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Challenges of Deregulation of Electric Power Sector in a Third World Economy

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Abstract: *Electricity as a vital tool in national development is receiving increasing attention from various regimes of Government in the third world countries particularly Nigeria. Obviously, there is great deal of potentials for investors in the country; this is the idea behind the reform in the industry. The recent total deregulation in Nigerian power sector industry is veritable pointer to this argument. This unavoidable fact has led to the proffered solutions herein stated in this work for other developing economy. On this note, the success of privatization in the telecommunication industry in Nigeria has informed the recent implementation of restructuring of the electric power sector in the country. Finally, it is necessary to look closely at deregulation and what to be expected by the country from it. This work will be a useful tools and reference material for other developing economics.*

Keywords: *challenges, deregulation, power sector, unbundling, econometric.*

I. Introduction

Electricity industry in many developing economics has been undergoing a restructuring exercise which has brought about deregulation.[1] For quite some time now, the electric power industry has been government-controlled, government regulated industry which has meant vertically integrated utility (VIU) ie operation chart is from generation to transmission to distribution.[1]

This is generating a number of energy policies that are changing the outlook of political and economic lexicon in the electric power industry. In order for Government to cope with the challenges posed by this metamorphosis, a number of policies have been initialized to improve on power delivery. Even though there are many challenges in ensuring excellent performance of electricity supply industries in the third world countries, it is not a hopeless situation if the experts' idea could be implemented in the overall interest of the successes of this deregulation. Nigeria for instance, has been going through a number of challenges in its effort to close the gap between electricity supply –to- demand. But the recent restructuring of this industry has evolved a paradigm shift whereby people, business and industries no longer buy their power from a local monopolistic power company but rather this monopoly is split up in favor of free market, which gives rise to a number of companies namely; Generation (GENCOS), Transmission (TRANSYSCO) and Distribution (DISCOS). This led to the release of the first phase of power sector deregulation and privatization policies. These policies became a public document in 2005 after the submission of the report of the Electric Power Reform Implementation Committee (EPIC) in 2000.

Her key duty and objective are to undertake a Comprehensive Study of the electric power industry and make recommendations for the promotion of a policy to usher in total liberalization, competition and private sector-inspired development in the industry. When the energy policy was passed to law; this was then known and referred to as the Electric Power Sector Reform (ESPR) 2005 Act. But just as it was the case in many other third world economic [1] the market has remained the same in operation while on paper the old utility has been unbundled into 18 successive companies. There have been many challenges towards the full blown unbundling and sale of the companies. These challenges range from gross inefficiency[2] high level of in deptness [3] , the labor union issues [4,5] economic and social[4,5],technical, political, and environmental[5] to advance age of most of the power equipment within the electric power network.

II. Unbundling Of The Electric Power Sector

This is the separation of the ownership and operation of the electricity assets. This begins with the sale of government interest in the generators to private companies while the transmission and distribution are regarded as natural monopoly hence they remain regulated.

But some cases, distribution is also sold to the private. This exercise brings about the power to make choice by the consumers. Critical mathematical model of population estimation proves that the world's population is geometrical increasing, [2] therefore, it will be difficult for the Government alone to continue providing the service to the populace through the former monopolized market of electricity. Hence, the essence of opening the market up to the private investor. Thus the generic structure for deregulation is presented in the fig 1 below.

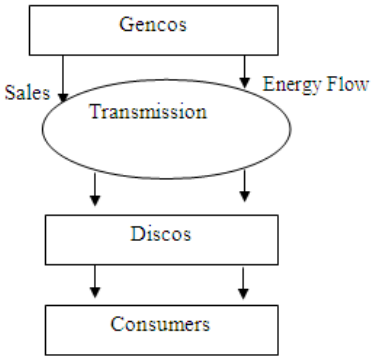

Fig 1. Electricity trading using pool model

Virtually everyone involved with the issue of deregulation of power sector seems to agree that electricity deregulation can work. The major question is "HOW". The drive for electricity deregulation is being exemplified by its success in some parts of the world. Since electricity is not like any other market because volatility in this electricity market makes other markets to appear small. In fact, seasonal variation in price is common to some commodities than that of electricity market which can simply be explained, thus the price elasticity of demand, elasticity of supply, a relevant range; the magnitude of demand shift over environment, the public should expect substantive price volatility because of these reason.

From the foregoing point, it becomes very exciting to look at the unbundling of the electric power sector with a story view that it becomes a serious form of argument whether or not electricity deregulation delivers the benefits touted by its supports such as lower prices and more competitive and adequate services has become an open question for example in the USA'S experience; the Pennsylvania's deregulation experiment, enacted in 1998, has been a rousing success by most accounting nearly 500,000 consumers- more than 11 percent of rate payers- had chosen to leave their utility company as of Oct. 1999. In the Philadelphia Area, residential customers who chose the least expensive electricity supplier were saving about $10 per month.

III. Problem Facing Transition To Competitive Electricity Market.

Electricity is a great campaign point for Government to get to power hence several of them may promise several things towards the electricity industry during this period. In Nigeria, the political economy is being played by the incumbent Government when it recently informed the citizenry of the multi-year Tariff Order (MY TO) in which case the Governments will keep increasing the per KWH price of the purchasing electricity in such a manner that the difference shall be paid by it for a period of five years after which the consumers would bear the whole responsibility for electricity. This same idea has shot up the price of electricity in South Africa recently to a level that is beyond the average citizen's economic power. The third world economy is still under severe threats from a number of the world Bank to ensure that the investors in power sector in this kind of economy has value for their money.

3.1 Regulation Of The Transmission Section

This is quite good for a growing nation but it has its own unhealthy impact on the mutual trust of the market players especially the generations. This is due to the fact that the electricity cannot be stored in large amount for very long time which means electrical power must be consumed within minutes of its production hence the policy that makes a body to control who uses the transmission access may

3.2 Econometric Of Interest

The fact that the price is not stable in the deregulated environment is a well known fact among the participants and hence there may be times whereby there could be a significant drop in electricity price in the market but this may be kept by the generators as the profit on their generation meanwhile it should have gone into affecting the consumers' payment for electricity for such period. This is a clear case in England and Wales since their privatization experience.

Thus the Nigerian Electricity Regulatory Commission (NERC) has a great job on its hand to act as an unbiased umpire in this power affairs.

3.3 Age Of The Generating Station

One of the major reasons for deregulating a power sector is to ensure that the private investors are encouraged to participate in the supply of electricity. But for the independent power producers to take up the

responsibility presented by the existing power generating station in the country would not be financially advisable for a good investor, this is due to the fact that all of the generation stations in the country are quite old with the earliest being in the neighborhood of eighteen years old since its installation and commissioning.

IV. Electricicty Pricing In A Deregulation Market

Deregulation of the electricity industry in the industrialized and developing countries encourage new independent power producers (IPPs) to enter into the market. In 1996, IPPs accounted for 3% of the market for new power plant, compared with less than 5%s 10 years previously, IPPs were first established in the united states and the united kingdom's following deregulation. They have spread to other countries that require private finance to fund their growing request for electricity. In this line the pricing process has to be looked into, to ensure that copper pricing does not leave the poor out of the scheme. In Nigeria before this era of transition to deregulation, electricity price per kilowatt hour is currently between N4 and N6 for single phase resident and between N6 and N8 for industrial users. While maximum demand users pay between N8 and N12 per kilowatt hour. But with total deregulation the price of electricity may be low again [1,2]. The NERC has adopted a Multi-Year Tariff Order as against a single year Order. MYTO provides a price path into the future. It allows for limited adjustments each year according to cost of inflation and changes in fuel costs and for major reviews each five years to allow a fundamental review of all of the inputs into the tariff calculations. It is believed that the MYTO would reduce some of electricity and investors. This regime of tariff is expected to encourage investment in Nigeria's electricity market.

This tariff can be modeled as

$$P = \sum_{n}^{N} (C_c + C_m + C_{o+m} + C_f + C_{me+co})$$

Where N is number of years.

C,m, o+m, f, me+co are Capacity, Maintenance, Operation and Management, fuel and metering and Connection Charges respectively. For maximizing profit, then the tariff should be the unit production of electricity which will be adjusted in such a way that marginal revenue will be equal to the marginal cost.

Table 1. Electricity Pricing in Regulated Market in Nigeria.

User	Date	Regulated Market Per Kilowatt hr. (₦)	Source
Single Phase Resident	July 22, 2011	4 to 6	Naija Technology guid July 22, 2011
Industrial		6 to 8	
Maximum Demand		8 to 12	

Table 2: Electricity Pricing Deregulated Market in Nigeria.

User	Date	Deregulated Market Per Kilowatt hr. (₦)	Source
Single Phase Resident	July 22, 2013	2.58 + Subsidy	Naija Technology guide July 22, 2011
Industrial		5.6 + Subsidy	
Maximum Demand		8.2 + Subsidy	

With the result of table 1 and table 2 above, electricity deregulation is recommended to the developing economy hence it creates job, wealth and enhances development in the developing countries.[6].

V. Expectation From Deregulation

There are several expectations from the power markets in a deregulated environment. This includes real time pricing, elasticity of demand signal for market clearing case, the demand is not responsive to price in most of the markets because of the whole sales fluctuations are not passed on to the retail market. Often the retail

market has remained under some kind of regulation which has to do with slow implementation of real time pricing.

In the case of industrial and commercial loads, they face time-of-use pricing or demand charges, in such a case, the time-of-use price is expected to be high due to the fact that demand is high at such time.

Weather-driven pricing and demand should well in advance be prepared for in a deregulated market due to the fact that the electricity market is volatile and thus special attention should be paid to the weather condition and season ahead provision should be made for it so as to avoid energy demanded but not supplies

VI. Conclusion

There are a lot of benefits to achieve from electricity deregulated power sector if the stake holders can give it the necessary impetus that it requires to take off. It is going to improve service and help to improve economy of any developing nation that takes part in it. Thereby, encouraging investors, even though the price may be high initially but with Government subsidy during this period then the investors would have faith in deregulation in the third world emerging economy.

References

[1]. Loi Lei Lai "Energy generation under the new development; Power System Restructing and Deregulation- Trading, Performance and information Technology, edited by Loi Lei Lai, John Wiley, Chicester, 2002 pp 1 – 49.
[2]. T.O Akinbulire, P.O Oluseyi and COAS Awosope; "Application of Optimization technique to electricity market in an emerging deregulated environment. Proc of Int. Conf. & Exhib. On power systems. University of Lagos, July 2007 pp 67-73
[3]. T. Mc Govern and C. Hicks, "Deregulation and restricting of the global electricity supply industry and its impact power plant suppliers" International Journal of Production, Economic Vol 89, Issue 3.18 June 2004, page 321-337
[4]. EIA 2002 International Energy. Outlook 2002, Energy information Administration, Washing DC.
[5]. Steven Stoft, Power System economics: designing markets for electricity, wiley inter-science NY2002.
[6]. Naija technology guide july 22 2011 and july 2 2013, pp 7 and pp 12 respectively.