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## **Policy Options for Improving the Efficiency of the Power Sector in Nigeria. (An Impact Analysis of National Electric Power Authority)**

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**ABSTRACT** - One of the key effects of privatization of National Electric Power Authority (NEPA) is to ensure that power supply could be enhanced to mitigate the erratic power supply in Nigeria. The study examines issues relating to productive and distributive inefficiency of state owned enterprises in Nigeria. It is increasingly clear that NEPA is incapable of meeting the needs of all consumers in Nigeria. As a component of reforms initiatives, privatization process is seen as a better option for management which introduces competition and efficiency in the sector. A regression analysis was used to establish the fact that the actual available capacity was far below the installed capacity in spite of the huge public investment in the sector. Productivity and efficiency also dropped in addition to this governmental financial commitment. The paper further suggests proper and transparent privatization as a possible means of restructuring the Nigerian Economy with a view to attaining greater productivity and efficiency.

**KEYWORDS:** Privatization, Enterprises, Productivity, Economy, Nigeria.



## **INTRODUCTION**

Nigerian economy like most developing countries until recently had witnessed a growing involvement of the state in the management of her economic activities. The rapid growth in the public enterprises in developing countries was a conscious and deliberate policy choice by their governments. According to Brutton and Hill (1996), public enterprises were deliberate choice by the public to allow the government to provide certain goods and services that the household and the market could not provide for efficiently. In them the state sought to take charge of the commanding heights of the economy, justice, reduce poverty and provide public goods for the economically disadvantaged masses. This led to the rapid expansion of such enterprises in numbers as well as across sectors.

Recently times, estimation in sub-Saharan African region of the existing public enterprises (excluding South Africa) showed that, there were about 5000 public enterprises (Fadahunsi, 1986). Their sizes, numbers, problems of management and concept, have given rise to demand by scholars, that their role, aims and objectives be clearly defined because, they seem to have become organizational monster that could devour human, material and financial resources at a pace beyond the widest quest of the present generation of public enterprises management. The worsening economic condition of many developing countries in Africa for instance, has been linked to the woeful performance management of these enterprises. The question therefore is, how can public enterprises be better managed in Africa?

According to (Fubara, 1998), the above question demands an urgent answer, especially, in Nigeria, where public enterprises are failing in spite of government continual huge investment on them. This leads to some fundamental questions, which eventually form the research questions of this study.

- (i) In what way can public enterprise be managed more efficiently?
- (ii) Which of the public enterprises should be managed with the private sector management style?
- (iii) Which of these enterprises should be privatized?
- (iv) What should be the safe scope of the privatization?
- (v) Should a public enterprise like NEPA be privatized?

These questions increase the desire of one to know whether privatization would improve performance of the public enterprise and improve the welfare of the people. Affirmative response to this question will adequately justify the privatization of NEPA. The performance of most public enterprises in Nigeria has been less than satisfactory in spite of the massive budgetary

allocation to these enterprises. Their inefficiency manifests in inadequate supply and maintenance of basic economic and social infrastructures. For example there is inadequate and erratic supply of power, energy, telecommunication, water, transport, housing and education to mention but a few.

It is this inadequacies and wastages associated with public enterprises that have made privatization one of the cardinal issues of the Nigerian government reform agenda. Apart from the creation of true market economy, privatization eliminates structural rigidity and encourages economic flexibility, growth and development of resources. The role of government in market economies around the world has changed dramatically over the two decades. Privatization of public enterprises perhaps most strongly associated with Great Britain under Margaret Thatcher has become a world wide phenomenon. Today global government revenues from sale of public enterprises had reached almost \$1 trillion by 1999. (El- Rufai 2003).

The classists argued that privatization bring about competition from competent and efficient indigenous and foreign investors, which will in turn, promote efficiency and tremendously increase productivity. The chain reaction will extend to, creation of jobs, innovation increase per capital income of the people, improve standard of living in general and take care of inflation and poverty rates.

The vision 2010 committee observed that the Federal Government of Nigeria's investment in public enterprises stood at over US\$100billion in 1996. The return on these investments averages less than 0.5 percent per annum. Similarly, the technical committee on privatization and commercialization (TCPC) in her survey observed that public enterprises account for between 30 and 40 percent of fixed capital investment and about 50 percent of formal sector employment. Surprisingly, public enterprises engage only about 400,000 people in economic activities.

The scope of this study is however limited to NEPA as its privatization will affect its performance and productivity in Nigeria. Privatization of NEPA like any public enterprise will be expected to build strong and competitive economy, refocus the role of the government, attract foreign investment, create skilled jobs, and bring benefits to the common man in the society (Othman 2003). If these goals were achieved, privatization should be able to lead NEPA to economic and financial improvement. Such improvement will also enable the government to reduce budgetary support for the corporation because privatization generates sufficient funds and operational efficiency.

The NEPA was established by degree No. 24 of 1972 with the amalgamation of Electricity Corporation of Nigeria (ENC) and the Niger

### *Policy options for improving the efficiency of the power sector in Nigeria*

Dam Authority (NDA). NEPA was empowered to maintain, generate and coordinate electricity supply to all the nooks and crannies of Nigeria. The major power stations are Ijora, Afan, Ogorode, (thermal stations) while Kainji was the only hydro plant. With the increase in the level of demand, the power station has increased to include; Jebba, Shiroro, Lagos, Afam, and Ogorode.

### **A REVIEW OF PUBLIC ENTERPRISES IN NIGERIA**

According to Jerome (2003), the resort to privatization/commercialization was informed by several considerations. First, by 1985, the quantum of resources required to sustain the State-Owned Enterprises (SOEs) had become an unbearable burden on the affected nations. Second, it was envisaged that a carefully planned privatization programmes would be an effective strategy for improving operational efficiency, broadening share ownership, attracting foreign investment and reducing the role of the state where the private sector has the capabilities to operate more efficiently. Finally, since the beginning of the 1980s, privatization of public enterprises has become a major policy tool in most developed countries following the apparently successful privatization programmes in Britain.

Concerning the performance improvement brought by privatization, the evidence is contradictory. According to the studies by Adams et al (1992), megyery and Sader (1997), Bishop and Kay (1989), there was no significant difference in performance between privatized and non- privatized firms. However, other studies (Kikeri et al 1992 and Megginston et al, 1994 found a general performance improvement post privatization.

Galal et al. (1994) and Jerome (2003) probably represents the most comprehensive study on the impact of privatization on efficiency and state budget. They examined the welfare consequences of privatization in Chile, Malaysia, Mexico and the United Kingdom through a sample of 12 firms covering telecommunications (three firms), airlines (four firms), electricity (two firms), a lottery company, and a port and transport company. The welfare implications were measured in terms of the impact of divestiture on major economic actors (the government, consumers, buyers of firms and competitors). The study compared the post- divestiture performance of the selected enterprises with that their performance would have been without divestiture. Thus, a counterfactual scenario was created for each enterprise, with the difference between the level of welfare under divestiture and the counterfactual scenario attributed to divestiture. With the exception of Mexico Airlines, divestiture was found to improve world welfare in all the 12 cases. The expected stream of benefits to the society from divestiture was estimated at an annual average of 26%. This was attributed to several factors, including



a dramatic increase in investment and improved productivity in 9 of the 12 firms. In all but five cases, consumers were considerably better off or unaffected.

Also, the Nigerian Railway Corporation (NRC), the Nigerian Telecommunication Limited (NITEL), the Nigeria Port Authority (NPA), National Electric Power Authority (NEPA), etc, are parastatals that direct economic activities and are directly and completely owned by the Federal Government of Nigeria. Edigin, (1996) revealed that some four major non-financial institutions accounted for 31% of accumulative government investment in the public sector. Another survey by the World Bank in 1990 estimated that state's owned enterprises contribute 35% to the Gross Domestic Product (GDP) and accounted for 20% share of modern sector employment.

Similarly, state enterprises accounted for 20% total Gross Domestic Product (GDP) in 1983 averaging to 14.9% between 1987 and 1991. In addition, net financial flow from government to the public sector amounted to 61% between 1978 and 1991. Furthermore, state owned enterprises accounted for 14.8% of Nigerian total external debts as at 1983 and figure averaging to 9.3% between 1978 and 1991.

The past also proved that, the management of public enterprises is plagued with political and budgetary constraints, insecurity of tenure of office, unsatisfactory reward system that led to job dissatisfaction with frustration, lack of commitment and underpayment when compared with what is applicable in the private sector. Also, sycophancy, lobbying, bribery, corruptions, non-payment of pensions allowances, embargo on promotion and employment characterized the act of public enterprises in Nigeria (Fubara, 1996). Consequently, most of the public enterprises were paralyzed.

## MODEL SPECIFICATION

Seeking insight into the impact of privatization on public enterprises, particularly (NEPA) a non-linear production model was used.

$$Y_t = f(x_t) \dots \dots \dots (1)$$

$$Y_t = b_0 x^{b_1} \dots \dots \dots (2)$$

Where;

$Y_t$  = (the actual capacity generated in mega watt (mw) as the performance of NEPA).

$X_t$  = installed available capacity in all stations.

This non-linear model is converted into a model suitable for the use of linear regression analysis to estimate the parameters. To achieve this, both

### *Policy options for improving the efficiency of the power sector in Nigeria*

the dependent and independent variables were transformed into logarithm to satisfy approximately the assumption of linear regression.

Starkie (1967) found this logarithm transformed regression model to be distinctively superior to the untransformed version in terms of statistical reliability and goodness of fit. By taking the logarithms of all the variables in the modified model, it is possible to derive all parameters.

$$\text{Log } Y_t = \text{Log } b_0 + b_1 \text{Log } x_t + e_t \dots\dots\dots (3)$$

The linear regression in this case appears more acceptable technique for exploring and estimating NEPA performance.

$$Y_t = b_0 + b_1 x_t + e_t \dots\dots\dots (4)$$

Where;

$b_0$  = constant

$b_1$  = regression coefficient

$e_t$  = Error term

The variable in the model were selected to determine the:

- (i) extent to which the selected variable can explain the variability in the dependent variable;
- (ii) efficiency of the installed capacity utilization in power station;
- (iii) actual output based on the installed capacity utilization.

### **DATA ANALYSIS**

The data analyzed in this section is an observed sample of random values collected from nine generation stations of NEPA during the month of July 2001. At the onset, the NEPA was installed with capacity of 6000 Mega Watts (MW) in the 1980s, by 1990; the installed capacity had dropped to less than 2000 MW. The drop in the installed capacity coupled with the syndrome of inefficiency, unprofitability and corrupt practices that characterized the authority like all the other public enterprises were.

Table 1: Performance of NEPA

				X	Y	Z
				MW	MW	MW
S/N	Station	Installed Unit	Available Unit	Installed Available Unit	Actual Capacity Generated	Generation Losses
1	Kanji	8	3	260.0	186.0	074.0
2	Jebba	6	4	385.6	269.0	016.0
3	Shirorp	4	2	450.0	425.0	025.0
4	Egbin	6	3	880.0	825.0	057.0
5	Sapele	10	2	360.0	253.0	107.0
6	Afam	18	3	040.0	030.0	101.0
7	Delta	20	3	320.0	291.0	029.0
8	Ijora	3	1	020.0	000.0	020.0
9	Calabar	1	1	001.0	001.0	000.0
	Total	76	22	2716.6	2278.0	338.6

Source: Daily Broadcast, National Control Center, Oshogbo 2000.

Table 1, shows the amount of NEPA'S status in terms of performances taken from the broadcast from the Nation Control Centre Oshogbo in 2000. Out of the 76 installed units, only 22units were operating and they were operating below full capacity utilization. Out of the 8 units installed at Kanji only 3 units are functioning at below full capacity. With a total of 260 Mega Watts installed capacity at the start, with four generator of 80 MW each. By 1970, two machines of 100 MW each 120 each were added to bring the total installed capacity to 760 MW. Jebba, has a total 385.6 MW at inception and presently has total of 578.4 MW from 6 units, out of which 4 units were working below full capacity utilization. Shiroro operates on total installed capacity with only 2 units functioning.

The Lagos Thermal station (Egbin) had 880 MW installed Capacity. at inception but improved to 1320 MW, with 6 units 220 MW capacities each. Sapele Thermal Power Station, has a total output of 253 MW with two functional units out of the installed 10 units, six additional units were installed in 1980 to give out 720 MW at 120 MW each. Four units were added in 1984 to give 300 MW at 75 MW each.



***Policy options for improving the efficiency of the power sector in Nigeria***

**Table 2: Table of Performance of NEPA**

				X	Y	Z
				MW	MW	MW
S/N	Station	Installed Unit	Available Unit	Installed Available Unit	Actual Capacity Generation	Generation Losses
1	Kanji	8	3	760	318	442
2	Jebba	6	2	578.4	177	401.4
3	Shiroro	4	2	600	290	310
4	Egbin	6	4	1320	999	321
5	Sapele	10	3	1020	348	672
6	Afam	18	3	699	290	409
7	Delta	20	6	600	385	215
8	Ijora	3	1	20	0	20
9	Calabar	1	1	1	0	1
	Total	76	25	5598.4	2807.0	2791.4

Source: Daily Broadcast, National Control Center, Oshogbo 2000.

Table 2, shows the amount of NEPA'S status in terms of performances taken from the daily reading from the National Control Centre, Oshogbo on the 20/11/2004. Out of the 76 installed units in the National Power Authority Network, only 25 units were operating below full capacity utilization. This is a clear manifestation of inefficiency and waste of available resources in spite of huge investment in the power sector.

A clear comparison between the broadcast of 2000 and 2004 shows that despite the installations of greater number of generators in all the stations, total installed capacity had increased less than the full capacity utilizations. Higher generation losses or unavailable capacity were recorded in table 2 in 2004 than was shown in table 1 in 2000. Based on this poor performance, it is suggested that if NEPA is opened up for competition through privatization and commercialization it would be revived. The revival would lead to greater efficiency, higher profitability and prudent management.

In computing the production function for NEPA Productivity and efficiency it is hypothesized that the productivity of NEPA can be influence by privatization.

**Table 2 Regression Results**

Constant	Actual Capacity $X_t$	F- Value	R <sup>2</sup>
253	-0.93	5.59	0.98

The coefficients in production function represent the elasticity of output with respect to the variable. Our result shows that a one percent increase in installed capacity led to 0.93 decreases in capacity generated. This result shows that, given the present set up of National Electric Power Authority, continuous investment in it will not yield a desirable outcome.

The result also shows that the coefficient of determination  $R^2$  is 0.98 showing that 98% of the observed variables in installed capacity were explained by the actual capacity indicated in the model.

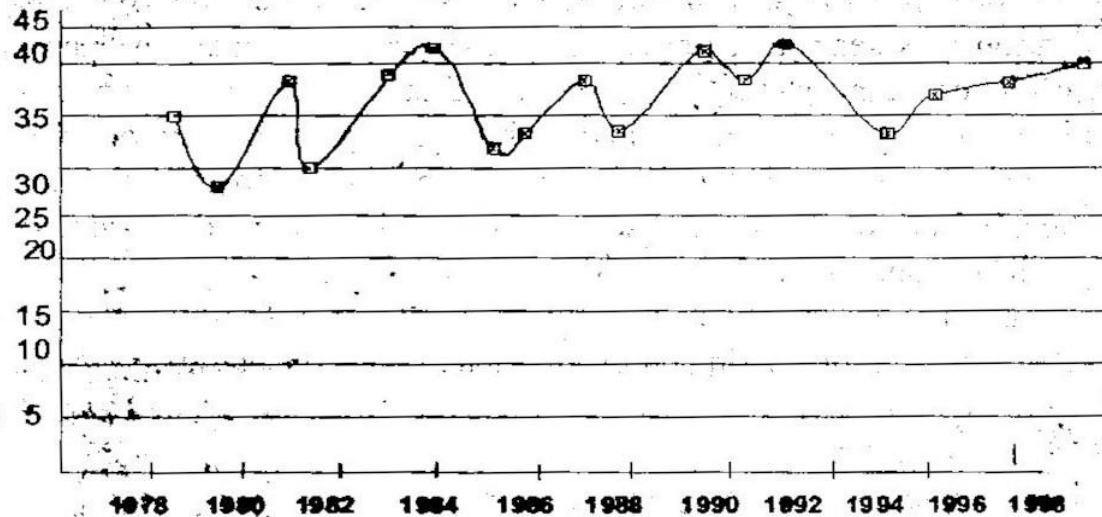


Fig. 1. Level of efficiency from actual generated capacity (MW)

Fig. 1 shows the efficiency level of the Actual Capacity Generated of 43% as indicated in fig. 1 as against the expected efficiency level of 72%.

This is below average efficiency, which explained, why NEPA could not measure up to expectation.

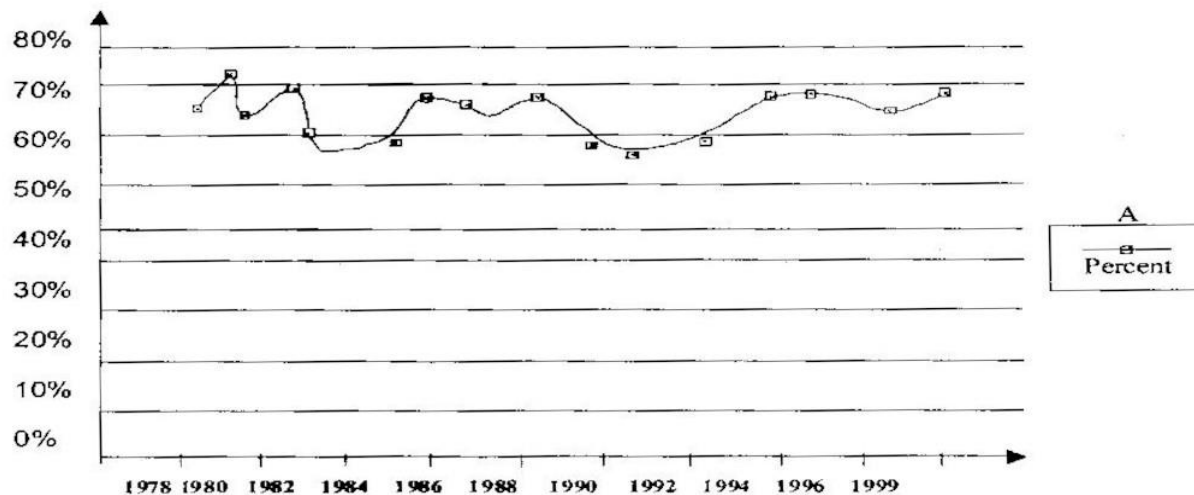


Fig. 2 level of efficiency from the installed availability capacity (mw)

### *Policy options for improving the efficiency of the power sector in Nigeria*

Fig.2 depict the level of efficiency as expected from the installed available capacity within the period in study, which here fall short of machine installed efficiency of 95% as against 72% as in the graph. This is a mark of inefficiency.

### **CONCLUSION AND RECOMMENDATIONS**

The results of this study have shown that public enterprises are not responsive to investment opportunities by the government to such enterprises. It was specifically revealed that in spite of all the adequate economic incentives provided to NEPA its productivity still remained low over time. Privatization was seen as a better alternative way of managing National Electric Power Authority. It was suggested that if such an enterprise like NEPA is privatized productivity and distribution of electricity supply would be enhanced. However Privatization needs to be publicized to gain confidence and support of the people. In the absence of such publicity and documentation people will be suspicious and skeptical about the entire program. Privatization of NEPA is one way in which government can spur economic growth by freeing herself from subsidizing public parastatals and concentrate on creating right socio-economic and political competitive environment for efficient management of resources

The implementation of privatization programme should be transparent and fair to all concern. In order to have a much clearer picture of the impact on public enterprises, further researches on its welfare is suggested further.



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***Policy options for improving the efficiency of the power sector in Nigeria***

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