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Full length Research Paper

Management of electricity generation and supply in Africa: The Nigerian experience

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Incessant power failures have caused irregular production and low utilization of resources in industries and educational institutions while the Nigerian government has also been embarrassed on several occasions when Power Holding Company of Nigeria (PHCN) switched off power during government official functions. The PHCN has thus become an object of ridicule and opprobrium for over two decades. The paper therefore sets out to examine and analyse relationships among characteristics of organisational environment and motivation for effective performance of the Power Holding Company of Nigeria Limited, a public enterprise established, financed and managed by the Federal Government of Nigeria. The paper utilized both primary and secondary sources of data and data collected were descriptively analysed with a view to seeking answers to the broad question of what factors within the perceived organisational environment of the PHCN are related in a positive or negative manner to its effective performance. The findings revealed that PHCN has to contend with internal and external environmental hostilities and constraints such as poor funding of the enterprise, corruption, excessive control by the Federal Government, vandalisation of its equipment by hoodlums, fraud, shady dealings, poor maintenance, erosion, debts owed it and irregular rainfall. The paper concluded that electricity is the bedrock of socio-economic development of any nation hence priority must be set for its adequate budgetary funding in Nigeria, in particular and in African countries in general.

Key words: Management, electricity, organisation.

INTRODUCTION

In most countries whether developed or developing, the involvement of government in the planning and execution of economic policies is almost inevitable. Government" involvement in the economy in the less developed countries of Africa has become even more important given the absence of viable indigenous entrepreneurial class and the threat posed to their entire economic and political structures by neo-colonialism. Shortly after independence, it became clear to most African countries that neither the public service they inherited nor the few scattered private enterprises controlled by alien investors could produce goods and services that would satisfy the aspiration of the newly independent but impatient people. Besides, the desire of most African governments to control strategic areas of their economy has made them to adopt policies that play down the orthodox laissez-faire economic doctrines which essentially restrict governments to their traditional role of maintaining law and order (minimal government).

According to Obadan (2000), the case for public ownership has often been made on many grounds among which are:

1. The persistence of monopoly power in many sectors, meaning that certain markets have the tendency to move towards monopoly power, especially when technological factors imply that only one producer, a natural monopoly, can fully exploit available economics of scale, particularly in services requiring heavy investment e.g. an electricity grid. In this special circumstance, direct government control may be required to ensure that prices are not set above the cost of producing the output (Todaro, 1989, 567).
2. Freedom of government to pursue objectives relating to social equity, which the competitive market would ignore, notable among which are employment and easy access to essential goods and services.
3. Capital formation was a condition at the early stages of

development when private savings were very low. Investment in infrastructure at this stage was crucial to lay the ground work for further investment. Furthermore, lack of private incentives to engage in prospective economic ventures due to factors of uncertainty about the size of the local markets, unreliable sources of supply and inadequacy of technology and skilled labour.
4. Certain goods that are of high social benefits are usually provided free or at a price below their costs where the private sector has no incentives to produce such goods, hence, the government must be responsible for their provision.
5. The government may seek to achieve income redistribution by locating enterprises in certain sectors especially where private initiatives are low.
6. Ideological motivation and the desire of some governments to gain national control over strategic sectors or over multinational corporations whose interests may not coincide with those of the African countries or over key sectors for planning purposes.

In Nigeria, statutory corporations and state-owned enterprises became an increasing tool of government intervention in the development process especially from the early 70s. The Nigerian Second National Development Plan, 1970 to 1977 lends credence to the aforementioned assertion when it says:

"Their primary purpose is to stimulate and accelerate national economic development under conditions of capital scarcity and structural defects in private business organisations. There are also basic considerations arising from the dangers of leaving vital sectors of the national economy to the whims of the private sector often under the direct and remote control of foreign large-scale industrial combines".

In effect, the State Owned Enterprises (SOEs) in Nigeria played a crucial role in Nigeria‟s quest for national economic independence and self-reliance. So most of the SOEs created then were to operate as a "quasi-commercial" organisation due to the following reasons:

1. The normal bureaucratic machine does not lend itself to the speedy decisions so essential for commercial operations.
2. The government system of accounts is designed to facilitate close expenditure control by the legislature and not necessarily to promote operational efficiency.
3. Commercial undertakings tend to generate an atmosphere of initiatives which bureaucratic rigidity may not allow.
4. It was necessary to minimize political pressures and partisan influence in some sensitive social institutions (e.g. Nigerian Television Authority), in order to sustain public confidence in their policies and programmes.
5. It is doubtful whether private enterprises can sustain the magnitude of investment in such institutions as in Ports Authority, Railway Corporations etc. which may not satisfy the canons of private profitability.

The philosophy has been that, in the absence of high cadre traditional entrepreneurs needed to propel economic development, the public sector was to be used as the effective instrument of government intervention in the economy. It was this principle that informed the Nigerian governments to establish public enterprises like Water Corporation, Electricity Corporation of Nigeria, Nigeria Airways Authority, Nigeria Ports Authority etc.

However, the actual performance of most of the SOEs in Nigeria left much to be desired. Many of them were not responsive to the changing requirements of a growing and dynamic economy and they do not possess the necessary tools for translating into reality the hope of successful commercial operations (Omoleke, 2008). In exceptional cases, some SOEs have however performed and still perform well in terms of being well run, profitable and efficient. In general, the SOEs are bedeviled with the following:

1. Economic inefficiency in the production of goods and services by the public sector with high cost of production, inability to innovate and unnecessary delays in delivery of the goods and services produced.
2. Ineffectiveness in the provision of goods and services such as failure to meet intended objectives and diversion of benefits to elite groups.
3. Rapid expansion of the bureaucracy severely straining the public budget with huge deficits hence public enterprises become massive drain on government resources.
4. Poor financial performance of SOEs reflecting a history of huge financial losses, overstaffing and burden of excessive debts (Samuel, 1999).

As discussed earlier, this paper examined the National Electric Power Authority‟s (known as PHCN) level of performance within the framework of the Nigerian economy as one of the most criticized public enterprises in Nigeria.

In order to throw more light on this broad objective of the paper, the following more specific issues were addressed.

1. What are the statutory objectives of PHCN?
2. What are the relationships of the dimension of PHCN‟s organisational environment and its performance?
3. What are the multiple variables within the PHCN‟s organisational environment that militate against its performance?

Arising from the above specific research questions, the purpose of this paper is to relate the independent variable of PHNC‟s organisational environment to dependent variable of performance. In other words, it examined some inherent factors within organisational climate of PHCN that hinder its performance and disturb it from meeting customer‟s demands for electricity within and

outside Nigeria. We now grope for some theoretical explanation of PHCN epileptic supply of electricity.

THEORETICAL EXPOSITION AND REVIEW OF LITERATURE

The theory underlying this work is based on the concept of organisational climate and partially on expectancy motivation theory. The concept of organisational climate is derived from the work of Lewin (1951) who perceived importance of environmental impact in determining organisational behaviour. In like manner, Taguiri (1968: 27) in defining the term, states that:

"Organisational climate is a relatively enduring quality of internal environment of an organisation that is experienced by its members, influences their behaviour and can be described in terms of the values of a particular set of characteristics of the organization".

Perhaps Taguiri informed Olowu (1983) to state that the constellation of environmental factors determines to a great extent the structure and functioning of a system. Furthermore, the scholars of public administration also recognize the early need for an ecological approach to the study of public administration. Indeed, Max Weber‟s typology of authority-administrative system draws heavily upon the influence of the environment on the character of public administrative system. It should be noted that dynamism and complexity characterises the environments of organisations in Africa. One of the best-known studies of the relationship between an organisation‟s external environment and its structure was conducted (Emery and Trist, 1965). These authors categorized the environments into four types or „causal textures‟ as they called them. Each type of environment is conducive to the development of certain organisational structures.

The environment and corresponding structures proposed by Emery and Trist were based in part, on a case study of a British food canning firm. The identified environments are thus discussed.

Placid, randomized environment

This is the simplest environment and one which is not likely to be encountered by present day organisations either in Africa or the West. The environment is stable and unchanging but the resources are dispersed almost randomly within it, and are therefore not logically connected. This makes it difficult for the organisation to predict what will happen in its environment. Such an environment is conducive to small and independent organisations with simple structures. Little forward planning is possible and the organisation proceeds through trial and error.

Placid, clustered environment

Here the environment is still not subject to rapid change, but is more predictable owing to the existence of logical, causal connections between resources and other elements within it. An organisation‟s survival and success depends on its being able to predict the environment, and therefore planning becomes important. Organisations tend to be larger and more hierarchically structured.

Disturbed, reactive environment

The major difference between this environment and the preceding one is the existence of a number of similar organisations competing for the same resources. The ability to predict the environment and to plan accurately is complicated by the existence of competitors, and so, relative power becomes a vital consideration. As Aldrich (1979) states, „large size might give organisations such power and overtime‟. The larger organisations might drive out the smaller ones‟. Such an environment also promotes structural flexibility and encourages decentralization.

Turbulent environment

This is a highly complex, rapidly changing environment, characterized by multiple connections between resources and other elements within it. Three factors contribute to this change and complexity. First, adaptation to the third type of environment mentioned earlier increases the links between competing organisations (that is what happens to one often affects the other and them all, because of their competition over the same resources, customers etc. subject to similar pressures), and this in turn creates a backwash effect from the organisations to the environment itself. Second, there is an increasing interdependence between organisations and society in general. Organisations come to depend heavily on customers and client groups within certain parts of society, and „society‟ in turn depends on formal organisations for certain goods and services. Third, competition and rapidly changing environments make it necessary for organisation to rely increasingly on research and development activities, which themselves help to speed up the general rate of change.

When, Litterer (1973) observes; that organisation faces a regular set of demands from the same environment, such as producing the same product or the same service for the same or very similar clients, the organisation faces stable conditions. He offers as an example public utilities that produce a standard product, such as electricity, at a limited range of voltages and at a single frequency. The opposite, of course, is the turbulent environment in which new products and operating innovations are common. According to Duncan (1972), understanding the environment is

important because it facilitates identifi-cation of characteristics that contribute to uncertainty in organisational decision making. Such uncertainty is thought to comprise three components; lack of information concerning the environmental factors associated with particular decision making situations, inability to accurately assess the probabilities of environmental factors affecting the success or failure of an organisation performing its function(s) and lack of knowledge regarding the costs associated with an incorrect decision. Duncan"s conceptual framework is useful because it emphasizes the fact that perceived uncertainty and the degree of complexity and dynamics of an organisation"s environment must be considered as dominant features in its decision making. It is in the light of the above theoretical exposition and review of literature that this paper attempts to hypothesize whether the environment (internal and external) of the National Electrical Power Authority (PHCN Ltd) has impacted on its alleged unimpressive performance.

It was an attempt of the Nigerian government to intervene in the strategic sector of the economy that gave "birth" to the National Electric Power Authority now PHCN. The establishment was legally backed up by the promulgation of Decree No. 24 of 1st April, 1972, with the amalgamation of Electricity Corporation of Nigeria (ECN) and the Niger Dams Authority (NDA).

The mission at its inception was to maintain a coordinated and efficient system of electricity supply to all parts of Nigeria and the neighbouring country like Niger Republic. It was also meant to serve as an engine of industrial development bearing in mind the significance of energy supply in industrial development. Specifically, Decree No. 24 of 1972 stated inter alia the objectives of PHCN as follow. Section 1, subsection 1 a-c itemized the objectives:

a. To generate or acquire supply of electricity
b. To provide supply of electricity for distribution within or outside Nigeria, and,
c. To provide electricity for consumers in Nigeria and as may from time to time be authorized by the Authority. Section 7 sub-sections a-e also stated the powers of the Authority as follow:

a. Managing, maintaining and working the electricity undertakings that are vested in the Authority under Decree No. 24 of 1972;
b. Establishing, managing and maintaining such electricity undertakings as the Authority may deem it expedient to establish in the public interest;
c. Supplying electricity and promoting economic and efficient electric generation, distribution and supply at reasonable prices;
d. Using any ancillary works for the generation of electricity, the improvement of navigation of inland waterways and the promotion of agriculture and,
e. Operation of irrigation schemes with the approval of Federal Executives Council in connection with River Niger.

PHCN has thus remained a vital and almost indispensable public enterprise in the area of electricity generation, transmission and distribution. The Authority was rated fairly well during its few years of existence but its performance deteriorated in the last two decades and since then it has remained the most criticized public enterprise and has thus become the butt of the Nigerian public. Having stated the objectives and legal powers of PHCN, the next question is: to what extent has PHCN been able to substantially achieve its objectives and statutory functions? Unarguably developmental studies have shown that electricity is a factor of economic growth and has significantly contributed to the prosperity of some advanced nations of the world. This in fact suggests that the efficiency with which electricity supply responds to the volume of need of a society can be crucial to the speed with which economic development proceeds. It is against this background that the Nigerian government enunciated unambiguously the state policy on socio-economic development in Sections 16(1) of 1979 and 1999 Constitutions, respectively:

The State shall, within the context of the ideals and objectives for which provisions are made in this constitution:

a. Harness the resources of the nation, promotes national prosperity and an efficient, dynamic and self-reliant economy.
b. Control the national economy in such manner as to secure the maximum welfare, freedom and happiness of every citizen on the basis of social justice and equality of status and opportunity.
c. Without prejudice to its right to operate or participate in areas of the economy other than the major sectors of the economy, manage and operate the major sectors of the economy.

It is in fulfillment of the earlier state policy that PHCN becomes relevant as an agent of government intervention in the economy. This now leads us to examine the role of the Power Holding Company of Nigeria (PHCN) in socio-economic development in Nigeria.

APPRAISAL OF PHCN'S PERFORMANCE IN NIGERIA

Although the Authority had installed capacities of five thousand eight hundred and sixty megawatts (5860 MW) of power generation in 1996 while the total available capacity of electricity consumption stood at three thousand megawatts which is just 51% of the installed capacity. However, the installed capacity has been increased to 8,702.25 MW in 2010 (Table 1).

Table 1. Electricity plant‟s capacity in Nigeria (2010).

Power station	Installed capacity (MW)
Kainji hydro	760
Jebba hydro	578.4
Shiroro	600
Egbin steam	1320
Ajaokuta	110
A.E.S. (Gas)	302
Sapele (ST)	1020
Okpai (Gas)	480
Afam (I-V) (Gas)	931.6
Afam IV (Gas)	497.25
Delta (Gas)	882
Geregu (Gas)	414
Omoku G.T.	100
Omotosho	335
Ibom	37
Olorunsogo	335
Total	8702.25

Source: PHCN Office, Osogbo, South-Western. Nigeria.

Table 2. Electricity consumption for residential and industrial sub-sectors January to December 2009 in KWT

Month	Residential supply	Industrial supply
January	17,162,642	609,392.00
February	14,944,432	557,385.00
March	16,848,560.01	916,111
April	22,250,503	678,801
May	21,090,873.38	590,531
June	19,931,243.15	502,260
July	19,299,733.33	449,135.00
August	17,738,941.00	660,299.00
September	22,179,676.94	396.268.72
October	14,778,256	407,836
November	15,380,213	456,413
December	0,596,791	429,441

Source: PHCN Office, Osogbo. South-Western Nigeria, (September 2009)

Notwithstanding the increase in the installed capacity, what raises concern is the Authority‟s claim which stands at variance with electricity demands of Nigerians. This has generated a lot of reactions from the Nigerian public who have continued to be victims of the power failure and rationing. This is particularly true of the manufacturing sector whose operations depend mostly on electric power supply. The sector has lamented the continued drop in its production capacity resulting in massive retrenchment of workers. The domestic/residential electric consumers are not left out as an incessant power failure from PHCN‟s inaction has spelt doom on their local businesses and electrical gadgets. Some of the companies, due to epileptic supply of electricity were compelled to relocate to neighbouring country like Ghana where they are now operating. A good example is not far fetched and that is Dunlop Nigeria limited producing motor vehicles tyres which has moved from Ikeja, Lagos to Ghana.

The Federal Republic of Nigeria Government is not spared in PHCN‟s unimpressive performance just like industrial and residential sectors discussed earlier. The Government was embarrassed on April 16, 1988 when the Ghanaian Head of State (Lieutenant Jerry Rawlings) visited the country and the reception organized for him had to be held in a blackout. It would also be recalled that Babangida administration jailed eleven (11) PHCN officials for offences relating to sabotage of power failure. Furthermore, the African Nations Cup, Morocco/Congo Match was disturbed for good fifteen minutes in Lagos National Stadium when PHCN took off power. Perhaps the cumulative effects of PHCN‟s dereliction of duties forced President Obasanjo to sack the PHCN top management and the Presidency took over the management of the Authority. The above scenario of poor performance also lends credence to the opinion survey carried out by the author of this paper in major cities and towns in South Western Nigeria (Ile-Ife, Ikire, Ibadan, Lagos and Ijebu-Ode). The aggregate opinion sampled confirmed that:

1. There exists inefficiency in power distribution and transmission.
2. The constant power failure without prior official notice to customers.
3. The corrupt practices among the PHCN officials.
4. The arbitrary charges coined “crazy” bill.
5. The poor maintenance culture of PHCN equipment.

Perhaps the earlier surveyed result also lends credence to Akintayo (1999) when he opined that:

“If PHCN is in charge of the air we breathe, heaven knows the calamity that would have descended on mankind”.

This incapacity of PHCN has been statistically expressed in Table 2 which shows the electric distribution in Kilowatt to both residential and industrial consumers in Osogbo the State capital of Osun State of Nigeria between January and December 2009. Obviously, the statistics shows under supply of electric power to both sectors of the economy.

Despite Nigeria‟s enormous investment in the provision of energy infrastructure, the performance of the power sector has still remained poor, in comparison with Ghana for instance. This, assertion lends credence to the verdict of a World Bank assessment study conducted in 1993 on energy development in Nigeria which compared the performance of Nigeria‟s power sector with those of 20 other developing countries. The study revealed that the

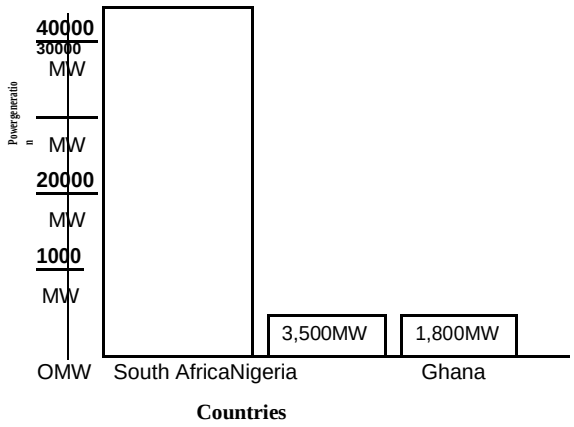

Figure 1. 'Power generation in South Africa, Nigeria and Ghana'**.** (Source: Energy Magazine, Thursday January 21, 2010)

sector had one of the worst records in terms of:

1. The highest percentage of system losses at 33 to 41%.
2. The lowest generating capacity factor at 20%.
3. The lowest average revenue at US $1.56 KWH.
4. The lowest rate of return at 8%.
5. The longest average accounts receivable period of 15 months.

Perhaps, the embarrassing and worrisome picture depicted by the report and other negative considerations informed the Federal Government‟s decision to embark on the full privatization of the power sector and the proposal for increased foreign participation in the sector (Section 17 of the Nigerian Investment Promotion Commission Act of 1995 CAP N 117 LFN, 2004).

Inspite of the fact that the privatization and comercialization Decree No. 25 of 1988 recognized the need for NEPA (PHCN) to operate a tariff structure to facilitate increased revenue generation which ultimately would reduce its dependence on government for funding, supports its costs of operations and funds parts of its annual investment plans, yet the performance of PHCN is still poor.

As earlier pointed out, despite the slow growth in economic activities in recent years the demand for electricity in Nigeria continue to increase. Consequently, the expensive and unreliable power remains a major concern to Nigeria‟s industrial sector, the government itself and household consumers alike.

Unarguably, unpredictable and epileptic power supply which has become a daily occurrence in Nigeria has resulted in equipment malfunctioning in all sector of the economy and consequently makes it difficult to produce goods and provide services efficiently.

As a result of this fundamental problem, industrial enterprises have been compelled by necessity to install their own electricity generation and transmission equipment and consequently adding considerably to their operating and capital costs. The situation also creates unnecessary market for importation and sale of generating plants as alternative domestic and industrial supply of power. Little wonder when Enweze (2001) estimated that about 25% of the total investments in machinery and equipment by small firms and about 10% by large firms were on privately installed infrastructure.

Despite the attempts by some firms to supplement the power supply by PHCN Ltd, electricity demand by consumers, especially domestic consumers and offices, has continued to be on the increase. At present, the Power Holding Company of Nigeria Limited has been (NEPA) converted into a commercial enterprise, yet it still retains monopoly on power generation and distribution, and has set tariffs below the supply cost. Regrettably, PHCN‟s metering and billing system seem inadequate and thus reducing revenue by about 25%.

The Central Bank of Nigeria remarked that electricity production in Nigeria has increased steadily from 135,800 KWH in 1960 to an aggregate generating capacity of 10,221.1 million kilo watts (KWH) in 1985. Furthermore, the generating capacity improved further to 13,462.9, 5,856.0 and 14,684.3 million KWH in 1990, 1995 and 2000, respectively.

According to the Apex bank in Nigeria the aggregate electricity generation was 18,000.9 million KWH in 2001, of which PHCN accounted for 99.5%, while thermal energy purchased from private firms contributed a meager of 0.5% (appendixes 1 and 2). However, the energy generated between January and December 2008 stood at 5,025,638.94 MWH while the total sum of energy generated between January and December 2009 was 20,893,432.80 MWH, respectively (appendixes 1 and 2). Comparatively, Nigeria power generation and distribution is still far below what obtains in South Africa (Figure 1). Perhaps this inadequate generation and distribution of electricity informed the Federal Government of Nigeria to promulgate Electric Power Reform Act which was enacted on March 11 2005. The Federal Government has an ambitious programme of generating 10,000 MW in 2011, which is just a mere 25% of what South Africa generates. Paradoxically, Nigeria has failed to generate its 6000 mw as at December 2009 as proposed. Finally the inadequate and epileptic supply of electric power has crowned Nigeria to be the number one generator importing country in the world. Out of about $43.2 million that African countries reportedly spent on generator import in 2005, Nigeria was said to have accounted for $ 152 million (35%) of the figure. (Sunday Punch, 2010).

In response to increasing demand for electricity, PHCN developed an additional capacity for the generation and transmission of electricity in the 1980s involving investment outlay in hydro power, gas and steam turbines. Consequent upon the heavy investment is the six thermal and three generating units with a total installed capacity

of about 5,984 mw which became operational by 1992. The thermal stations were sited at Afam, Delta, Egbin, Sapele and Ijora with generating capacities of 100, 820, 1,320, and 66 mw, respectively. On the other hand, the hydropower stations were located at Jebba (578 MW), Kainji (760 MW), and Shiroro (600 MW) (Table 1).

In order to ease distribution of power supply, the country was divided into five zones, namely, Lagos, Western, Kaduna, Eastern and Jos directorates. The distribution network has been expanding rapidly as a result of various rural electrification projects throughout the country being commissioned to join the national grid.

Contrary to the initial spirit behind the establishment of PHCN in 1972 (Decree No. 24), the promulgation of decree on privatization and commercialization in 1991 enjoined the government agencies including PHCN to fix rates, prices and charges for their products and services. Perhaps, the objective was to encourage the agencies to provide services at competitive and market driven prices which, in turn, would enhance efficiency.

Paradoxically, PHCN has not been performing as efficiently as the enabling decree envisaged. The organization has failed to rationalize its structure and management. Hence, it has been unable to achieve cost effectiveness in the generation and distribution of electricity, forcing government to pay huge subsidies to protect Nigerian electricity consumers, despite taking advantage of governments commercialization programme to raise more revenue through increased tariffs. Ironically, PHCN has also been confronted with a persistent problem of low capacity utilization where installed capacity stands at 8702.25 megawatts whereas only 1573 are currently generated, less than 20% of the total installed capacity. Furthermore, the percentage of total supply has been fluctuating over the years with deterioration in both transmission and distribution resulting in incessant power outages, fluctuations and constant load shedding. Power supply is also constrained by transmission problems caused by broken-down transformers. In some instances, new transformers are budgeted for while refurbished ones were put in place instead (official fraud). Finally, perhaps due to mismanagement, the PHCN"s tariff structure has always been below marginal cost (MC7 MR) resulting in short fall in revenue which seems to have aggravated the enterprise financing equirements and consequently resulted in more black-out than light.

PHCN'S OPERATIONAL BOTTLENECKS

Indeed, every national planning programme from the 1960s had to contend with the abysmal failure of public enterprise and one re-organisation or the other has been suggested and carried out. In these circumstances, an examination of the factors militating against PHCN"s level of performance is necessary here. It is therefore apposite to relate PHCN"s level of performance to the concept of environment which we discussed extensively under the theoretical exposition of this paper. As PHCN does not operate in a vacuum and like any other organisation, it has both internal and external environments which tend to have impacted on its level of performance (Olowu, 1983; Lewin, 1995; Taguiri, 1968). We will therefore grope for factors that hinder PHCN"s performance. We will treat these factors as issues arising from its environments.

This author"s interaction (interview) with the PHCN management revealed that the Authority is not insensitive to the public plight of epileptic supply of electricity. It said:

"We know that many people are suffering as a result of erratic supply. We know the commodity

we sell is required for twenty-four hours (24 hours). People should however know that we are doing something".

Environmental factors hindering effective and efficient performance of PHCN

Inflation as an economic variable within PHCN"s environment constitutes serious constraints that deter PHCN"s performance and efficiency. Over a decade ago Naira value had depreciated and this depreciation has a salutary effect on PHCN operations which have been bogged down by the burden of high operational costs that keep on rising year in year out.

Non-settlement of electricity bills

The non-settlement of electricity bill issued by PHCN to its customers has been identified as a major environmental factor that weighs down the performance of PHCN. The paradox of this huge indebtedness is that government parastatals and agencies are notorious with the highest unpaid bills. The total indebtedness which stood at N12, 477,442,811.00 is very disturbing. This indebtedness has also been identified (Obadan, 2000) when he said:

"PHCN was crippled by its customers' indebtedness; its privatization can start with the employment of private companies to collect tariffs on its behalf".

There is no reason doubting the fact that prompt payment of PHCN bills may likely enhance regular power supply and reduce PHCN"s ineptitude as earlier identified in this paper. This will enable it to fund the (TAM) Turn around maintenance of its machines as when due.

Vandalisation of PHCN's equipment

Related to the environmental factor is what Emery and

Trist (1965) called “Turbulent environment”. The two author‟s concept tends to apply to PHCN‟s condition hindering its performance. One of the major problems arising from PHCN‟s external environment bothers on vandalisation of its installations by hoodlums and brigands. The general equipment lost to vandalisation stands at N1.5 billion between 1991 and 1996. (Official Journal of PHCN, 1998).

Funding and autonomy

Unarguably, inadequate funding of the Authority seems to be a contributing factor responsible for irregular power supply in Nigeria. The Federal Government appears to be reluctant to invest a huge sum of money on the Authority whereas this has become necessary to enable the organisation replace the obsolete equipments. The Federal Government‟s rigid remote and immediate control of the organisation does not allow policy implementation and initiatives for effective delivery of service to customers.

Poor maintenance of equipment

Our empirical study reveals that the generating units and their auxiliaries have become obsolete while poor maintenance culture of the organisation has immensely contributed to the nagging erratic power failure in Nigeria. For instance, the Kainji Power Station commissioned in 1968 is yet to undergo a full turn around maintenance (TAM). The plant with an installed capacity of (760 MW) generates only (580 MW). Other power plants like Egbin (1320 MW) and Ijora with a combined capacity of 3153 MW also need routine repairs.

Erosion

PHCN‟s performance is being plagued by natural adversities like erosion and seasonality of tropical rain. Erosion washes off sand silt by corroding the base of high voltage equipment in Gombe, Maiduguri and Abakaliki areas of the North and East of Nigeria, respectively. Other operational problem has been associated with low water level periodically experienced at Kainji, Shiroro and Jebba stations in savanna region of the country. The low water level affects the generation and supply of electricity through the thermal stations especially during the dry season.

Faulty town planning

The area originally designed for residence has, in recent times witnessed an influx of industries. This has led to incessant power disruption in those areas due to heavy overloading of transformers which hitherto were meant for residential areas. This attitude constitutes external environmental hostility to the organisation.

Bureaucratic corruption

The corruption perpetrated by the staffs of the Authority who may connive with the customers in order to evade payment of PHCN bills endangers PHCN performance. The PHCN officials pretending to act for the organisation collected money from customers for supply of prepaid metre yet they refused to supply the metres and thus damaging the tone and image of the organisation.

In sum, all the above environmental factors (internal and external) constitute a clog in PHCN performance to supply adequate and stable electricity to residential, commercial, industrial and governmental agencies in Nigeria. This, in effect substantially upholds our theoretical assertion made at the beginning of this paper that ecological factors go along way to determine the level of performance, efficiency and effectiveness of an organisation. In order to overcome environmental factors hindering stable power supply in Nigeria, we therefore want to proffer the following solutions.

SUGGESTED SOLUTIONS

The PHCN must establish a domestic electrical engineering industry to combat obsolete equipment rather than relying absolutely on external technology. This attempt will serve as a primary support base to manufacture its basic spare parts for generation, transmission and distribution of electricity to consumers. Perhaps, this will eliminate the situation where PHCN is in “hostage to finance and technological forces outside its control” (Iweribor, 1994). Worried by PHCN‟s regular power failure, the Obasanjo administration promised that within two years of his administration, the black-out would become a thing of the past as power distribution would be deregulated to allow participation of the private sector to provide and sell power. Unfortunately, this promise was a ruse. The Lagos State Government has seized this initiative to minimize its dependence on the PHCN when it decided to sign an undertaking with ENRON Power Nigeria Limited and Yinka Folawiyo Power Limited for setting up a 560 megawatts turbine power plant. Obviously, this is a right decision, at least to break the monopoly of the allegedly inefficient PHCN. This new development is welcome as it relates well to the policy of privatization if the intention is faithfully implemented.

Furthermore, there is need for a regular Turn around maintenance (TAM) of PHCN‟s installations and acquisition of modern tools if regular power supply is to be guaranteed.

The physical planning of the cities, towns and villages need to be addressed more seriously. Places designated as industrial areas should be clearly mapped out and

distinct from residential areas. This will enable PHCN to plan for quantity of energy for specific areas (residential, commercial, governmental, educational and industrial locations).

We want to suggest further that, the Corporate Affairs Department needs to be more alert to its responsibilities of informing the public in advance of any power interruption.

In order to nip in the bud, the problems of hoodlums and brigands who vandalise PHCN equipment, we recommend that an organic and draconian law be legislated by the National Assembly to summarily deal with any miscreants or brigands caught tampering with PHCN cables and installations if found guilty. The debt owed PHCN should be recovered through legal recourse and deduction at source in the case of public agencies which defaulted. The Federal Government of Nigeria should adequately fund and commercialise PHCN as against the present intention to privatize it. PHCN is one of the strategic public enterprises and its privatization may have political and security implications. The law that established PHCN that is, Decree No. 24 of 1972 should be amended to make PHCN account for its actions and inactions and to facilitate easy litigation against PHCN if and when the Authority performs below expectation. On the bureaucratic corruption, the anti corruption law should be enforced to curb any miscreants that are caught engaging in corrupt activities inimical to PHCN‟s performance.

As a matter of government policy, PHCN board of management should be constituted to enable it formulate policies that will guarantee high level performance of its statutory functions. This will also minimize the remote control exercised by the Federal Government, ministry of mines, steel and power on PHCN‟s management. In other words, a high degree of autonomy should be enjoyed by PHCN as a public enterprise to motivate and enhance its level of performance.

Finally, it appears PHCN, as an organisation, is incapable of adjusting to the uncertainty of its environment (Parson, 1961) and perhaps this is one of the weaknesses of the concept of environment/performance relationship in organisational theories. The PHCN should beef up its system to face challenges arising from its changing environment.

Conclusion

In this short presentation, our concern has been to examine the management of electricity in Nigeria as a case study of an African country and consider how the public enterprise (PHCN) in charge of electricity has faired in its statutory functions and objectives since its inception in 1972. In doing so, we have tried to see the extent to which the theoretical concept of environment (environmental variables) has militated against or enhanced the performance of PHCN. The essay has revealed the difficulties inherent in PHCN‟s internal and external environment that tend to hinder its regular supply and distribution of electricity, a *sine qua non* for socio-economic, development of Nigeria in particular and Africa in general. We want to believe that uninterrupted power supply is feasible in this millennium if Nigerian Government can review its planning programme, develop urban and rural areas as well as imbibe the culture of self discipline. The foregoing, however are dependent on the quality and quantity of human and material resources available. The ecological and social problems of power failure in Nigeria can thus be summarized in the words of White (1891) when he said:

“The greatest want of the World today is the want of men; men in their in-most soul and true and honest; men who do not fear to call a sin by its right name; men whose conscience is as true to duty as a needle to the pole; men who will stand for the right though the heaven falls”.

So Nigeria needs devoted men with sound rectitude, and probity who are ready to abide by and respect the code of ethics of their callings to manage her parastatals. Little wonder then when Emerson (1965) asserted:

“What makes a nation’s pillar high, not gold, but only men can make a people great and strong, men who for truth and honours sake stand fast and suffer long; they build a nation’s pillars deep and lift them to the sky”.

The National Electric Power Authority now PHCN should not be written-off or privatized on political and security grounds. We therefore, solicit for its proper funding as it could attain a standard comparable to a similar organisation in many advanced countries of the world if managed by the right men. On this note and as a drive to the power reform in the electricity sector, the Federal Government released N200 billion to PHCN to address the labour content of the reform. The Government must continue to motivate the human resources in this organisation in order to achieve organisational goal of providing adequate power for socio economic development of Nigeria (The Punch, 2010).

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Appendix

Appendix 1. Energy Generated (MWH) January to December, 2008

JEBBA	SHIRORO	EGBIN	SAPELE	DELTA	AFAM	OMOTOSHO	GEREGU	OLORUNSOGO	TOTAL (PHCN)	AES	OKPAI	AJAOKUTA	OMOKU	AFAM VI	IPP TOTAL
258920.00	141730.00	332940.00	48720.00	179863.90	100804.50	36798.50	118326.00	41440.20	1548120.10	168874.01	266432.00	9494.00	24947.98	0.00	469747.99
205384.00	140369.00	253052.21	95784.00	146894.10	97481.00	41294.40	83885.30	16375.90	1356266.91	159992.18	317287.00	968.00	28220.96	0.00	506468.14
217515.00	152691.00	169570.60	94670.00	172157.40	40262.20	37839.00	177406.60	12425.10	1360813.90	104851.53	282825.00	0.00	22653.06	0.00	410329.59
207147.00	80681.00	385562.64	50835.00	160100.20	12041.10	42822.00	95341.10	34068.33	1322821.37	131334.79	248658.00	0.00	17069.00	0.00	397061.79
169693.00	103718.00	292985.66	38001.00	75624.10	12979.00	28678.40	79473.10	2761.90	1009116.16	143028.30	172813.00	0.00	25384.18	0.00	341225.48
130558.00	91537.00	321555.81	60226.00	121210.80	9987.10	30555.00	137927.80	18743.00	1040163.51	132671.12	82669.00	0.00	28202.37	0.00	243542.49
1189217.00	710728.00	1756686.92	388236.00	856850.50	273554.90	217987.30	692359.90	143814.43	7637301.96	840751.93	1370684.00	10462.00	146477.65	0.00	**2368375.48**
111178.00	85225.00	403988.17	81744.00	193155.90	24725.00	39459.00	47394.42	26983.60	1117922.09	169061.40	188871.00	0.00	33110.13	0.00	391042.53
291786.00	139660.00	478223.00	110730.00	137875.00	0.00	31434.00	55444.86	49385.30	1467420.16	176322.50	248288.00	2318.00	30366.79	0.00	447295.29
328115.00	362125.00	434219.00	29174.00	100213.50	0.00	50645.00	42557.40	65468.60	1649499.50	160886.16	245641.00	0.00	9667.03	0.00	416194.19
375140.00	262869.00	597140.90	84997.00	78409.60	11886.00	48990.00	55705.00	38494.10	1806858.60	177074.77	247243.00	6772.00	22732.28	45557.83	499370.88
242662.00	192543.00	345544.60	31096.00	68444.80	176.00	40172.00	53852.60	74754.25	1337997.25	162417.94	118848.00	10792.00	39266.53	30995.73	362320.20
246878.00	178196.00	366781.00	0.00	77038.70	1929.70	43165.00	48760.40	19645.60	1266413.40	160190.20	289096.00	0.00	25968.95	65785.22	541040.37
1605768.00	1230618.00	2825898.67	340741.00	655137.60	88718.70	273885.00	303514.88	274731.45	8646111.00	1006862.87	1337887.00	19882.00	151102.71	142338.78	**2857263.48**
2794976.00	1941344.00	4381563.59	728977.00	1510988.00	312271.62	491852.30	995874.58	418545.88		1846704.90	2708671.00	30344.00	297380.26	142338.78	**5025638.94**

Source: PHCN Office, Osogbo Southwest Nigeria (September, 2009)

Appendix 2. Energy Generated (MWH) January to December, 2009

JEBBA	SHIRORO	EGBIN	SAPELE	DELTA	AFAM	OMOTOSHO	GEREGU	OLORUNSOGO	TOTAL (PHCN)	AES	OKPAI	IBOM	OMOKU	AFAM VI	IPP TOTAL
224509.00	185882.00	362837.00		172751.60	10383.00	13433.00	58576.20	34982.00	1362983.80	151308.73	317118.00		28320.01	75485.51	572232.25
216862.00	139236.00	321802.20		160644.00	5155.00	29672.00	53318.90	32091.00	1198211.10	152425.21	289420.00		36828.21	104444.90	583118.32
258166.00	167235.00	346163.00		183001.20	3336.00	47464.00	61987.40	12957.00	1354946.60	164355.10	276175.00		42182.39	142683.40	625405.89
210797.00	132881.00	357937.00		156686.60	5994.00	32071.00	48220.60	19148.00	1175895.20	167250.83	255310.00		35128.46	73660.70	531349.99
208951.00	147175.00	298523.00		125424.00	12392.00	23903.00	29888.10	7138.00	1029425.10	134064.71	299353.00		32240.73	151209.00	616867.44
184341.00	77053.00	184098.73		145607.30	13870.00	19660.00			755614.03	160568.05	245857.00		41636.55	182754.79	630816.39
1303608.00	**849282.00**	**1871360.93**	**0.00**	**944114.70**	**51120.00**	**168203.00**	**251991.25**	**97316.00**	**6877075.83**	**929982.63**	**1683233.00**	**0.00**	**218338.35**	**730238.30**	**3559790.28**
148842.00	141505.00	164335.60		105399.90	15639.00	19638.50			694782.00	115799.52	310448.00		45310.70	132438.83	603997.05
185801.00	285819.00	187556.37		91349.60	18082.00	24687.00			894434.97	135679.90	205394.00		44020.32	276557.73	661651.85
276000.00	300945.00	208398.30		75241.90	4591.00	24699.00	10364.10		1106649.30	132543.74	205539.00		41499.00	223594.00	603175.74
277397.00	262294.00	224732.70	29050.00	89081.10	6656.00	24617.00	39787.40		1179711.20	129413.40	193348.00		37141.00	246760.00	606662.40
247358.00	220597.00	337580.00	68148.00	151346.50	18316.00	7948.00	46028.20	6275.00	1428443.70	112181.90	168307.00		15906.03	204812.80	501207.73
237856.00	221695.00	390026.40	24073.00	135039.00	36644.00	33934.00	30432.29	0.00	1396882.69	125850.44	313115.00	3204.00	22141.64	314656.98	778968.06
1373254.00	1432855.00	1512629.37	121269.00	647458.00	99928.00	217062.50	126611.99	6275.00	6700903.86	751468.80	1396151.00	3204.00	206018.69	1398820.34	3755862.83
2676860.00	2282117.00	3383990.30	121269.00	1591572.70	151048.00	383265.50	378603.19	103591.00	13577979.69	1681451.43	3079384.00	3204.00	422355.04	2129058.64	7315453.11

Source: PHCN Office, Osogbo Southwest Nigeria (September, 2009)