibadan, Oyo State, power stations.

The Niger Dam Authority (NDA), was set up in 1960 to build and manage dams in Nigeria and the total capacity available was slightly above 50 megawatts. The NDA built and managed Kanji Hydro Power Station, Afam Power Plant, Delta Power Station and additional megawatts to Ijora power plant. The sector witnessed a major expansion in generation, transmission and distribution of electricity between 1960 and 1974.

THE EMERGENCE OF NATIONAL ELECTRIC POWER AUTHORITY (NEPA)

For greater efficiency, both the ECN and NDA were merged to form National Electric Power Authority, NEPA through Decree No 24 of April, 1972. It was formed as a vertically integrated power utility outfit responsible for generation, transmission, distribution and sale of electricity. It was given the mandate to maintain an efficient, coordinated and economic system of electricity supply to all parts of the nation and to propel the nation's technological and industrial growth. It started with four major power stations and Kainji Hydro Power station serving more than two million customers nationwide.

There were many transmission expansion projects as well as distribution network fortification during the period which also witnessed the steady growth in the power sector. Some of the plants built include Kaduna Power Station, Oji River Power Station, Ibadan Power Station and Trans Amadi Power Station. Between 1975 and 1990 relative growth in the power sector was experienced. More Power Stations, transmission stations, transmission lines and distribution networks witnessed corresponding growth. Rural electrification was given a boost. Some of the power stations that came on board within this period are Jebba, Shiroro, Sapele and Egbin.

NEPA made giant strides in the production and marketing of electricity to the nation and beyond. A principal beneficiary of NEPA's extended electricity programme is the Republic of Niger under an agreement with NIGERLEC (Niger Electric Company). Similarly, in September 1996, an undertaking was signed between NEPA and Communante Electricque Du Benin, CEB, which is responsible for the production and transmission of electric energy in the Republic of Benin and Togo.

However, NEPA faced multitudes of operational challenges, some of which included the ever-rising consumer debts, vandalisation of NEPA installations, high cost of maintenance, inadequate gas supply, low water level at the hydro power stations, high cost of foreign exchange, the abysmally low tariff regime, illegal connections and unbridled monumental corruption. NEPA was largely unable to meet its obligation in distribution and marketing stable electricity to its numerous residential, commercial and industrial customers. The period between 1990 and 1999 did not witness major improvement. In fact, it was a period of decadence in the sector. Instead of growth, the nation witnessed a steady decline due to lack of maintenance of existing plants.

THE FORMATION OF POWER HOLDING COMPANY OF NIGERIA PLC (PHCN)

Due to the perennial problem of power supply in Nigeria, the Federal government decided to unbundle NEPA and allow private sector participation in the sector. The signing into law of the Electric Power Sector Reform Act 2005 on March 11, 2005, by former President Olusegun Obasanjo, facilitated the formation of initial holding and successor companies to take over the functions of NEPA and all its assets, liabilities and staff. Vice President Atiku Abubakar inaugurated the board of Power Holding Company of Nigeria PLC (PHCN), the new company that replaces the NEPA. PHCN is expected to carry out its business and fulfill all its obligations and functions as provided for in the Electric Power Sector Reform Act. The company is also expected to create at least 18 successor companies that would be registered as limited liability companies and subsequently privatized.

In order to attract private sector investment and sustain the development of the power sector to ensure uninterrupted and efficient power supply in the country, the National Council on Privatization, NCP, defined the objectives for power sector. They are to promote competition to facilitate more rapid provision of service throughout the country;

create a new legal and regulatory environment for the sector that establishes a level playing field, encourage private investment and expertise, and meet social goals; restructure NEPA and encourage the successors to NEPA to undertake an ambitious investment programme.

The Electric Power Implementation Committee with the advice of reputable power sector consultants put together a power policy, which was approved by the Federal Executive Council in March 2001. The policy envisages a three-stage legal and regulatory reform of the power sector. The first transition stage is characterized by private sector generation through independent power producers, IPPs, and emergency power producers, EPPs. There will be a corporate restructuring, unbundling and privatization of NEPA through sale or license of all thermal plants to private operators or concessionaries and transfer of management, ownership and control of selected distribution companies.

Secondly, the policy has a medium term, which will create competition among generating companies; encourage energy trading between generation and distribution companies primarily on the basis of bilateral contracts through contact exchanges and sales. There will also be payment of full price by generators for natural gas and other fuels and sale of energy by companies generating power in excess of their needs to distribution companies.

Thirdly, there will be competition structure, which envisaged that during this phase, the various power generation, transmission and distribution companies would be operating optimally.

Additionally, there would economic pricing of electricity to cover the full costs of supply, including expectation of a reasonable, risk-adjusted rate of return on capital. It will create opportunity for the large industrial consumers to choose their suppliers and a well-developed wholesale market with formal membership rules, procedures and full retail sales competition.

Figures 1, 2 and 3 show the expansion of the National Grid from 1973 – 2005 and figure 4 shows the Nigerian Grid Map as delineated in 2008.

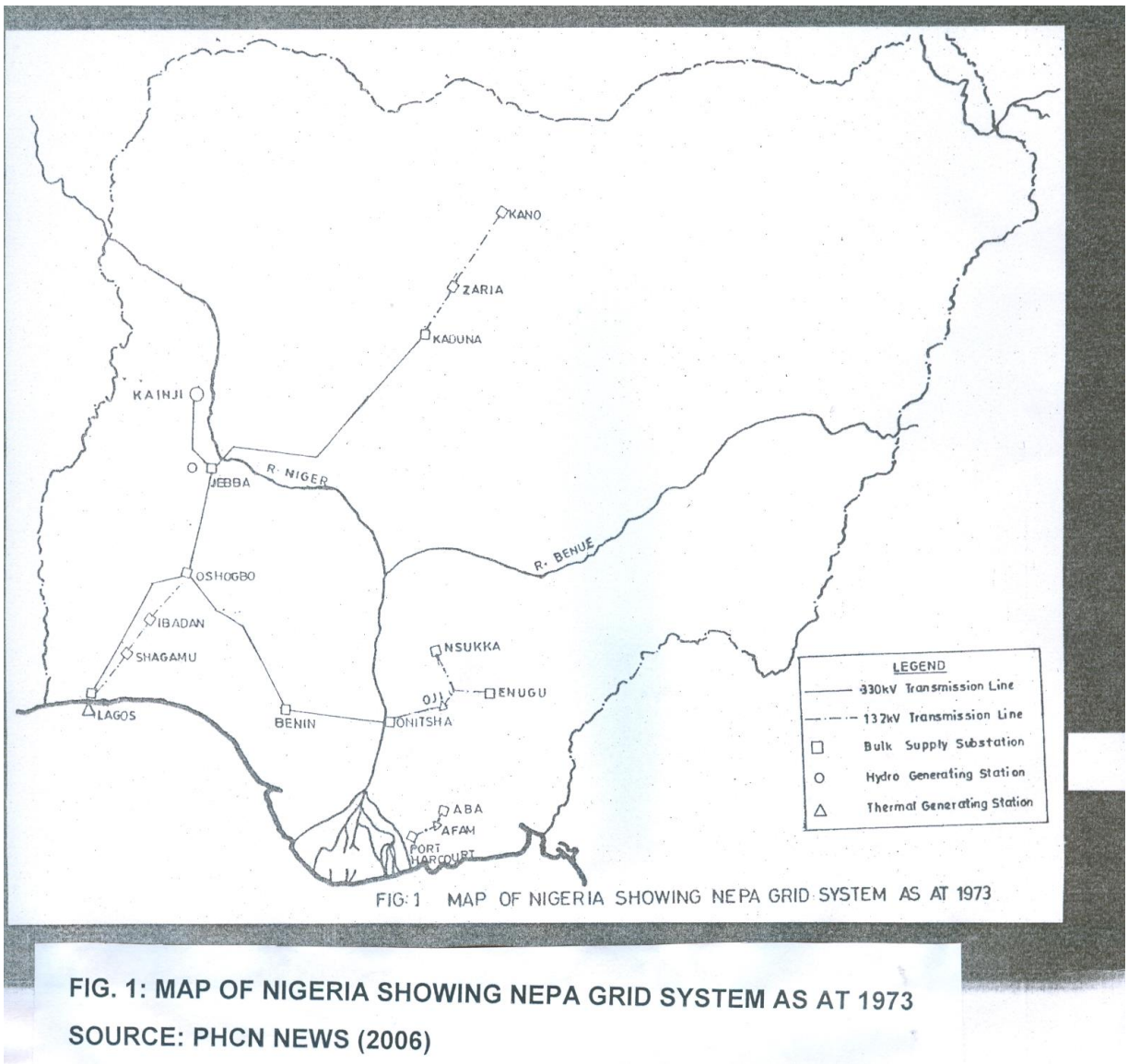

FIG. 1: MAP OF NIGERIA SHOWING NEPA GRID SYSTEM AS AT 1973

SOURCE: PHCN NEWS (2006)

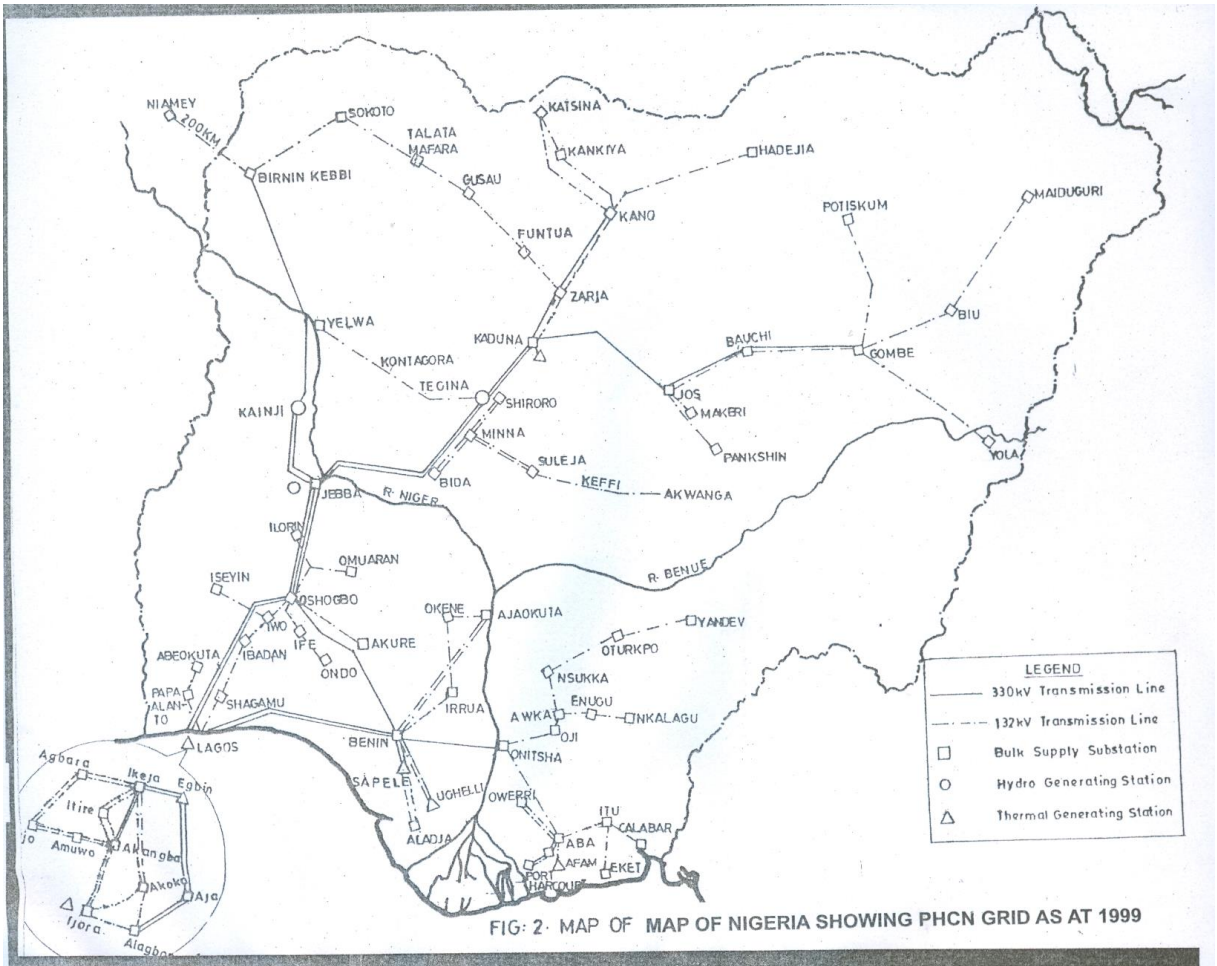

FIG: 2· MAP OF MAP OF NIGERIA SHOWING PHCN GRID AS AT 1999

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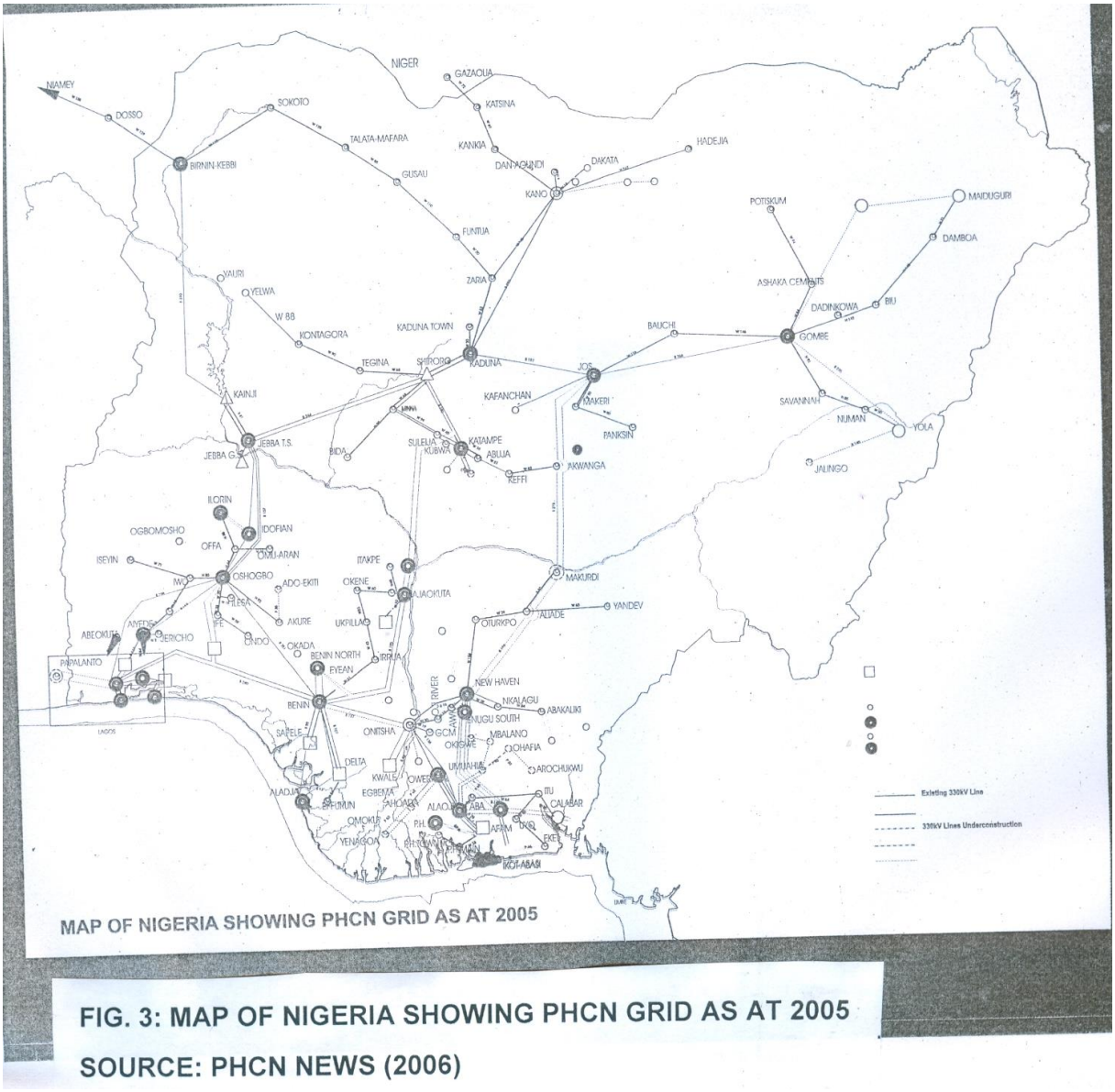
SOURCE: PHCN NEWS (2006)



MAP OF NIGERIA SHOWING PHCN GRID AS AT 2005

FIG. 3: MAP OF NIGERIA SHOWING PHCN GRID AS AT 2005

SOURCE: PHCN NEWS (2006)

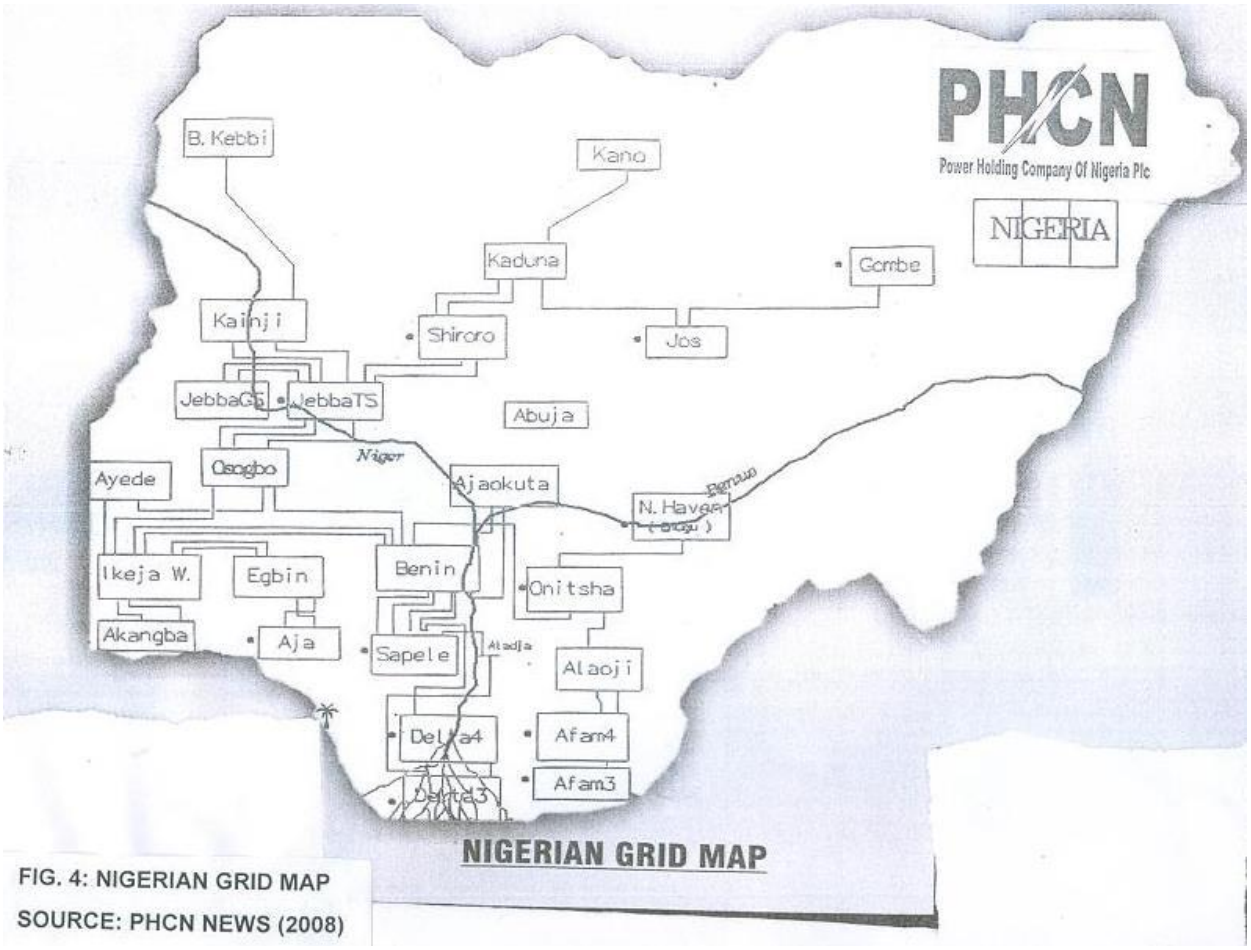


FIG. 4: NIGERIAN GRID MAP
SOURCE: PHCN NEWS (2008)

ELECTRICITY SUPPLY IN NIGERIA: THE PROBLEMS AND SOLUTIONS TO POWER GENERATION, TRANSMISSION AND DISTRIBUTION

In order to get rid of the problems facing the power sector, they have first to be identified and analysed. The problems of the Nigerian power sector are multifaceted, affecting the three major segments of the sector, namely, generation, transmission and distribution (including marketing). These component parts comprise the upstream and downstream segments of the power sector. Some of the problems are technical in nature while some are not, and while some of the problems may require the expenditure of money, others simply require the application of wisdom, the exercise of good judgement and the infusion of morality in matters of core national interest.

A checklist of the various problems facing the power sector will be presented. While it may not contain every possible problem that has ever arisen in the sector, it is an attempt to highlight some of the core issues which if not effectively addressed, may continue to impede a thorough revamp of the power sector.

Checklist of Power Sector Problems

1. **The core Issue of Political Will to Drive Reforms and Problems associated with Staffing, Planning and Organizational Structure:**

a. Many of the previous federal administrations in Nigeria did not have the requisite political will and clear focus to decisively address the various problems facing the power sector, and indeed may not have understood the full nature and extent of the problems.

b. Over the years, many poorly qualified persons were appointed to both the board and management levels of the defunct National Electric Power Authority (NEPA) without due regard to professional, technical or managerial competence, and there has been a severe shortage of well-qualified technical staff for various tasks in the power sector.

c. Many competent professionals who might have been inclined to work for PHCN are deterred by low public sector wages. This factor also demoralizes the current workers of the organization, who sometimes also face irregular payment of such low wages.

d. Policymaking and co-ordination have been chaotic and generally problematic in the power sector, and there was inadequate reform planning before the commencement of the power sector reform programme by the last federal administration.

Regarding the dual pursuit of electricity projects (new power plants) by the federal government and various state governments, an issue is whether there is adequate synchronization in order to ensure the optimum use of scarce resources, obtain the best possible deals from various contractors engaged for these power projects and utilize the advantages offered by economies of scale.

2. Monopoly-induced problems:

a. PHCN's monopoly structure partly contributed to its gross inefficiency. Its customers had no alternative energy provider to switch to, and although many customers had small private power generators, this was a very expensive alternative and had other problems associated with it.

b. In addition to the above, the NEPA Act 1972 (now been superseded by the Electric Power Sector Reform Act 2005) initially insulated it from law suits, thereby creating a moral hazard and a fertile ground for inefficient/suboptimal performance.

c. Considering the geographical and numerical size of the country, over-centralization of operations within the defunct NEPA considerably added to the monopoly problem since inefficiency, corruption at the head office could effectively cripple operations in any part of the country.

THE ROLE OF THE ELECTRICITY POWER SECTOR REFORM ACT IN THE ORGANIZATIONAL CHANGES IN THE ELECTRIC POWER INDUSTRY

The role of the above-named reform Act is embodied in the provisions of the major steps, in terms of the initial holding company, formation of successor companies, privatization, new players and infrastructure ownership under the Act.

The Act has rather chosen an unusual tool used with success in other countries to put vertically integrated monopolies to sleep. It is called "unbundling". Physically, unbundling may sound like tearing a person into pieces limb by limb. Unbundling simply means the subdivision of a vertically integrated process so that each new segment becomes a distinct whole. By way of explanation, NEPA was a single entity that was in control of three aspects of electricity: Generation, Transmission and Distribution. Unbundling will treat these three aspects as separate sectors (different bundles) with different unrelated companies handling each aspect. Understanding the unbundling process prescribed by the Act may be easier if we follow the steps sequentially. The Act prescribes three major steps:

STEP 1 – INITIAL HOLDING COMPANY

Sections 2,3,4 & 6

The Act specifies that the National Council on privatization shall set up a company to be known as "Initial holding company" whose shares would be 100% owned by the Federal Ministry of Finance on behalf of the Federal Government. Thereafter, on a specified date called the "initial transfer date" NEPA will transfer all employees, assets, liabilities rights and obligations to the holding company (The company has been registered as duly publicized and is called Holding Company of Nigeria). The final transfer of liability or obligation under this Act releases NEPA of that obligation or liability. The Act transfers in unequivocal terms all obligations: contractual; pending proceedings, etc. The current employees of NEPA are taken over by the holding company on "terms not less favourable than those enjoyed immediately prior to the transfer". The proposed lifespan of the holding company is a maximum of 18 months.

STEP 2 – FORMATION OF SUCCESSOR COMPANIES

Sections 10 – 16

Within 8 months after the incorporation of the initial Holding Company, the National Council on Privatization shall incorporate such number of successors companies as are necessary to be formed which shall be the successor companies for assuming the assets and liabilities of the initial holding company. The functions of these companies shall include but shall not be limited to generation, transmission, trading, distribution, and bulk supply and resale of electricity.

The shares in these companies shall be held jointly in the name of the Ministry of Finance Inc and the Bureau of Public Enterprise. The initial Holding Company shall not

later than 1 year from the initial transfer date by order of the National Council on Privatization "transfer employees, assets, liabilities, rights and obligations to one or more successor companies".

The National Council on Privatization shall specify the terms and conditions of each transfer order. For avoidance of doubt, this is the second time these effects are being transferred. First was from NEPA to the initial holding company and now from the initial holding company to the successor companies. Upon the completion of the transfer, the National Council on Privatization shall issue interim licences to the successor companies.

STEP 3 – PRIVATIZATION

Section 17

After step two the successor companies that are holders of generation, distribution or transmission licences shall be privatized by the National Council on Privatization in accordance with the Public Enterprises (Privatization & Commercialization) Act, No. 28 of 1999 and the Bureau of Public Enterprise shall organize the sale of shares of the successor companies to the public.

WHO ARE THE NEW PLAYERS?

Sections 61 – 65

It would be easier to find out who the new players are by previewing the different types of licences permitted under the Act. Let us first deal with those who are exempted from licences. In this regard, it should noted that S. 59 of the Act permits Nigeria's most common form of power generation (the private power generator) to operate without a licence as in "a person who generates electricity not exceeding an aggregate of 1 megawatt at a site and/or a distribution capacity not exceeding 100 kilowatts". I megawatts is 1 million watts. For clarity, 1 megawatt should power approximately 16,666 electric bulbs of 60 watts. Another exception to the licensing requirement is "captive generation" which the Act defines as electricity generated for "purpose of consumption by the generation itself and not sold to a third party". The combined effect of these two exceptions seem to imply that one who generates electricity not in excess of 1 megawatt or 100KW distribution capacity may sell electricity on that site without a licence. This may cover some residential or industrial estates with independent generation capacity.

It would seem also that electricity generated for personal consumption (captive generation) does not require a licence and it should follow that captive generation even if above 1 megawatt does not require a licence. Having dealt with the exceptions, the Act seems to introduce holders of 6 types of licences: (1) Generation Licence (2) Transmission Licence (3) System Operator Licence (4) Distribution Licence (5) Trading Licence (6) Temporary Bulk Purchase & Resale Licence.

Another player introduced by the Act is the Independent Power Producer (IPP) who will invariably have a generation licence side by side with the successors companies. The IPP's will likely be privately-held companies (it is still in contention whether state-owned companies would be included) and they would undoubtedly play a major role in increasing the amount of power generated nationwide and in boosting the natural gas utilization efforts of the Federal Government.

The National Electricity Regulatory Commission is another new creation of the Act. The Commission shall basically regulate access, structures, completion, consumers and other aspects of the new electricity industry. Part IX of the Act creates the "Power Consumer Assistance Fund" to be used to subsidise underprivileged power consumers as specified by the minister. Part X also creates the Rural Electrification Fund which is supposed to be a public and private sector programme aimed at paying attention to rural electrification. One of the sources of income for the rural electrification fund is the fines and penalties collected by the Commission.

INFRASTRUCTURE OWNERSHIP UNDER THE ACT

Generation Facilities

As regards generation, it is clear that the current NEPA facilities would devolve to the successor generation companies whilst the Independent Power Producers will establish and own new generation plants or take over existing NEPA plants.

Transmission Lines

With transmission, it is not as explicit because the question of "open access" to the national gird (the existing national power transmission lines) needs to be addressed. To put it in layman's terms, it is clear that each major power generator/producer needs to transmit electricity through the existing transmission lines. What rights do they have to do so?

Who operates and manages the transmission lines?

This is a usual issue with unbundling in the electricity market. In the US, the Federal Energy Regulatory Commission Orders 888 & 889 obliges owners of transmission lines to allow open access. In Nigeria, the Act in S19 mentions the Minister's power to make market rules for operation of national grid by the system operator and S68 (2) (a) states that "the terms of a licence may require a licensee to enter into agreements with other persons for the provision of or use of electric lines and equipment operated by the licensee". Invariably, one of the successor companies would take over the duties of overseeing the transmission lines and may metamorphose into the Independent system operator when full competition is emplaced in accordance with S. 19 of the Act.

Land – S68 (10) and S 74

During the period within which the licence is in operation (30 – 50 years subject to renewal, a Licensee may request the Commission for acquisition of any land required.

Such land may be acquired by the Commission as required for public purpose. This is subject to the following rules: it applies only to generation, transmission or distribution companies; landowner must have a right to fair hearing: must be compensated if acquired; has right of first refusal to repurchase if licensee decides to relinquish; any repurchase shall be at a price the equivalent of compensation paid. If the doctrine of quic quid plantaur solo solo cedit (whatever is on the land belongs to the land) is applied to some of these compulsory acquisitions at the expiry of the licence, some landowners may by default become power station owners.

CONTRACTING FRAMEWORK UNDER THE ACT

The emergence of the Act will see new contracting modes in our legal landscape. These include but are not limited to: Transmission line utility contracts; Sale, mortgage, or lease or licences S66; Electricity Distribution Contracts; Novation Contracts S. 18(e); Long term electricity purchase and supply contracts; End user contracts for bulk energy use; Gas supply contracts; Brokerage contracts; Build Operate and Transfer Schemes (BOT); Long term Infrastructure Finance Schemes; Royalty Agreements; Right of Way Agreements and a host of others.

AN OVERVIEW OF STRATEGIES FOR POLICY IMPLEMENTATION

As mentioned earlier on, policy making and co-ordiantion have been chaotic and generally problematic in various aspects:

a. The government has not been able to adequately forecast and plan for the growth of the demand for power in the country, with the result that the gap between the demand for power and supply of power in the country has been growing over the years.

b. Many hastily set targets and arbitrary deadlines have been missed and the date for providing stable power supply to the country has been frequently shifted, from the initial estimation of end of 1999, to October 2002, then October 2005, then end of 2007 and even beyond. The project volume of power to be generated and supplied by various target dates has also undergone constant revision.

c. Different government departments, including the Power Holding Company of Nigeria, the former Ministry of Power and Steel and BPE have at various times given different estimates regarding the financial cost of developing the power sector, building new power stations, ending power outages and achieving stable power supply. Different figures have also given about how much has been given about how much has been spent already, indicating lack of proper budgeting and cost audit at best, or possibly, corruption.

d. The electricity privatization timetable has been incessantly revised over the years, which is indicative of inadequate planning.

e. The government is constructing several new power plants in the country while pursuing privatization at the same time, thereby potentially sending confusing

signals to private investors as to the government's intentions. The proposal by the last administration to subsequently privatize the new plants may not be cost-effective given the huge up-front cost of building the power plants. It also raises three questions, first will the BPE be able to ensure effective privatization of these power plants?; secondly, will the government be able to effectively regulate the private owners/managers to ensure efficient operations after privatization?; And thirdly, if a private company (including any of the contractors building the new power plants) is serious about investing funds in the Nigerian power sector, why not simply apply for a licence and build a new power plant to desired specification instead of waiting to buy one being built by the government?

f. There is need for a re-examination of the organizational structure of electricity sector.

g. The operational link between the PHCN management on the one hand and its supervisory board, supervisory ministry (the Federal Ministry of Energy) and the presidency on the other – is it properly streamlined and who is authorized to instruct who?

h. Further to the foregoing, there is some concern about the multiplicity of government departments and ministries that undertake electricity – related functions either wholly or partly. These include the BPE, which is implementing the privatization programme, the Nigerian National Petroleum Company, NNPC (fossil fuel development, gas infrastructure development, and construction of some new power plant via joint venture arrangements with multinational oil companies); the Nigeria Atomic Energy commission/Nigerian Nuclear Regulatory Authority (nuclear energy development); and the Federal Ministries of Energy; Science and Technology; Agriculture and Water Resources (construction of dams); and Solid Mineral and Steel Development (development of power sources like coal). Is there a clear structure for linking their functions and policy frameworks to ensure consistency and avoid duplicating reform efforts?

i. There is some concern about the internal management structure at PHCN, which is the biggest state-owned enterprise in Nigeria with up to 30,000 workers. Where the organization's management is unable to adequately supervise the workers, this would pave way for absence of accountability at all levels, poor utilization of budgetary allocations, entrenchment of a lackadaisical work ethic and severe organizational inefficiency. Regarding the dual pursuit of electricity projects (new power plants) by the federal government and various state governments, an issue is whether there is adequate synchronization in order to ensure the optimum use of scarce resources, obtain the best possible deals from various contractors engaged for these power projects and utilize the advantages offered by economies of scale.

POLICY RECOMMENDATIONS AND CONCLUSIONS

The power sector reform will transform Nigeria's socio-economic landscape, following the liberalization of the sector. According to Nnaji (qtd. in Daily Sun: 2011), the liberalization of the telecoms sector could unleash a revolution in Nigeria; the power sector, which is a much bigger sector, will definitely cause a bigger revolution.

Nevertheless, shortage of ideas of policies on the part of the government in the power sector has never been the problem; the bane has been in the faithful implementation of the policies. Such policies as the unbundling of PHCN, investments in power generation to hit 4,000 megawatts, even the privatization of the marketing aspect of PHCN to foreign firms had failed to yield dividend. According to the Vice President of Nigeria, Namadi Sambo (qtd. in Daily Sun: 2011), however, the greater dividend would come from the liberalization and privatization of PHCN. He stated further that the policy which formed part of the power sector reform programme, would change Nigeria's socio-economic landscape far more than what the country has seen in telecommunications, following the sector's liberalization.

He went further to add: "The change of Federal Government status as the sole owner of the 17 generation and distribution companies to that of a minority share owner will benefit the nation. A situation where most of the Federal Government's plants do not produce up to half of the installed capacities whereas private electricity producers like Shell, AES and Agip generate 100 percent of installed capacities is as instructive as it is revealing".

Indeed, all these government programmes are to prepare the ground for the privatization of PHCN and the deregulation of the power sector; and thus engender regular power supply to physical facilities, namely, residential developments, commercial and industrial facilities, etc. However, one issue that comes to mind as regards the process of privatization is the need to avoid a situation where we have unbundled a vertically integrated government monopoly and used the instrumentation of the law to create related company monopolies (albeit in private hands).

In this connection. Jemide (2005) stated that: "A situation where several companies in different segments are owned by a group of people will surely be the antithesis to the Act. It is for this reason that S67 (3) specifies disclosure to the Electricity Commission by an application for a licence who owns more than 10% of another company who has applied for or owns another licence. This in my opinion can be circumvented and only scratches the surface. We look to the commission to come up with strong regulations in this regard".

REFERENCES

Emery, F. E. (1969) Systems Thinking, Penguin Books Ltd., Harmondsworth, Middlesex, England, p. 15.

Ewelukwa, N. O. (2007) Electricity Supply in Nigeria: Problems and Solutions, The Guardian Newspaper, Lagos, Nigeria, p. 13.

Farris, M. T. and Sampson, R. J. (1973) Public Utilities: Regulation, Management and Ownership, Houghton Mifflin Company, Boston, U.S.A., p. 9 – 268.

Idemudia, G. (2004) Eko Zone Launches NEPA Management Systems (NEPAMS), NEPA NEWS, Official Journal of the National Electric Power Authority, p. 21.

Iyoha, M. O. (2008), National Control Centre (NCC), Osogbo, Delivering Excellence in Electricity Grid Operation, PHCN News, Abuja, Nigeria, p. 9.

Jemide, A. (2005) Understanding the Electric Power Sector Reform Act, The Guardian Newspaper, Lagos, Nigeria, p. 70 – 74.

Klein, T. A. (1977) Social Costs and Benefits of Business Prentice – Hall Inc., Englewoods Cliffs, New Jersey, U.S.A., p. 20 – 42.

PHCN Review (2006), What a Milestone!, The Expansion of PHCN Electricity National Grid, 1973 – 2005, PHCN News, Abuja, Nigeria, p. 16 – 17.

Poole, M. S. and Van de Ven, A. H. (2004), ed., Handbook of Organizational Change and Innovation, Oxford University Press, Inc., New York, U.S.A., p. xii.

About the Author

Dr. Felix Ikekpeazu

Nnamdi Azikiwe University
Anambra State, Nigeria

Dr. Felix Ikekpeazu holds a Bachelor of Architecture (B. Arc) and a Doctor of Philosophy Degree in Architecture, specializing in Housing delivery systems. He joined Nnamdi Azikiwe University in Anambra State after serving as Chief Architect at the Enugu State Housing Development Corporation. He is currently a senior Lecturer in the Department of Architecture. His research interests are in Housing delivery systems, Green buildings and energy efficiency in buildings. Dr. Ikekpeazu is a registered Architect and has published in many local and international journals. He can be contacted at felixositaike@gmail.com