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Sustainable Infrastructural Development in Africa: The Build Operate and Transfer (BOT) Alternative for the Power Sector in Nigeria

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Abstract: The build, operate and transfer (BOT) investment model can be advantageously adopted in Nigeria in ensuring the rehabilitation of the decaying and obsolete electricity infrastructure in the country as low electricity generation and consumption has serious negative implications on both the households and economic activities in the economy. Thus, the objective of the paper is to interrogate the existing electricity infrastructure in Nigeria and advocate for a form of private investment model. Using qualitative method and documentary evidence predicted on the public-private partnership model, the study found that electricity infrastructure in Nigeria is obsolete and inadequate. Power generation in Nigeria compared to other leading economies in Africa is abysmally low due to lack of adequate investment in the sector. The BOT investment model has been used successfully to build and maintain cost-intensive infrastructures like the power plants, highways, railways, airports, etc in both developed and developing countries of the world; as seen in China, India, Pakistan, Philippine, South Africa, Ghana, etc. Thus, the paper submits that the BOT alternative should be adopted to address the power sector menace in the country.
Keywords: Infrastructural Development. Public-Private Partnership (PPP)Capital Project.

I. BACKGROUND TO THE STUDY

Electricity is a key ingredient to economic growth and development not only to a developing economy but also to advanced economies. From various internet links, electricity is defined as a form of energy fuelled by the transfer of electrons from positive and negative points within a conductor. It is also defined as a form of energy resulting from the existence of charged particles such as electrons or proton either statically as an accumulation of charge or dynamically as a current. Such energy is carried through wires, to operate machines, lights and power appliances. Electricity is widely used for providing power to buildings, electric devices, appliances and even some automobiles. Thereja &Thereja(2005)

Electrical energy has different sources. They are renewable and non renewable energy sources. Renewable energy source are those which can be renewed or recycled like hydropower, wind, biomass, solar energy, etc. Non renewable energy sources are those energy sources that can run out or cannot be replaced. They usually expire with time. Examples are fossil fuel (natural gas, crude oil and coal) and uranium. In Nigeria, the major sources of electricity are the hydro and thermal (gas fired) power. Electricity production from hydroelectric source was reported by the World Bank to be 17.59% in 2014 with the thermal power plants dominating the Nigerian power supply mix. Nigeria currently has four hydroelectric power stations in service located at Kainji, Jebba, Shiroro and Zamfara with additional four proposed power stations to be located at Kano, Zamfara, Kiri and Mambilla power station proposed to be completed in 2018. There are about 23 natural gas stations with proposed one coal and one natural gas plant located in Azura (Edo state) and Geregu (Kogi State) respectively. Nnaji (2017)

The electricity infrastructures consist of production and distribution technologies and consumption management. This paper focused more on the production and distribution technologies. Electricity power is divided into three sectors- generation/production, transmission and distribution sectors. The power generation or production is the process of generating electric power from primary energy source. It is the first process in the delivery of electricity to consumers through the use of power plants. Electricity transmission is the process of carrying electric power from the generating plants to the substations with the use of electrical wires known as conductors. The movement of electrical energy is facilitated through a transmission network. The power

distribution is the final stage in the delivery of electric power and it carries electricity from the transmission system to individual consumers through the use of transformers, and cable wires.

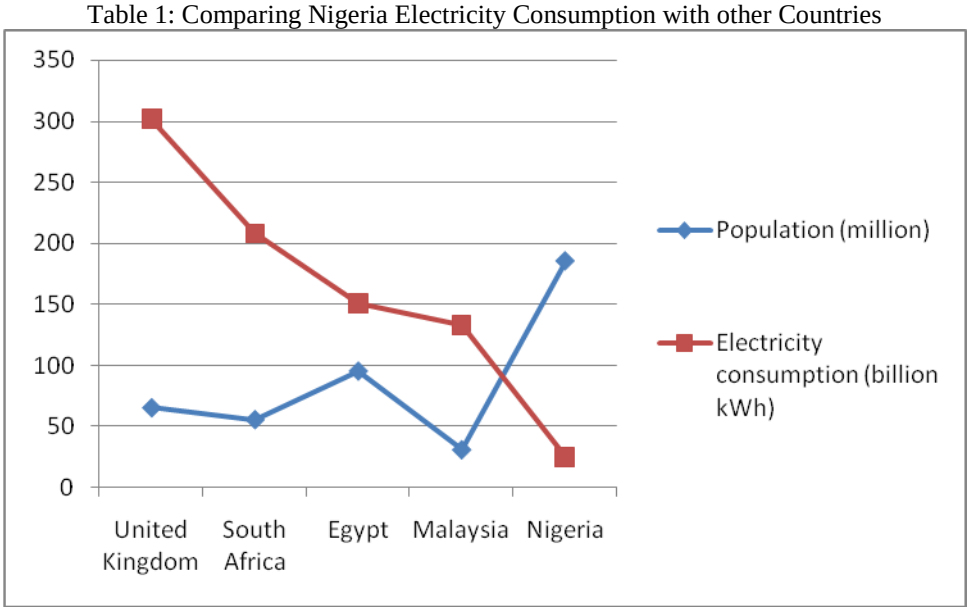
Infrastructure development generally is a critical part of Nigeria's vision 20:2020 agenda and also a precondition for private sector investment in the economy. Increasing the stock of infrastructure investments in core sectors (like power sector) by one percent can increase the Gross Domestic Product (GDP) growth by up to one percentage point (African Development Bank (AFDB), 2014). Electricity infrastructure development can be a stimulus for economic growth and development in any economy. Hence, productive economic activities that lead to employment generation and poverty reduction may not happen without sufficient and adequate electricity supply given the all pervading potential electricity has in every sector of the economy.

General Electric (GE) has described electricity infrastructure in Nigeria as inadequate, ageing and degrading, a situation responsible for the current power crisis in the country (Eboh, 2014). According to Angbazo (2014), the country's power sector is bedevilled by inadequate generating capacity and inadequate gas supply. He further stated that the transmission facilities are ageing, and degraded, while the distribution facilities comprising meters, transformers, etc are grossly inadequate. The main cause of Nigeria's inadequate power supply is a lack of investment in the sector by a succession of government over the past twenty five years (AFDB, 2014). The Nigeria Vision 20:2020 report stated that the main challenges facing the power sector are inadequate power generation, overloaded transmission and distribution network due to obsolete and inefficient equipment among others which contribute to the electricity problem in the country.

Since Nigeria returned to democracy in 1999 till the present government, infrastructure development especially in the power sector has been a major concern. In the quest to improve the electricity supply in the economy, the Nigerian government privatized the power sector with the expectation that the regulatory authorities will boost the power generation capacity to 40GW by 2020. In 2013 precisely when the new owners took possession of power producing assets, they discovered that electricity infrastructure were crumbling, decaying and ageing. According to the association of power generation companies (APGC), the country cannot enjoy more than 4,600 megawatts (MW) of electricity despite its capacity to produce 12,000Mw due to paucity of funds to buy feed stock (gas) to power the turbines. This source also stated that the transmission infrastructure that would take power to the distribution companies have limited capacity, so it recommended a total system overhaul in order to facilitate the supply of electricity in the nation. Electricity is all pervading in every other sector of the economy, thus, its importance cannot be underestimated. Many instances abound in Nigeria where lives are lost especially in the hospital due to power outages. Pre-mature babies, women undergoing caesarean delivery, children and adults who are supported by oxygen need constant and stable electricity to survive.Angbozo(2014)

The Federal Ministry of Power, Works and Housing placed the nation's electricity demand at 12,600 megawatts (MW) but current power supply is not up to 4,000MW. In the same vein, Salau (2016) quoting the Executive Director, Association of Nigerian Electricity Distribution Companies (ANED), said that Nigeria need 160,000MW national aggregate electricity to satisfy the local electricity demands.

Table 1: Comparing Nigeria Electricity Consumption with other Countries



Source: Authors computation from World Fact Sheet

With a population of only 31.19 million, Malaysia has electricity consumption of 133 billion kWh while South Africa has a population of 55.9 million with electricity consumption of 207.7 billion kWh, the highest in Africa. Egypt has also a population of 95.69 million and electricity consumption of 150.4 billion kWh. The United Kingdom which was Nigeria's colonial master has a population of 65.64 with electricity consumption of 301.6 billion kWh, the highest in the figure above. Nigeria among the comparator countries with the highest population of 186 million has the lowest electricity consumption of 24.57 billion kWh. Thus, Nigeria has an obvious shortfall which most people living in the country are too familiar with.

Based on the foregoing, it is imperative for the economy to subscribe to an investment model that guarantees successful building, completing and efficient management of electricity infrastructure in Nigeria. Globally and especially in developing countries, there is a paradigm shift from public provision of infrastructures to a public-private arrangement where the development projects are realized without any fiscal burden to the government. Also, in line with the Federal government road map for power reform policy, it is recommended that there shall be no obstacles for the private sector investment in the power generation, transmission and distribution in Nigeria. The public-private partnership model has proven its potentials to build and manage different cost–intensive infrastructures in many countries such as China, India, South Africa, Ghana, etc. In Nigeria also, the Lagos-Ibadan express way and the Lekki expressway (Lekki Toll Plaza) are successful Build, Operate and Transfer (BOT) project which are functional till date.Achanya(2012)

II. STATEMENT OF PROBLEM

Due to the ageing and degrading nature of electricity infrastructure in Nigeria, power generation and consumption in Nigeria has been abysmally low. There are evidences of constant outage of electricity supply due to poor (quantity and quality) electricity infrastructures AFDB, (2014), Nnaji,(2017). Low installation capacity resulted in frequent and unpredictable load shedding which informed the usage of generators by industry and households as alternative power supply. Regrettably, power generation, installed power capacity and per capita electricity usage in Nigeria are low compared to other African countries. Nigeria is the second largest economies of Africa after South Africa and has been named among the three (South Africa, Nigeria and Egypt) riches economies in Africa also. But, in terms of electricity generation and consumption, Nigeria ranked lowest among them.

For instance, in terms of electricity production, Egypt produces 162,000 million KWh/year, South Africa (SA) produces 235,000 million KWh/year while Nigeria produces 29,000 million KWh/year. The installed power capacity for Egypt is 29,190 MW, South Africa is 45,970 MW and Nigeria is 6,940 MW. In terms of electricity usage per capita, Egypt is 1,864 million KWh/year; South Africa is 4,858 million KWh/year while Nigeria is 164 Nnaji, (2017). Ironically, Ghana which Nigeria supplied energy few years ago uses 505 million KWh/year which is about thrice the quantity Nigeria uses as a country. This implies that an average Ghanaian uses more electricity than an average Nigeria.(Nnaji 2017)

Furthermore, the economic implication of power deficit in Nigeria is substantial. The Nigerian Investment Climate Assessment (ICA) survey report stated that the country is affected by power outages more than 320 days in a year and 96% of firms experience 196 hours of power outage per month. Current available electricity generation capacity is 50% below estimated power demand. Lack of government investment in the sector for the past decades and failed interventions due to inappropriate planning contributed greatly to electricity shortage in Nigeria. Erratic power supply in Nigeria has affected cost of production of goods and services negatively and according to Oyesola, Iba, Usim and Nwaoguji (2016), manufacturers spent N800b annually on generators. In the same vein, the Manufacturers Association of Nigeria stated that member companies spent N20.8b monthly for the past three years on power generation to run their production process. Thus, the broad objective of the study is to ensure the development of infrastructure in Nigeria using the BOT financing alternative.

III. METHODOLOGY AND LITERATURE REVIEW

This paper is an outcome of a desk research. The study used mostly online secondary data and other information from different sources. The newspapers, the journal articles and data banks were consulted. The author used analytical method based on the data consulted from the CIA world fact sheet on electricity consumption. The review of extant literature is done thematically.

Public-Private Partnership (PPP) Framework

In general, public private partnership refers to forms of co-operation between public authorities and the private sector which aim at ensuring the funding, construction, renovation, management and maintenance of infrastructure associated with the provision. According to Achanya (2012), Rodriguez (2017), public private partnership (PPP or P3s) can be described as the future of infrastructure projects and can provide a solution to problems of financing, project completion and investing in large projects without spending government

finances. PPP is a mode of providing public infrastructure and services by Government in partnership with private sector with a long term contract arrangement (Jose, 2016). PPP is a contractual arrangement normally between a public agency (federal, state or local) and a private sector entity usually of a long term nature to provide public asset or service. The private party bears the significant risk as it also manages the responsibilities and remunerations attached to the contract.

It can be used to finance, build, and operate large and cost-intensive projects such as public transport networks, parks, air port terminals, convention centres, etc. There are different types of Public private partnership and depends on the needs and options available. Power generation (electricity) projects and infrastructure projects appear to options that are best suited to PPP (Rodriguez, 2017). The key feature of PPP is concession, as the concept was first developed in France. Under French law the concessionaire has the obligation to provide continuity of services (la continuité du service public), to treat all consumers equally (l'égalité des usagers) and to adapt the service according to changing needs (l'adaptation du service"). In return, the concessionaire is protected against new concessions which would adversely affect the rights of the concessionaire (Institut de la Gestion Délégué (IGD), 2008).

According to *http://ppp.worldbank.org/public-private-partnership*, a concession gives a concessionaire the long term right to use all utility assets conferred on the concessionaire, including responsibility for operations and some investment. Asset ownership remains with the authority and the authority is typically responsible for replacement of larger assets. A concession covers an entire infrastructure system (so may include the concessionaire taking over existing assets as well as building and operating new assets). In a concession the concessionaire typically obtains most of its revenues directly from the consumer and so it has a direct relationship with the consumer. It is usually within 25 – 30 years of contract. Unlike many management contracts, concessions are focused on outputs - i.e., the delivery of a service in accordance with performance standards. There is less focus on inputs - i.e., the concessionaire is left to determine how to achieve agreed performance standards, although there may be some requirements regarding frequency of asset renewal and consultation with the awarding authority or regulator on such key features as maintenance and renewal of assets, increase in capacity and asset replacement towards the end of the concession term.

IV. LEGAL FRAMEWORK OF PUBLIC-PRIVATE PARTNERSHIP

The term "*public-private partnership*" is not defined in the European Union (EU) legislation on public contracts however, a government may decide to enact a PPP law or a concession law for a number of reasons, such as to give priority to a process of developing, procuring and reviewing PPP projects that will take priority over sector laws, or to establish a clear institutional framework for developing, procuring and implementing PPPs. PPP laws can also be used to close gaps in the laws of a host country may need to allow for successful infrastructure PPP projects, such as enabling the grant of step-in rights to lenders and requiring open and fair procurement processes. These modifications may be embodied in sector-specific law or in a general concession or PPP law.

Each PPP/ concession law needs careful drafting to be consistent with the host country's existing laws. Legal draftsmen need to strike a balance between setting ground rules that encourage transparency and imposing general restrictions that may hinder bidding teams from achieving value for money or sensible solutions when bidding out PPP projects. To safe guard the interests of government, private investors and the taxpayers, a comprehensive legal framework must be put in place. Some projects may require the passing of legislation in cases where the private party charges the general public for services normally deemed to be provided by government and hence should be free, e.g. tolls on roads.

In Nigeria, the Infrastructure Concession Regulatory Commission (ICRC) is Nigeria's main PPP unit with a key objective to foster investment in the country's national infrastructure through private sector funding. The ICRC assists the federal government and its ministries and development agencies in implementing and establishing effective PPP processes. PPP has different forms. They include Design-build-operate-transfer (DBOT), Design-build-finance-operate-transfer (DBFOT), operate-maintain-transfer (OMT), Lease-Develop-Operate (LDO), Build-Own-Operate (BOO), Build-lease-transfer (BLT), Build-Own-Operate-Transfer (BOOT), Build operate and transfer (BOT), Build-Operate-Lease-Transfer (BOLT), Rehabilitate-Operate-Transfer (ROT).

V. THEORETICAL FRAMEWORK OF ANALYSIS

Rousseau theory of popular sovereignty is the theoretical framework used for this study, Jean-Jacques Russeau was a Geneva born philosopher who lived between 1712 and 1778(Enemuo 1999), he was of lowly birth, his father was a craftsman. This explains largely why he identified with the masses in his political postulations. He believes that the general will is a moral force, which implies seeking the welfare of all and this provides the basis for popular sovereignty (Enemuo 1999).

He postulates that the people constitute the nerve centre of government. Little wonders that Ebenstein has described him as the first modern writer of politics that was of people, the submerged, inarticulate masses of the petit bourgeois, the poor artisan and working men and small peasants (Ebenstein 1969). His teaching along the realm of equality of men had a great influence on the American and French Revolutions. More importantly, it was said that "many of the ideas expanded by the French Revolutionaries were more or less faithful referendum of Jean-Jacques Roussean(Healer 1967), hence the central theme of Roussean's teaching is the involvement of the largest number of people in whatever decision that is to be taken by government, the general will of the people must prevail.

I believed that this theory fits into our discussion on achieving Sustainable Development Goals (SDG's) using the public-private participation approach to the development of electricity infrastructure which will act as a catalyst for industrialisation and sustainable development.

VI. THE STATE OF ENERGY GENERATION IN NIGERIA

The total installed capacity of the government-owned plants in Nigeria is 6,978 MW, but available capacity in 2010 stood at about 3,360 MW (AFDB, 2014 Report) which is equivalent to only about 48 percent of installed capacity. The total installed capacity for Indonesia is 59,340MW with per capita consumption at 852kwh as at 2017 Nnaji, (2017). According to Amakom and Ekeocha (2017), Nigeria was better than Indonesia in terms of electric power consumption in 1971 as the country stood at 28.57kwh per capita with Indonesia at 14.35kwh, but as at 2016, the World Development Indicator (WDI) showed that Indonesia's per capita is 801.95kwh while Nigeria stood at 144.4kwh.

The facilities currently owned by the Federal Government include three hydropower plants with an installed capacity of 1,900 MW, one oil-fired plant with a capacity of 60 MW, one coal-fired plant with a capacity of 30 MW, but which is no longer in operation, and seven gas-fired thermal plants with an installed capacity of 4,988 MW (AFDB, 2014). The result is frequent and unpredictable load shedding, so much so that those who can afford generators rely on them for most of their power supply. The country's installed capacity in 2011 was 64 megawatts per million people compared to 800 MW per million people in Africa's middle-income group of countries.

Informal estimates of consumption from self-generation by industry and households using diesel and petrol generators suggest that the capacity of these self-generation facilities could match or even exceed the existing capacity of the public generation facilities (AFDB, 2014; Nnaji, 2017). The transmission network for Nigeria consisted of the following facilities 5,524 km of 330 kV transmission line and 6,802 km of 132 kV lines with thirty-two 330/132kV substations. The average technical losses associated with transmission were estimated to be 8.5 percent. However, much of the transmission equipment is outdated, with many of the facilities being 30-40 years old (AFDB, 2014). In terms of distribution facilities, the network consisted of 37,173 km of 33kV lines, 29,055 km of 11kV lines and 70,799 km of 0.415 kV lines with one hundred and five 132/33/11kV substations. However, in South Africa, there is a total of 27 770 km of high voltage transmission lines and 325 000 km of distribution lines, a formidable distance to inspect and maintain. Other factors also contribute to the disruption of electricity in Nigeria. These include the vandalism of critical infrastructure, human capital issues, sector liquidity and legacy debt overhang (Eboh, 2014). These challenges confront the power sector and hamper the steady supply of power.

VII. THE IMPACT OF LOW ELECTRICITY GENERATION ON NIGERIA ECONOMIC ACTIVITIES

Low electricity in Nigeria has resulted to constant instability of power, load shedding and power outages. According to the Nigerian Investment Climate Assessment (ICA) survey report, the country is affected by power outages more than 320 days in a year and 96% of firms experience 196 hours of power outage per month. The findings from an empirical study of Nwankwo and Njogo (2013) indicate that the sluggish growth in the Nigerian industrial sector is worsened by the electricity crisis like blackouts. High cost of production as a result of inadequate electricity has frustrated many manufacturing industries and has also led to the closure of many (Oyesola, Iba, Usim and Nwaoguji, 2016). The surviving companies had to bear so much loss as the outages mostly occur when goods are in the middle of production. According to the Director General, Lagos Chamber of Commerce and Industry (LCCI), members of the Chambers, be it multi nationals or Medium, Small or Micro Entrepreneurs (MSMEs) have all resorted to alternative source of energy, ranging from gas, diesel or PMS, which negatively affect their cost of operation and overall effectiveness. Most companies, like Coca cola, Wempco, Nigeria Flour Mills, etc self-generate their power and do not rely on the national grid.

According to a report from the Manufacturers Association of Nigeria (MAN), members companies in the past three years spent N20.8 billion, monthly on power generation to run production process. Also Ugwoke, Dike and Elekwa (2016) found out in their empirical study that excessive production cost due to low electricity consumption in hinders industrial progress in Nigeria. According to Nextier Power (2015), the Good

Governance Initiative (GGI) research report, stated that Nigerians spend N3.5 trillion on fuelling their generators annually and the unsteady power supply contributed to spending over N800billion yearly on generators in the manufacturing sector. The report stated also that in the banking sector, over N4 million is spent on diesel in a month.

No fewer than 1,500 workers had been sacked in the food and beverage sector as employers seek ways of coping with strangulating operational costs (Oyesola, Iba, Usim and Nwaoguji, 2016). This placed over three million jobs that are under threat. The Food, Beverage and Tobacco Senior Staff Association (FOBTOB) also stated that between the 2012 and the first half of 2015, over 3,000 workers were sacked due to epileptic power supply. This source added that the manufacturing industries have the potentials to operate well, expand their capacities and employ more workers if power supply were adequate. According to the National Bureau of Statistics (NBS), over 17 million SMEs in the country rely on generators to run their businesses as the country continues to grapple with abysmal power generation. The Nigerian Association of Chambers of Commerce, Industry, Mines and Agriculture (NACCIMA), stated that despite the privatisation of the power sector, there is still epileptic power supply in the country. In the aviation sector, running the various government airports on private power generators had doubled cost of maintaining the airports and also stifled recent attempts to earn reasonable revenue as a business (Oyesola, Iba, Usim and Nwaoguji (2016).

VIII. THE ALTERNATIVE: BUILD, OPERATE AND TRANSFER (BOT) INVESTMENT MODEL

Globally, the PPP approach has proven to be successful in the realization of infrastructure development both in developed and underdeveloped nations. Again, considering the failed interventions of the government to ensure stable, qualitative and quantitative electricity supply and consumption in Nigeria, engaging in alternative investment options would be most appropriate. A BOT contract is a model used to finance large projects typically infrastructure projects developed through a public-private partnership. Under such contract, the government grants a concession to private company or consortium to finance, build and operate a project. The company usually operate the project for a period agreed under the concession contract with the goal of recouping its investment, then transfers the control of the project to the government. BOT is an outsourcing option of public projects to private sector to take charge of the design, finance, construction and operation of the facility under a concession agreement (Kashef, 2011). According to Investopedia, BOT projects are normally large scale, greenfield infrastructure projects that would otherwise be financed, built and operated solely by the government.

In a BOT framework, the host government grants a right to a consortium of private investors or companies to finance an infrastructure project. The investors build, construct and operate the project for an agreed period of time (to cover the cost and make profit) and eventually transfer the ownership of the project to the government without extra charges (Nourzad, 2009 and Kashef, 2011). In a BOT approach, "… a private party or concessionaire retains a concession for a fixed period from a public party, called principal (client), for the development and operation of a public facility (Menheere and Pollalis, 1996).

Other Forms of BOT

a. The build-Own-Operate-Transfer (BOOT): The BOOT is a financing investment model in which a developer designs, builds, owns and operates the facility as a business for a specified period after which, it transfers it to the government or partner at a previously agreed market price. Under the BOOT arrangement, the contractor owns the project during the project period. This contract arrangement is used for projects like building an airport, high way, power plant, seaport, etc.
b. Build-Own-Operate (BOO): This is a variant of the BOT and the difference is that the ownership of the newly built facility will rest with the private party here. The public sector partner agrees to 'purchase' the goods and services produced by the project on mutually agreed terms and conditions.
c. Build-Lease-Transfer (BLT) contracts: It is a public-private partnership (PPP) project model in which a private organization designs, finances and builds a facility on leased public land. The private organization operates the facility for the duration of the lease and then transfers ownership to the public organization. Under the BLT, the contract is under the lease period as the government leases the land to the contractor within the agreed time.
d. Design-Build-Operate-Transfer (DBOT): Under this arrangement, the contractor design as well as build the project. It is unique because it provides clients with a flexible solution for delivery, operations and optimization for a pre-defined period.
e. Design, Build, Finance and Operate (DBFO): In this model, the private party assumes the entire responsibility for the design, construction, finance, and operate the project for the period of concession.

f. Design-Build-Finance-Operate-Transfer (DBFOT): In this structure, the government entity enters into an agreement with a private sector party under which it allocates to that party all of the project's duties. This includes designing, constructing, financing, operating and maintaining the project. At the end of the period, operating control is transferred back to the government entity.
g. Design-Build-Finance-Operate-Maintain-Transfer (DBFOMT): Under this partnership model, the private sector owns the asset until the end of the contract when the ownership is transferred to the public sector.
h. Build-Operate-Lease-Transfer (BOLT): In this approach, the government gives a concession to a private entity to build a facility (and possibly design it as well), own the facility, lease the facility to the public sector and then at the end of the lease period transfer the ownership of the facility to the government.
i. Lease-Develop-Operate (LDO): Here, the government or the public sector entity retains ownership of the newly created infrastructure facility and receives payments in terms of a lease agreement with the private promoter. This approach is mostly followed in the development of airport facilities.
j. Rehabilitate-Operate-Transfer (ROT): Under this approach, the governments/local bodies allow private promoters to rehabilitate and operate a facility during concession period. After the concession period, the project is transferred back to governments/local bodies.

IX. SOME SUCCESSFUL BOT PROJECTS IN DIFFERENT COUNTRIES

BOT Projects in India: Most of the BOT projects are in the transport sector. The Dhule bypass in Maharashtra was the first BOT built in 1997 in India. The longest road in India (Madhya Pradesh of 203 km) was constructed under a BOT model in 2003

BOT Projects in Philippine: The Ilijan Combined-Cycle Power Plant built in 2005 is located in Ilijan, Batangas and it is the largest natural gas facility in the country comprising 1200 MW combined-cycle, dual-fuel electricity generation facilities with a design life of 25 years.

BOT Projects in China: China has used the Build–Operate–Transfer (BOT) delivery method since the early 1980s. The country has used this method to achieve increased development of economic infrastructure projects. The Chinese electric power industry has adopted the BOT approach in a number of projects to alleviate the pressure of sole state-owned investment. Also, the Chinese government has taken enormous efforts to create an environment to facilitate the application of BOT approach in electric power projects**.** Examples are the power (thermal and wind) and water projects respectively (Zhao, Zuo and Zillante, 2013; & Chen & Messner, 2007).

BOT Projects in Ghana: There are many PPP projects in Ghana including the 2018 proposed projects in different sectors like the transport sector, housing sector, port, etc. The following are examples- the Eastern Railway Line (2018), Accra-Tema Motorway (2018), Terminal in Takoradi (2017), Integrated Terminal at Takoradi Port (2106), University of Ghana student housing (2015), etc.

BOT Projects in South Africa: Majority of the BOT projects in South Africa are seen in the transport sector. Since 1994, the South African National Roads Agency implemented the four major BOT projects. These are: N4 Maputo Corridor (440 km), N3 Heidelberg - Pietermaritzburg Toll Road (450 km), N4 Platinum Toll Road (400 km) and N1/N2 Winelands Toll Highway (180km).Menheere, S. and Pollalis, S.(1996)

BOT Projects in Nigeria: Both the Federal and State governments in the country have declared their openness to PPPs and have formed policies and laws to that effect. In fact Government intends to use PPP as a tool for up to 40 percent of its infrastructure development (Venture Africa, 2013). However, there is need to review the process followed in awarding the concessions and how they determined the outcome. Some BOT projects in Nigeria are seen mostly in the transport sector and are very successful. Examples include the rehabilitation of the Murtala Mohammed (MM2) road and the airport respectively (Deloitte, 2017). Others include the rehabilitation and upgrade of Onitsha inland waterway port, rehabilitation and upgrade of Kiri-Kiri Lighter Terminals 1 &11, Lagos-Ibadan express way and the Lekki expressway (Lekki Toll Plaza). Deloitte(2017)

X. CONCLUSION

The state of electricity infrastructure in Nigeria calls for action due to the high social and economic costs which industries and households experience. Optimu m electricity generation and consumption in Nigeria may not happen except there is a huge investment in the power sector. The BOT financing alternative can succeed in Nigeria especially because of the legal framework through the ICRC Act. This makes the terms of operation for any type of BOT project is Nigeria easy. Besides, the long time contract will allow the investors enough time to build, manage and recover their gain before transferring back to the government. More so, other countries (Africa and advanced countries) have achieved infrastructure development with this model. Successful BOT electricity project in Nigeria will reduce the noise and air pollution caused by constant use of generators. In terms of the GDP, adequate and stable electricity supply has the potential to impact positively on the nation's GDP. In fact, if electricity is produced and stable in Nigeria, South Africa and Egypt will not near Nigeria in terms of the economic growth, that will help in actualise most of the Subtancible Development Goals (SDGs).

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