Nigeria's Power Generation: Analyzing the Cost Implication of Poor Generation on the Running Cost of Telecom Business in Nigeria

Nsikan Nkordeh, Oluyinka Oni, Felix Olowononi, Ibinabo Bob-Manuel

***Abstract*- As we advance in the 21st century the major task is to develop our telecommunications as a way to liberate our people economically. Telecommunications is the frame of the evolving information society worldwide, Electricity is very important in our day to day activities such as powering our homes, schools, hospitals, offices, businesses, and it also advances industrialization. Electricity market is an area that always continues to attract an international attention and is a top agenda on the list of all governments worldwide.**

One of the major challenges to the advancement and stability of telecommunication in Nigeria is the issue of poor power generation. Despite the fact that telecommunication industries in Nigeria have recorded progress and stability, Nigeria's power generation is still facing many problems ranging from slow growth in generation capacity to damage of electrical transmission lines and distribution equipment, poor maintenance of existing electrical equipment and corruption. The growth and expansion of telecommunication industries in a nation depends on the power generation. The telecommunication network will be put to maximum use if the nation has a very reliable and stable power supply, but on the other hand, if the power supply is poor, the telecommunication network is affected.

That is why this paper takes a look at the poor generation in Nigeria, and how it has affected the operation of the telecommunication industries and the effect it has on telecommunication in Nigeria.

***Index Terms*—Power Generation, GENCO,DISCO**

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I. INTRODUCTION

Telecommunication could be seen as the sharing, that is, sending and receiving of information over a distance with time. It has to do with conveying messages, by electrical means, over long distances. A telecommunication company, also known as a telephone service provider, or telecommunications operator, is a kind of communications service provider (CSP) that provides telecommunications services such as telephone and data communications access and also internet services. Major telecommunication companies include MTN, Etisalat, Globacom, and Airtel.

Manuscript received January 13, 2017; revised January 19, 2017.
We appreciate Covenant University for financial support in getting the work done
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Telecommunication technologies which include base stations and mobile phones have become very common technologies in the developed and developing world. About three billion users spend most portions of their income on these telecommunication technologies. Therefore, access to telecommunications is important to the development of all sectors of a nation economy. [1]

In Nigeria, telecommunication is one of the fastest growing sectors, it could be dated back to the time colonial masters had to establish contact with the London government. From that point onwards, Nigeria has seen a drastic advancement in the telecommunication industry [2]. Despite the privatization of power distribution companies (DISCOs) and Generating Companies (GENCOs) in the most recent couple of years to enhance power supply, very little has enhanced in power to such an extent that telecommunication subscribers have to contend with mobile operators, battling to generate their own power.

Telecommunication networks require an enormous amount of power. However, the telecommunication industry in Africa faces many problems both operational and infrastructural, to operate the mobile networks in a cost effective manner. The erratic grid electricity infrastructure is one of the major problems in running the networks and adds a significant cost to operations. For instance, In the world, Africa has one of the lowest electrification rates with only 43% of the population having access to grid electricity, leaving over 600 million people without access to electricity. Also, wherever there is access to grid electricity infrastructure, the supply of electricity is highly unreliable with frequent and long power shortage. [3]

II. POWER GENERATION IN NIGERIA

It is a known fact the nation's economic growth is dependent on its electrical power generation. Power generation has always been one of the biggest challenges in the developing countries

In the late 19th century, the Electricity Corporation of Nigeria (ECN) was established by Act of Parliament in 1951, eleven years later 1962, Niger Dams Authority (NDA) was put up to produce hydroelectricity which later in 1972 was merged with ECN to form National Electric Power Authority (NEPA). NEPA was later translated into the newly incorporated Power Holding Company of Nigeria (PHCN) Plc, comprising of 18 separate successor companies, the 6 generation companies, a transmission company and 11 distribution companies. With all the huge government investment in the power sector for the past 16

ISBN: 978-988-14047-5-6
ISSN: 2078-0958 (Print); ISSN: 2078-0966 (Online)

years, Nigeria has only managed an installed electricity generation capacity of 10,000 megawatts and still operates at about 30 per cent of it that is between 2,000 and 3,500MegaWatts. Sadly, per capita electricity usage in the country remains 136 kilowatts/hour, and in the world it is one of the lowest electricity consumption on a per capita basis when compared with the average per capita electricity usage in India that is 616KWH, China 2,944KWH, South Africa 4,803 KWH, Singapore 8,307KWH, Libya 4,270KWH, and in the United States 13,394KWH.

The following are the challenges responsible for the figures in fig.1 below; slow growth in generation capacity, delay in market deregulation process and interference by Government, power lines and distribution equipment vandalism, poor maintenance of existing power system, corruption. Per capita electricity generation has barely risen in over 30 years. [4]

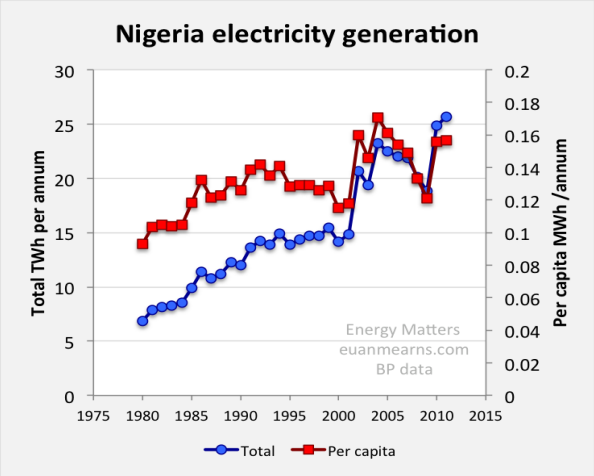

Fig. 1. Electricity generation capacity in Nigeria. [16]

Over half of the nation's population is not in connection with the nation's electricity grid. And the power generated is estimated inadequate for those connected to the grid. And as a result, these Nigerians depend on generators in order to run their homes, hospitals, industries, schools, churches, government offices and the economy as a whole. Due to this, studies and analysis have been carried out by researchers, which show that Nigerians spend N3.5tn annually on buying fuel for operating generators, and in the past five years summed up to N17.5tn. Breaking it down, the GGI President, Mr. Festus Mbisiogu, said, "The GGI conducted a research into the negative multiplier effect of fluctuating power supply and some information showed that the manufacturing sector spends over N800bn yearly on generators in addition to the roughly N2tn spent on running generators by millions of Small and Medium Scale Enterprises, banks, other corporate entities and traders across the country." [5]

III. ` POOR POWER GENERATION - A CHALLENGE TO THE RUNNING COST OF THE TELECOMMUNICATION INDUSTRIES IN NIGERIA

Power generation plays a major role in running the mobile network with a benchmark network uptime of 99.98% in order to maintain the reliability and quality of services.

An unreliable and poor power supply to the telecommunication tower sites hinders the efficient running of the telecommunication network's operations. [6] The issue of power generation has been a big problem in the running of these base stations, where each base station is expected to have at least one generator and maybe a backup generator, especially now that electricity has become almost unreliable in the country, and the price of diesel has escalated.

The Association of Telecommunications Companies of Nigeria (ATCON) made it clear that telecommunication subscribers lose about an average of N730 billion yearly due to the poor quality of service provided. This issue can be solved If there was a steady power supply from the mains, the issue will be solved so that the telecommunication networks will be connected directly to the national grid. Unfortunately, in Nigeria telecommunication networks sort for their own power supply. Also Gbolahan Awonuga, the executive secretary, Association of Licensed Telecommunications Operators of Nigeria (ALTON), said, "the Global System for Mobile (GSM) communications, LTE operator and internet service providers have always been the largest consumers of diesel in Nigeria. They spend roughly a value of N175 million daily or N45 billion monthly on diesel for powering their Base Transceiver Stations (BTSs) nationwide." This meant that N540 billion in total was spent by the operators to power diesel generating sets annually, a value that may have increased due to the unstable diesel price in the country.

The adoption of Telecom business in Nigeria means that there will be the need of several Base Transceiver Stations (BTS) operating on both grid power and diesel fuels. But, because many parts of the nation lack reliable electricity supply, it leaves the telecommunication industries no choice than to operate most their BTS with diesel fuels. [7] The increase in size of telecom business at a speedy rate has its price which can bring about network overcrowding and low quality of service delivery most especially when there is restriction in size. [8] At the reduction of government power in the telecom industries in Nigeria, the Base Transceiver Station in Nigeria was below 200, and covered a land mass of over 900,000sqms. [9] At 2003, the overall Base Transceiver Station had gone higher than 1800. Though, at 2007, it advanced towards the 10,000 figure mark. It then increased to 25,374 in 2011 and also to 26500, 30411 and 31133 in 2012, 2013 and 2014 respectively in the order already mentioned. See figure1

The power supply infrastructure expansion compared to the tremendous expansion of telecommunication infrastructure across Nigeria has fallen short. And as a result there are regions with mobile network growth which have no access to power supply. [10]

Below is the effect of poor power generation on the major telecommunication industries in Nigeria;

ISBN: 978-988-14047-5-6
ISSN: 2078-0958 (Print); ISSN: 2078-0966 (Online)

IV. RUNNING COST OF MTN IN NIGERIA DUE TO POOR POWER GENERATION

MTN is a South African-based mobile telecommunications industry, operating in Nigeria and many other African, and a few European and Asian countries. MTN was established in 1994. MTN is the largest network in Nigeria with over 60 million subscribers and has over 10,000 base stations.

MTN on May 25 2015 expressed how critical diesel has become to its operations during the recent fuel crisis. The telco's Corporate Service Executive, Mr. Akinwale Goodluck, said, "MTN's available reserves of diesel are running low and the company must source for a significant quantity of diesel in the very near future to prevent a shutdown of services across Nigeria". [11]

MTN's high power bill in Nigeria, which is says accounts around 60% of its operating costs, could have been deployed in other critical areas such as network expansion in the country said an executive. The problem of power generation in Nigeria has always been a big obstacle for telecommunication operators. For instance, MTN Nigeria spends N30.5 billion annually on the purchase of diesel. This amount, experts said, could be used to build another 5,000 base stations which could have helped improve the quality of service in Nigeria and probably contribute to lower call rates.

V. RUNNING COST OF GLOBACOM IN NIGERIA DUE TO POOR POWER GENERATION

Globacom Limited, better known as Glo is a Nigerian multinational telecommunications company, which has its headquarters in Lagos. GLO is a privately owned telecommunications company which began its operations on 29 August 2003. It currently runs in four countries in West Africa, namely Nigeria, Republic of Benin, Ghana and Côte d'Ivoire.

Globacom is seriously contending with numerous problems slowing down their operations. The main factor affecting quality of service is the absence of a reliable source of power. To sustain regular network, GSM companies have resorted to running their Base Transmission Stations (BTS) with generators which operate automatically whenever there is power outage from the power supply. Every single site is powered 24 hours a day, 365 days a year by diesel Generators and requires regular supply of diesel. Globacom spends about N8.4 billion annually on diesel to power up their Base Transmission Stations (BTS).

VI. RUNNING COST OF AIRTEL IN NIGERIA DUE TO POOR POWER GENERATION

Airtel Nigeria is one of the major telecommunications network providers in Nigeria running in 20 countries across Asia and Africa. It was established on 7th July 1995 as a public Limited company. It has it's headquarter located in New Delhi, India. In terms of subscribers, Airtel is among the top three mobile service providers in Nigeria. Power Supply is a major concern in Nigeria and has affected telecom in terms of cost and reliability.

The CEO of Airtel Nigeria, Mr. Segun Ogunsanya, said, "The power costs of a site connected to the power grid are only about 1/6th those of a fuel-powered site, but only about 10 per cent to 15 per cent of base transceiver stations are connected to the electric power grid. Primarily, because of fuel costs, the average network costs in Nigeria are twice to thrice higher than in a number of other African markets. The implications of such absence of reliable power infrastructure are far-reaching." Also based on results by Airtel in 2015, power spent on powering base stations off the grid costs N6.4bn annually. [12]

VII. RESULTS ON THE EFFECT OF POOR POWER GENERATION ON TELECOMMUNICATION IN NIGERIA

The following are the ways in which poor power generation has affected telecommunication in Nigeria, from the quality of service to the subscribers and the nation at whole:

POOR RURAL TELECOMMUNICATION ACCESS IN NIGERIA: Nigeria's telecommunication sector has grown rapidly over the years, but the awareness in rural communities is still very low. There is a wide gap between telecommunication subscription and penetration. For example, figures 2 and 3 show more increase in subscription in developing countries than in the developed countries but in reality, the penetration is very low due to the fact that most subscriptions are concentrated in the urban areas. According to the World Health Organization (WHO), about 53% of Nigeria's population lacked access to electricity in 2008, and due to the poor power generation the rural areas have limited access to telecommunication

HIGH OPERATIONAL EXPENDITURE (OPEX): Poor or lack of grid electricity infrastructure increases energy OPEX of a site. As explained, the operational expenditure of the telecommunication industries in Nigeria is always on the high side. Due to the abysmal power supply, the telecommunication industries have been force into other means of generating power supply, and this increases their operational expenditure

POOR QUALITY OF SERVICE OFFERED: Due to the high cost of network maintenance and operations by the telecommunication operators caused by poor power generation including high cost of power for existing networks, it results in higher cost per subscriber and it affects the affordability of services. Poor quality of service includes dropped calls, poor mobile internet service, undelivered short message service (SMS), damage of infrastructure. Since these operators face power generation challenges which increases their costs, the quality of service offered drops.

HINDRANCE TO THE EXPANSION OF BASE STATIONS: Telecommunication companies, find it hard to build and expand the number of base stations due to the high cost of running and maintaining the existing base stations due to poor power generation.

FINES IMPOSED BY NCC ON THE TELECOMMUNICATION COMPANIES: Every telecommunication company is expected to maintain the standard benchmark network uptime which is 99.98%. But

ISBN: 978-988-14047-5-6
ISSN: 2078-0958 (Print); ISSN: 2078-0966 (Online)

due to the poor power supply to the base stations, these companies find it hard to meet this standard, and therefore failure to comply attracts fines imposed by NCC.

VIII. RENEWABLE ENERGY IN AFRICA: AS AN ALTERNATIVE FOR POWERING TELECOMMUNICATION NETWORKS

With the challenge of power supply and grid infrastructure in Nigeria, and Africa in whole, it is vital to consider other means of meeting the power supply demand, especially through exploiting renewable energy resources across the continent to promote the use of sustainable renewable energy sources to meet the increasing power demand by the telecommunication industry.

SUITABILITY AND FEASIBILITY FOR TELECOMMUNICATION POWER**:** Table 2 shows the total summary of green options and their level of suitability for telecommunication power generation in Africa. The adoption of green technology would depend on the availability of technology, vendors along with local technical support and market acceptance. If telecommunication industries are able to make use of renewable energy to power their telecommunication sites, and infrastructures, the operational expenditure will be reduced, and therefore the quality of service offered to the subscribers will be increased.

Table 1: Green Alternatives: Fit for Telecom Power Deployments [17]

	Solar	Wind	Biomass	Fuel Cell	Micro-Hydro
Resource Potential	High	Low to medium	Medium	Medium	Low to Medium
Technology Availability	High	Medium	Medium	Medium	Low to Medium
Market Acceptance and Commercial viability	High	Low to medium	Low	Low	Low
Supply chain readiness	High	Medium	Low	Medium	Low
Stage of Adoption	Commercial	Pilot/Early Commercial	Evaluation/ Pre-pilot	Pilot/Early commercial	Evaluation/ Pre-pilot

Data source: Tower Power Africa Database, 2014

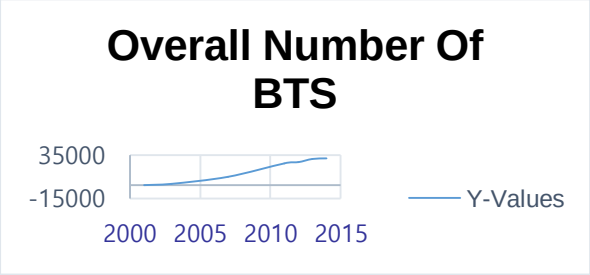

Fig. 2 Total BTS in Nigeria (selected years) [13]

Data source: 2013 and 2014 Year end Subscriber/Network Data Report, NCC

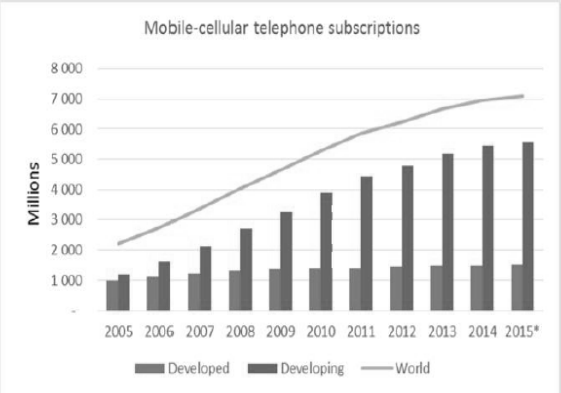

Fig. 2 Mobile-Cellular Telephone Subscription [14]
Data source: ITU World Telecommunication/ICT Indicators database

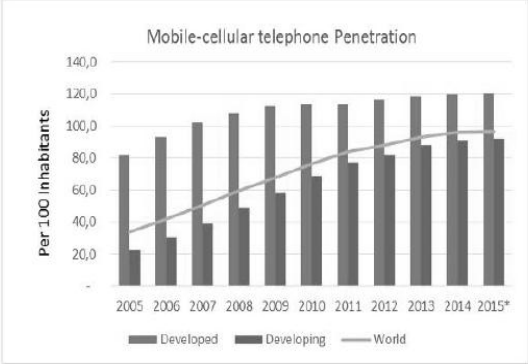

Fig. 3 Mobile-Cellular telephone penetrations [15]
Data source: ITU World Telecommunication/ICT Indicators database

IX. CONCLUSION

Telecommunication network has been seen to be one of the fastest developing sectors in evolving economies of the world. However, providing telecommunication in developing countries is stopped by many challenges, but a major challenge facing the development of telecommunication is the issue of poor power generation. In Nigeria, improved Quality of Service and cost reduction are important issues affecting the telecommunication industry, such as MTN, Airtel, Globacom and others, due to the nation's poor power supply. Telecommunication Companies believe that reliable and stable power supply to their base stations is capable of transforming the Nigerian telecommunication industry due to their low cost, reliability, stability and environmental friendliness.

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ISBN: 978-988-14047-5-6
ISSN: 2078-0958 (Print); ISSN: 2078-0966 (Online)