Perspectives on the Law and Policy for Operating Nuclear Power Projects in Nigeria

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Abstract

There is no doubt that Nigeria needs to engage more in alternative off grid energy sources to improve its power supply. Although several countries have for decades successfully operated nuclear power plants, the adoption of nuclear power plants in Nigeria remain contentious mostly because of the real risks associated with disposal of its waste products and accidents. Nuclear technology has however advanced greatly, reducing these risks even in developing countries. This paper therefore examines the law and policy for operating nuclear power projects in Nigeria to determine the adequacy or otherwise of same and to make proposals to ensure that the foundation for implementing and adopting this technology is gotten right. The basic principles of nuclear law are also identified and highlighted for inclusion in the Nigerian legal framework. It is hoped that this paper will create awareness as regards nuclear power generation, as well as address the concerns that the adoption of nuclear power generation can throw up in a developing economy such as Nigeria.

1. Introduction

In Nigeria today, the electricity supply situation is appalling as over 81% of the populace generate their own electricity using alternative off grid energy sources to compensate for irregular power supply.[1] One of the solutions that has been proffered for solving the nations power generation woes is nuclear power. President Muhammad Buhari attended the 4th Nuclear security summit in Washington, United States, to solicit support from other member nations, for a Nigerian Nuclear Power Programme. The

adoption of nuclear power plants in Nigeria has always been a contentious topic. Its proponents agree to the fact that a nuclear power plant can generate sustainable electricity with zero carbon emissions, and is held up as a solution to the insistent gas availability issues that has plagued the Nigerian power sector. Nuclear power availability in Nigeria is however not free of its antecedent risks, which include weapons development, reactor meltdown and the hazards of disposing of nuclear waste products, especially considering the fact that it is a developing country with few indigenous technology in nuclear power.[2]

Over the years, Nigeria's electricity generation has been largely dependent on hydro and gas fired power plants, with our nuclear energy sources and potential technology largely remaining undeveloped, unexplored and untapped.[3] This lack of development in building nuclear power plant has been mainly attributed to the lack of political will by previous governments to implement nuclear power adoption, in Nigeria's energy mix. Today however the story is different. The need to increase electricity generation has led to technological revelation that nuclear power can provide the nation with a cost effective and sustainable solution. The fact that a number of countries have successfully operated nuclear power plants for decades and that currently, there are about 440 commercial nuclear power plants and reactors being operated in over 31 countries, with over 380,000 MW of total installed generating capacity and about 65 more reactors and power plants being under construction gives our nation hope. It is worthy to note that some 56 countries operate a total of about 240 research reactors (including Nigeria) and a further 180 nuclear reactors power around 150 ships and submarines across the world. In the United States of America, commercial nuclear power plants generate approximately 22% of the electricity produced. For comparison purposes, nuclear generation accounts for the following of the total electrical production in some other countries: 75% in France, 46% in Sweden, 43% in Ukraine, 39% in South Korea, 30% in Germany, and 30% in Japan.[4]

The above statistic shows that various countries have been able to operate nuclear power plants successfully without accidents; this is a very important aspect to the adoption of nuclear power by Nigeria. This track record of safe operation of nuclear power plants has led to a growing interest worldwide in nuclear power (with the

exception of Germany),[5] based on the recognition of its potential for meeting increased energy demands.[6]

This paper examines the law and policy for operating nuclear power projects in Nigeria to determine the adequacy or otherwise of same and to make proposals to ensure that the foundation for implementing and adopting this technology is gotten right. The basic principles of nuclear law are also identified and highlighted for inclusion in the Nigerian legal framework. It is hoped that this paper will create awareness as regards nuclear power generation, as well as address the concerns that the adoption of nuclear power generation can throw up in a developing economy such as Nigeria.

2. Arguments For And Against Nuclear Power in Developing Countries

Energy sources are largely varied and are indicators of our lifestyles, capabilities and development. The type of energy source available to a nation is largely dependent on its technological capability and innovation to harness such source of energy, it can be rightly said that the type of energy at the disposal of a nation and the access of its citizenry to such energy services totally defines their economic output.[7] As such, it only flows from the above that a more technologically advanced country will have more sources of energy opened to it to tap from, based on its research and development capabilities. For instance, total electricity consumption in Sub-Saharan Africa is currently about 40 TWh, roughly equivalent to consumption in New York. In other words, 19.5 million residents of the United States consume as much energy as 791 million Africans, 165 million of whom are Nigerians. It is estimated that at least 76 million Nigerians (mainly in the rural areas) lack access to electricity.[8] To address this increasing divide in todays globalized world, it is necessary that Nigeria understands and create laws that can positively stimulate an environment where energy resources can be researched, developed and utilized for the national development.[9]

For Nigeria various scholars have expounded their fears that, the absence of rigorous safety regimes and a legal system based on the principles of nuclear law, presents unique security risks to the country, including the potential for proliferation of weapons capabilities to new states and terrorist groups like “Boko Haram”.[10] Notwithstanding the forgoing however, the adoption of nuclear

power in Nigeria will demand a total reorientation of the thoughts and perspectives of the citizens on nuclear issues.[11]

Others have opined that, we are a nation that has not been able to manage gas and hydro power plants, and we are now thinking of nuclear power. Their arguments are based on the view that with the national grid recording a system collapse nearly every month, the latest at the time of this paper occurring on Sunday, 14th May, 2016 with power generation on the grid recorded at 169MW[12], and being the sixth time power will drop below 1000MW on the national grid between April and May of 2016, causing incessant blackouts for consumers, can Nigeria handle nuclear power?

This latter argument however in our view brings to the fore the need for a suitable power mix to address the ever looming national blackout. The reason for incessant blackout is not far-fetched - 3599MW was shut in due to gas shortages, 247MW was lost due to line constraints and 560MW was shut-in due to lack of water/water management.[13] Power Stations affected included Shiroro (450MW); Sapele (240MW); Geregu (138MW); Olorunshogo NIPP (500MW); Omotosho NIPP (500MW); Trans-Amadi (75MW); Rivers (180MW) among others. This coupled with the setback suffered by the nation's 16 solar power projects with a combined capacity of 1,300MW owing to the lack of a bankable Power Purchase Agreements (PPAs) and lack of government funding to subsidize the solar power feed-in-tariff has reignited the need to diversify the nation's energy mix to accomodate nuclear power, to serve as a base load to the grid.[14]

3. Nuclear Power Policy in Nigeria.

With the signing of agreements with the Government of the Federation of Russia, the enacment of various laws and establishment of a regulatory agency, the national dream of having nuclear power is on course albeit at a snail slow pace, which due to the lack of political will, a robust regulatory regime, maintainace culture, the fear of a nuclear disaster, and the concerns related to the management and environmental impacts of nuclear energy. Technology however has begun to solve such problems. Increase in innovation, research and development has led to the inventions of new reactor types and technologies, less radioactive fuel cycles, better toxic waste management and disposal systems.[15]

In Nigeria, policy serves as a blue print for the sustainable development, supply and utilisation of energy resources within the economy, and for the use of such resources in international trade and co-operation. The aim of Nigeria's energy master-plan is to guarantee regulatory stability, define specific national targets/objectives, support development of network development plans, provide definition of promotion mechanisms and encourage inclusion of external financing. The policies relating to the adoption of nuclear power in Nigeria's energy mix are discussed below.

a) The Nigerian Energy Policy

In 1984, the Federal Ministry of Science and Technology produced a Draft Energy Policy Guideline. The contents were however limited in scope and depth. The Energy Commission of Nigeria, in furtherance of its mandate, produced a Draft National Energy Policy in 1993. This was later reviewed in 1996 by an Inter-ministerial Committee, under the Chairmanship of the Ministry of Science and Technology. The document was later revised and approved in 2003 by the Federal Executive Council.

In view of significant changes in the orientation of the economy, especially as regards increased private sector participation, it became necessary to review the 2003 document in 2013.

The foreword to the Nigerian Energy Policy of April 2003 stipulates that,

> *"The nature and extent of energy demand and utilization in a national economy are, to a large extent, indicative of its level of economic development. For a productive economy and for rapid and secure economic advancement, the country must pay maximum attention to the optimal development and utilisation of her energy resources and to the security of supply of her energy needs. To do this, the country needs to put in place a coordinated and coherent energy policy, which will serve as a blueprint for the sustainable development, supply and utilization of energy resources within the economy, and for the use of such resources in international trade and co-operation. The policy must also address the issues of energy manpower development, indigenous participation, domestic self-reliance, the energy needs of various sectors of the*

economy, energy sector financing, as well as private sector participation in the energy sector."[16]

From the foregoing, it can be said that the Nigerian Energy Policy alludes to the position that there is need, for a comprehensive and integrated national energy policy so as to provide proper direction to the development of the entire energy sector.[17]

Nuclear power in Nigeria's electric power sector is in dire need of development. Government cannot fully finance the development of these projects. The private sector needs to be involved, but it can only participate if these projects commercially viable and secure, which the energy demand of the country has done. The overall objectives of the policy refer to nuclear energy[18]

As specifically regarding nuclear sources in the nation's energy mix, the 2014 draft review of the Nigerian Energy Policy stipulates;

a) The nation shall promote the development of nuclear energy, and undertake all activities related to peaceful use of nuclear energy in its entire ramifications.
b) The nation shall pay adequate attention to safety, security and safeguard issues in the pursuit and operation of its nuclear programs.
c) The nation shall strengthen all institutional and legal/legislative frameworks and ensure their operation.
d) The nation shall encourage and fund the development of the requisite manpower and provide the enabling environment for the acquisition of competencies and skills needed for the design, construction and operation of the nation's nuclear facilities.
e) The nation shall support research and infrastructural development necessary to enable rapid domestication and encourage intellectual property rights.
f) The nation shall cooperate with the International Atomic Energy Agency and other international organizations involved in the peaceful use of nuclear energy.
g) The nation shall ensure that storage and disposal of nuclear waste is done in an environmentally friendly and sustainable manner.

To achieve the above, the policy intends amongst other objectives;

a) To promote nuclear energy, as an important electricity component in the nation's energy mix.
b) To pursue the exploration of nuclear mineral resources in the country.
c) To develop national capability in the deployment of nuclear energy to all areas of socio economic development of Nigeria and ensure that spin-off benefits are derived within the shortest possible time.
d) To design and implement the strategy for the integration of nuclear energy into Nigeria's program of accelerated development as contained in the approved nuclear power roadmap.
e) To institute the necessary nuclear safety, security and safeguard in the exploitation of nuclear energy.
f) To promote the development of appropriate framework necessary to attain self-reliance in nuclear matters in the long term.
g) To ensure that adequate resources are made available for the provision of safe and sustainable management of spent fuel and radioactive wastes.
h) To ensure that all nuclear facilities are operated in a transparent manner in line with international best practices.[19]

The above draft reveals that the nation's energy policy is in tangent with a path of including nuclear power in the nation's energy mix. This draft policy though commendable and a very good step in the right direction is yet to be adopted.

b) National Electric Power Policy 2001

This policy was developed by the Electric Power Sector Reform Implementation Committee (EPIC) in 1999, which was set up by the National Council on Privatization (NCP). The Terms of Reference (TOR) of the committee included the mandate to develop policy goals for the liberalization and privatization of the electricity sector to introduce competition. In fulfilment of the Terms of Reference, the committee produced a drafted policy document that was approved by the Federal Executive Council (FEC) in 2001. The overall objective of the policy was to ensure that Nigeria develops an Electricity Supply Industry (ESI) that can

meet the needs of its citizens in the 21st century.[20] It is worthy to note that under this policy the Federal Government was given the responsibility to taking measures required to support the federal policy on electricity which include but is not limited to, enactment of laws, regulations and development of policy to increase power generation in the country, which includes measures to support nuclear power generation under the development of a wholesale electricity market. This policy led to the implementation of the electricity reform policy.[21]It is worthy to note that the privatization of the Nigerian Electric Power Sector is considered to be the most important and far reaching privatization programme ever carried out in Nigeria.[22]

4. Legal and Institutional framework for Nuclear Power Plants in Nigeria

The implementation of a nuclear power programme in Nigeria would require the application of a wide variety of laws primarily relating to other disciplines other than law such as environmental protection, industrial safety, land use planning, administrative procedure, mining, transport, government ethics, electricity economics and electricity rate regulation. In general, deviations from the general framework of national legislation would need to be accepted where the special character of an activity warrants special treatment, for instance, the storage of nuclear waste. Therefore, to the extent that a nuclear related activity is adequately covered in other laws, it would not be necessary to promulgate new legislation, as this would only serve to duplicate existing functions. However, from the earliest days of its development, nuclear energy has been considered to require special legal arrangements in order to ensure that it is properly managed. This is because nuclear power creates special risks to health and safety of persons, and to the environment, which must be managed efficiently. Nuclear energy offers on the other hand significant benefits that must be weighed with the risks,[23] and this requires a suitable regulatory and policy framework, defining the objectives and fundamental principles for nuclear power generation in Nigeria. The current regulatory framework includes the Constitution, the Electric Power Sector Reform Act, Nigerian Atomic Agency Commission, Nigeria Nuclear Regulatory Agency and the Nigerian Electricity Regulatory Commission.

4.1 The Constitution

In Nigeria, the foremost legal instrument that drives the energy and electricity sector is the Constitution of the Federal Republic of Nigeria 1999 (as amended). The Constitution by the provision of Section 1 (3) is the *grundnorm* from which all other laws derive their legitimacy and it is supreme. In order to meet the objectives of ensuring availability of electricity to Nigeria citizens, the Constitution places electricity generation as item 13 and 14 in the Concurrent Legislative List, giving powers to both National and State Houses of Assembly to legislate on this subject matter.[24] Part II of the Constitution which contains the Concurrent List states *inter alia* in item 13 that;

The National Assembly may make laws for the Federation or any part thereof with respect to;

a) Electricity and establishment of electric power stations;
b) The generation and transmission of electricity in or to any part of the federation and from one state to another state;
d) The participation of the Federation in any agreement with another country for the generation, transmission and distribution of electricity for any area partly within and partly outside the Federation;
e) The promotion and establishment of a national grid system;
f) The regulation of the right of any person or authority to use, work, or operate any plant, apparatus, equipment or work designed for the supply or use of electrical energy.

Furthermore, item 14 of Part II of the Constitution provides that:

A House of Assembly may make laws for the State with respect to:

a) Electricity and the establishment in that state of electric power stations;
b) The generation, transmission and distribution of electricity to areas not covered by the national grid system within that state; and
c) The establishment within that state of any authority for the promotion and management of electric power stations established by the state.

The above allows both the Federal and State tiers of government to be involved in most aspects of the electricity supply industry, which includes nuclear power generation. However, when a law has already been made by the National Assembly on a matter, and the State House of Assembly also makes a law as regarding the subject matter, the state's law shall give way if any of its provisions is inconsistent with that of the National Assembly, based on the doctrine of "covering the field by the same Act".[25] It is noteworthy that the National Assembly in Item 13(c) and the House of Assembly in Item 14(a) can both make laws to establish a power generation station, the question on the fuel source / type of the power generation station is however not specified. The law is silent on the type of power generation stations that each Assembly can make laws for, therefore it can be argued that nuclear power is within the ambit envisaged by the law as current technological evolutions allow for off grid nuclear power plant ranging between 30MW and 50MW.[26]

Also, with regard to the mining and exploration of Uranium to fuel nuclear power generation reactors, the constitution vests ownership of all mineral and natural resources in the Federal Government of Nigeria. Section 43 (3) of the Constitution states inter alia that;

> *"... the entire property in and control of all minerals, mineral oils and natural gas in, under or upon any land in Nigeria or in, under or upon any land in Nigeria or in, under or upon the territorial waters and the Exclusive Economic Zone of Nigeria shall vest in the Government of the Federation and shall be managed in such manner as may be prescribed by the National Assembly"*

From the above, it is noted that Uranium *in situ* is owned by the sovereign state. Ownership however may at a point during exploitation or production pass to other person based on the terms of contract the government finds favourable to it.[27] Furthermore, all state laws on electricity must conform to the regulations of the Nigerian Electricity Regulatory Commission (NERC) and other Federal Agencies as well as the Electric Power Sector Reform Act 2005.

4.2 The Electric Power Sector Reform Act (ESPRA) 2005

The Electric Power Sector Reform Act, which was enacted in March 2005, repealed the statute establishing the National Electric Power Authority (NEPA)[28], and the Electricity Act of 2004[29], and gave legal backing to restructuring and eventually privatization of its successor companies. It also outlined specific structures for reforming the electric power sector, for example: transforming NEPA, a statutory authority, into a limited liability company called Power Holding Company of Nigeria (PHCN); unbundling PHCN and establishing successor companies; creating an independent regulator - the Nigerian Electricity Regulatory Commission (NERC); establishing the Consumer Assistance Fund; establishing the National Electricity Liability Management Company (NELMCO); developing a competitive electricity market; establishing a Rural Electrification Agency and Fund; creating a new, competitive electricity industry.

The Reform Act was introduced amongst other things to achieve affordable and cost-effective electricity throughout the country and to promote competition to meet growing electricity demand through the full liberalization of the electricity market on the short term. In the long term, it aims to provide a new regulatory environment that is sufficiently flexible to take into account new technological developments and the international trends in the power sector, like nuclear energy, so as to ensure that electricity supply is made more reliable, economically efficient and equitable as to effectively support the socio-economic development of the country.[30]

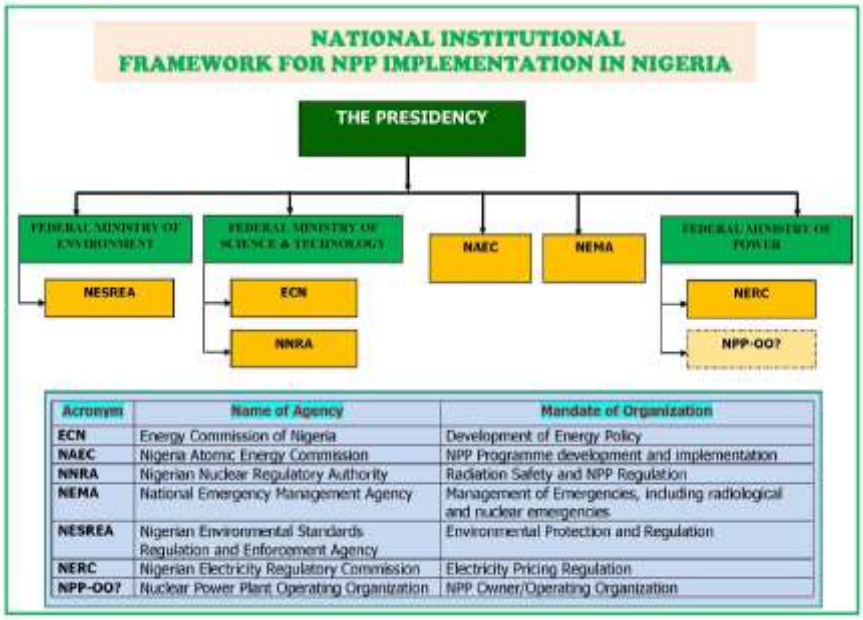
The Electric Power Sector Reform (EPSR) Act, 2005, recognizes the need for the diversification of electricity in the overall energy mix, especially for expanding access to rural and remote areas. In Part IX under Rural Electrification, Section 88 (9) stipulates that information shall be presented to the President by the Minister of Power and Steel on, among others, on the expansion of the main grid, development of isolated and mini-grid systems, and renewable energy power generation. This section would need to be amended to include other sources and means of energy generation, so as to robustly capture the intent of the legislature, as regarding the diversification of the nation's energy sources.[31]

Fig 1.0: Organizational Chart for the Implementation of the Nigerian Nuclear Power Programme.

Source: Country Nuclear Power Profile of Nigeria.

4.3 Nigerian Atomic Energy Commission (NAEC)

The Nigerian Atomic Energy Commission (NAEC) was set up under Act 46 of 1976 and has the institutional mandate for the development and application of nuclear energy in Nigeria.[32] Activated in April 2006 with a 10-member Governing Board headed by the President, it inaugurated in July 2006 the National



Acronym	Name of Agency	Mandate of Organization
ECN	Energy Commission of Nigeria	Development of Energy Policy
NAEC	Nigeria Atomic Energy Commission	NPP Programme development and implementation
NNRA	Nigerian Nuclear Regulatory Authority	Radiation Safety and NPP Regulation
NEMA	National Emergency Management Agency	Management of Emergencies, including radiological and nuclear emergencies
NESREA	Nigerian Environmental Standards Regulation and Enforcement Agency	Environmental Protection and Regulation
NERC	Nigerian Electricity Regulatory Commission	Electricity Pricing Regulation
NPP-OO?	Nuclear Power Plant Operating Organization	NPP Owner/Operating Organization

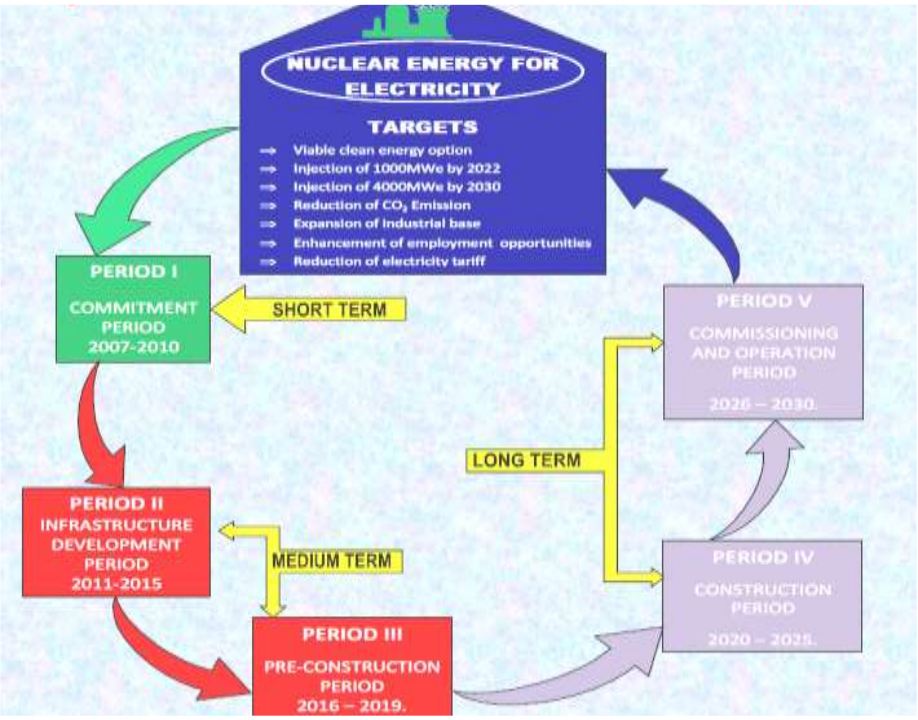
Nuclear Power Roadmap and Strategy for implementation. This was approved and adopted by the Federal Government for implementation in February, 2007. Five nuclear energy research centres involved in manpower training and capacity building operate under the supervision of NAEC.[33]

In March 2009, NAEC led negotiations that resulted in Russia signing a bi-lateral cooperation agreement with Nigeria, including provision for uranium exploration and mining in the country. A further broad agreement in June 2009 envisaged the construction of a Russian power reactor and a new research reactor in the country. In October 2010 NAEC announced the selection of four sites for further evaluation by its environmental and siting team. These are around Geregu/Ajaokuta in Kogi state in north central zone, Itu in Akwa Ibom state in the south-east, Agbaje, Okitipupa in Ondo state in the southwest zone and Lau in Taraba state in the northeast zone. In July 2011 Russia's Rosatom and the Nigerian Atomic Energy

Commission finalized a draft intergovernmental agreement to cooperate on the design, construction, and operation and decommissioning of an initial nuclear power plant.

This bilateral treaty needed approval and ratification by the two governments. A further three nuclear plants were planned, bringing the total cost to about $20 billion. In June 2012 Rosatom signed a memorandum of understanding with NAEC to "prepare a comprehensive program of building nuclear power plants in Nigeria," including the development of infrastructure and a framework and system of regulation for nuclear and radiation safety. In the agreement, Russian financing options will be available to Nigeria, whose preferred option is a Build-Own-Operate (BOO) arrangement with majority Rosatom equity. This was confirmed in a further intergovernmental agreement. The first two sites - Geregu and Itu - were evaluated from 2014 to 2015 and confirmed as preferred. Preliminary licensing by NNRA was expected in 2016. Rosatom said it expects two reactors to be built at each site. The intention is to have a first unit on line by 2025, and 4800 MWe operating in Nigeria by 2035.[34]

Fig 1.1: Strategic Plan for Nuclear Power Programme of the Federal Republic Nigeria 2006 - 2030



Source: Country Nuclear Profile of Nigeria.

The above is the Strategic Plan for Nuclear Power Programme of the Federal Republic Nigeria 2006 – 2030. This plan was revised in 2009 and became the strategic plan for the Implementation of the National Nuclear Energy/Power Programme 2009 – 2030.[35] The plan recognized the dire need to improve the national electricity supply situation of the country, and mandates NAEC as the pivotal promotional agency to provide technical leadership to achieve this objective. From the above commitments made by Nigeria, it is worthy to note that to make informed decision about the future of nuclear power in Nigeria, there is a need for the public to understand the safety, safeguards, and security features of both existing and new nuclear energy plants in order to have a basic understanding of the potential advantages and disadvantages of nuclear energy.[36]

4.4 Nigerian Nuclear Regulatory Agency (NNRA)

A fundamental element of an acceptable national framework for the development of nuclear energy is the creation or maintenance of a regulatory body (or regulatory bodies) with the legal powers and technical competence necessary in order to ensure that operators of nuclear facilities and users of nuclear material and ionizing radiation operate and use them safely and securely. The central consideration in structuring a regulatory body is that it should possess the attributes necessary for correctly applying the national laws and regulations designed to protect public health, safety and the environment. The regulatory body should be structured in such a way as to ensure that it is capable of discharging its responsibilities and carrying out its functions effectively, efficiently and independently.

The Nigerian Nuclear Regulatory Authority (NNRA) is the national regulator and licensing authority for nuclear fuels in Nigeria; established by the Nuclear Safety and Radiation Protection Act 19 of 1995, it became operational in 2001.[37] The Act stipulates that the Authority shall be charged with the responsibility for nuclear safety and radiological protection regulation in Nigeria and shall regulate the possession and application of radioactive substances and devices emitting ionizing radiation.[38] It further provides that the Authority shall ensure protection of life, health, property and the environment from the harmful effects of ionizing radiation, while allowing beneficial practices involving exposure to ionizing radiation; advise the Federal Government on nuclear security, safety and radiation protection matters; and liaise with and foster co-operation with international and other organizations or bodies concerned having similar objectives.

The Act empowers the NNRA to develop all regulations that would govern the operations of the nuclear power industry and enforce same as well as provide regulatory oversight on all uses of ionizing radiation, nuclear materials and radioactive sources under the Federal Ministry of Science & Technology. In other to fulfil the nuclear power aspirations of the country, the NNRA has developed a draft regulation on the Safety and Regulatory Requirements for Licensing of Sites for Nuclear Power Plants. Also a draft document on Regulations on the Safety of Research Reactors is also reached an advanced stage.[39]

It is pertinent to note that the challenges of regulating a commercial nuclear power industry would be enormous. The challenges will include developing and standardizing the license procedure and codes that will regulate nuclear safety, building designs, systems and components of a nuclear power plant. These above regulatory functions of the NNRA, would definitely coincide, with the regulatory functions of the Nigerian Electricity Regulatory Commission (NERC) as regard the powers of NERC to issue licenses to electricity generation companies and the criteria's these companies and plants are to meet as contained in **Section 63** and **64** of the Electric Power Sector Reform Act 2005. [40] To avoid conflicts, NNRA regulations being the latter in time should ensure there is harmony between both regulations instead of conflict.

4.5 Nigerian Electricity Regulatory Commission (NERC)

The first step that led to the creation of the Nigerian Electricity Regulatory Commission (NERC) was the reform of the electric power sector in Nigeria. The reforms were based on the recognition of the importance of the power sector as a veritable tool for economic and socio-economic development. The Federal Government, therefore, in 1999, commenced the implementation of the Electric Power Reform with the approval of the National Electricity Power Policy (NEPP). The Nigerian Electric Power Policy (NEPP) was adopted in 2001 in response to the dire shortage of electric power and the need for urgent reform of the sector.[41]

As a sector regulator, the Nigerian Electricity Regulatory Commission was established under **Section 31** of the Electric Power Sector Reform Act, 2005 to fill the gap of a strong and viable regulator for the electricity sector. Officially inaugurated on October 31, 2005, it is saddled with the responsibility of being the Independent Regulator to drive the power sector reform programme through; ensuring fairness, transparency & level playing ground for all investors, creating a strong and justifiable regulatory regime that is based on equity, fairness and transparency. NERC provides a formal independent regulatory framework for the electricity industry, ensuring sustainable growth, development and stability of the electricity sector. It aims to boost investor confidence while protecting the interests of consumers, promote competition within the industry, set and enforce quality

standards, enforce consumer service and licensee obligations and provide all necessary regulatory functions for the electricity industry. As a sector regulator, NERC undertakes technical and economic regulation of the electricity sector.

The principal objectives and functions of the Commission are stipulated in **Section 32 (1) (2) and (3)** of the Act which provides that;

(1) Subject to this Act, the Commission shall have the following principal objects;

a. to create, promote, and preserve efficient industry and market structures, and to ensure the optimal utilization of resources for the provision of electricity services;

b. to maximize access to electricity services, by promoting and facilitating consumer connections to distribution systems in both rural and urban areas;

c. to ensure that an adequate supply of electricity is available to consumers;

d. to ensure that the prices charged by licensees are fair to consumers and are sufficient to allow the licensees to finance their activities and to allow for reasonable earnings for efficient operation;

e. to ensure the safety, security, reliability, and quality of service in the production and delivery of electricity to consumers;

f. to ensure that regulation is fair and balanced for licensees, consumers, investors, and other stakeholders; and

g. to present quarterly reports to the President and National Assembly on its activities"

(2) For the furtherance of the objects referred to in subsection (1) of this section, the Commission shall perform the following functions:

a. promote competition and private sector participation, when and where feasible;

b. establish or, as the case may be, approve appropriate operating codes and safety, security, reliability, and quality standards;

c. establish appropriate consumer rights and obligations regarding the provision and use of electricity services;

d. license and regulate persons engaged in the generation, transmission, system operation, distribution, and trading of electricity;
e. approve amendments to the market rules:
f. monitor the operation of the electricity market; and
g. Undertake such other activities which are necessary or convenient for the better carrying out of or giving effect to the objects of the Commission.

In the discharge of its functions, the Commission shall consult, from time to time, and to the extent the Commission considers appropriate, such persons or groups of persons who may or are likely to be affected by the decisions or orders of the Commission including, but not limited to licensees, consumers, potential investors, and other interested parties.

As a regulatory agency, the Commission is immune from liability which may arise in terms of its performance of its regulatory functions[42] and also performs legislative[43], quasi-judicial and enforcement functions in the electricity market.[44]

In **Section 32 (1) (d) d. b** The NERC is saddled with the responsibility to ensure that the prices charged by licensees are fair to consumers and are sufficient to allow the licensees to finance their activities and to allow for reasonable earnings for efficient operation. This it does using the Multi Year Tariff Order (MYTO) as a price control mechanism. The Multi Year Tariff Order (MYTO) 2015 is the current operational tariff and it has been held to reflect the current market realities in electricity generation and distribution.[45] The MYTO 2015 was the outcome of an extraordinary tariff review process done in line with the NERC Regulation on Procedure for Rate Review (2014)[46] and became effective from the 1st of February 2016 and is meant to cover the periods of 2015-2024. [47]

This MYTO unlike others before it was implemented to reflect the real cost of electricity in Nigeria, but albeit, this was however been met with swift resistance by electricity consumers who approached the court to restrain the commission amongst others from "further foisting on Nigerians further hardship through an increase in electricity tariff, without significant improvement in power supply to at least for 18 hours in a day in most Nigerian communities, pending the determination of the substantive suit." [48] this goes

further to deepen the conundrum that there is certainly a lack of sustainable generation capacity, as power needs to be generated before it can be adequately supplied, irrespective of the price.[49] The fact that Nigerians have expressed their grievance that non-prepaid metered customers were invariably paying for sunlight as provided by God almighty makes the generation and distribution capacity in the electricity sector laughable and exposes the need for the immediate diversification of our energy mix.[50]

Notwithstanding the above, the instruments of regulatory control adopted by NERC in carrying out its regulatory functions include: Primary and subsidiary Legislations, licenses, price regulation, Industry Codes, Rules and Orders of the Commission. While the primary instrument for regulation by the Commission is the EPSR Act No.6 of 2005, the Commission adopts secondary instruments in form of subsidiary legislations (Rules & Regulations). For this paper, three relevant subsidiary legislation adopted by the NERC that gives room for competition, energy security and the adoption of nuclear power in the generation sub-sector in Nigeria are the Embedded Generation Regulations (EGR) 2012, the Independent Electricity Distribution Networks (IEDN) 2012, and the Nigerian Electricity Regulatory Commission Application for Licenses (Generation, Transmission, System Operation, Distribution and Trading) Regulation, 2010.

i. Embedded Generation Regulations (EGR) 2012

Embedded generation is a situation where a licensee of the commission who is licensed to generate electricity supplys it directly to the distribution company or the consumer, without sending it first to the national grid. This regulation allows the distribution companies to directly procure the required generation capacity to supply consumer demand. This is important to nuclear power adoption, as the regulation allows for alternative sources of power procurement for supply, separate from the one on the national grid. Through various agreements, an embedded generator that is powered by nuclear power can evacuate its generation capacity using power purchase agreements with distribution companies thereby allowing for access to sustainable generation capacity and an opportunity to harness the nations uranium resources.[51]

ii. Independent Electricity Distribution Networks (IEDN) 2012

Made pursuant to **Section 96 (1)** of the ESPR Act, this Regulation allows the existence and operation of independent distribution companies using distribution networks apart from that of the existing distribution companies. The grant of an IEDN licence however is subject to the condition that no distribution system exists within the geographical area the licensee intends to cover or that the infrastructure of an existing licensee is unable to meet demands of the electricity consumers in the geographic areas. In a situation where the existing infrastructure of the licensee is unable to meet demand, the IEDN operator must fulfil the following set down conditions;

i. Undertaking in writing that the existing distribution licensees facilities and infrastructure will not be used in its operations;
ii. That there shall be no parallel overhead lines near existing ones;
iii. Ensure the safety of equipment, workers and the public;
iv. Have a minimum distribution capacity of 5,000 kW;
v. Show the ability to provide generation capacity for the IEDN[52]

It is worthy to note that condition (v) above requires the IEDN to show generation capacity in places where there is an existing distribution infrastructure. This condition for generation capacity offers a potentially new market segment which independent electricity distributors buying power from nuclear power can fill.

iii. Nigerian Electricity Regulatory Commission Application for Licenses (Generation, Transmission, System Operation, Distribution and Trading) Regulation, 2010.

These regulation was made to provide for the Application for Licenses (Generation, Transmission, System Operation, Distribution and Trading and to repeal the Regulations for the Application for Licenses (Generation, Transmission, System Operation, Distribution and Trading) 2006. Chapter 2 of this Regulation provides for the manner of application for a generation license, as well as the document to accompany the application. As of today in Nigeria however, this is the only regulation that provides the terms for the application of a generating licence, for all sources of electricity generation in Nigeria.[53]

4.6 Nigerian Environmental Standards and Regulation Enforcement Agency (NESREA)

NESREA was established on 30 July 2007,[54] to replace the defunct Federal Environmental Protection Agency (FEPA). It is responsible for the enforcement of environmental standards, regulations, rules, laws, policies and guidelines. Its authority extends to the enforcement of environmental guidelines and policies, such as the National Policy on the Environment, 1999. The importance and relevance of standards, rules, policies and guidelines on the environment, though they may not have the force of law, are a vital and necessary element in the protection and preservation of the environment, NESREA is charged with responsibility for the protection and development of the environment, biodiversity conservation and sustainable development of Nigeria's natural resources as well as environmental technology.

In order to deliver on her mandate, the immediate implementation strategies of NESREA are:

i) Collaboration and partnership;
ii) Conducting public education and awareness on topical environmental issues; and
iii) Strengthening institutions and building capacity to monitor compliance and enforce existing environmental regulations, including guidelines for best practices.

Part II of the NESREA Act contains the functions of the Agency which includes enforcement of compliance with laws, guidelines, policies and standards of environmental matters.[55] Such standards would include the federal water quality standards and air quality standards. This is noteworthy as such standards will be needed to regulate a nuclear power program.

A notable provision of the NESREA Act is section 7(c), which mandates the Agency to enforce compliance with the provisions of international agreements, protocols, conventions and treaties on the environment and such other agreement as may from time to time come into force. Nigeria has ratified several international agreements on the environment in matters such as climate change, biodiversity, desertification, forestry, oil and gas, hazardous waste, marine and wildlife and pollution. However, most of these environmental treaties to which Nigeria is a state party are yet to be domesticated.

This provision could therefore be interpreted in two ways. First, it could be interpreted to mean that NESREA has authority to enforce such environmental treaties in Nigeria whether or not they have been domesticated, based on the fact that by ratifying the relevant treaty, Nigeria has signified its intention to be bound by the provisions of the treaty. The state cannot therefore shy away from the performance of its treaty obligations under international law. This principle enunciated above is as expressed in Article 26 of the Vienna Convention on the Law of Treaties, which provides that "Every treaty in force is binding upon the parties to it and must be performed by them in good faith". This principle is also known as the Principle of Good Faith.[56]

Second, the provision could be interpreted in such a way as to limit the enforcement powers of NESREA to only those international agreements and treaties on the environment that have specifically been domesticated in Nigeria by an Act of the National Assembly. Section 12(1) of the 1999 Constitution of the Federal Republic of Nigeria (CFRN) provides that;

> No treaty between the federation and any other country shall have the force of law except to the extent to which any such treaty has been enacted into law by the National Assembly where the treaty deals with maters not included in the Exclusive legislative list, it must in addition be ratified by a majority of all the state Houses of Assembly in the federation.[57]

The courts have consistently upheld this second interpretation. Thus for NESREA to enforce compliance with the provisions of such treaties, especially the nuclear power treaties and regulations, to which Nigeria is a state party, the relevant treaty would first of all have to be domesticated before it could be said to properly 'come into force'. Section 7c of the NESREA Act however has the laudable effect of highlighting the importance and relevance of international environmental law as a veritable source of Nigerian environmental law.

The provision of Section 7(h) of the NESREA Act, which ousts the jurisdiction of the agency from the oil and gas sector, does not however prevent it from performing its statutory duties in the nuclear power industry. The above section empowers NESREA to 'enforce through compliance monitoring, the environmental

regulations and standards on noise, air, land, seas, oceans and other water bodies other than in the oil and gas sector" The position of 7(h) is buttressed by 7(g) which mandates NESREA to enforce compliance with regulations on the importation, exportation, production, distribution, storage, sale, use, handling and disposal of hazardous chemicals and waste other than in the oil and gas sector.[58]

The Agency is further mandated to enforce compliance with policies, standards, legislation and guidelines on water quality, environmental health and sanitation including pollution abatement.[59] The establishment of such policies and laws are primarily directed at the prevention of pollution, environmental degradation and the general protection of the environment. It can therefore be implied that the functions of NESREA are directed primarily at the prevention of pollution and environmental harm rather than remedying harm that has already occurred to the environment. Where pollution is already occurring, the Agency is to enforce its abatement. This function would be very fundamental to nuclear operations in terms of providing safety standards for the prevention of nuclear accidents.

NESREA is also concerned with the enforcement of the guidelines and legislation on sustainable management of the ecosystem, biodiversity conservation and the development of Nigeria's natural resources.[60] This provision confers broad powers on NESREA over a wide range of issues. Guidelines and legislation on the sustainable management of the ecosystem and biodiversity conservation include the Sea Fisheries Act[61] and the Regulations made pursuant to it, the Endangered Species (Control of International Trade and Traffic) Act,[62] and the National Park Act.

NESREA likewise possesses oversight functions over hazardous chemicals. It is required to enforce compliance with regulations on the importation, exportation, production, distribution, storage, sale, use handling and disposal of hazardous chemicals and waste. The laws to be enforced by NESREA in relation to hazardous chemicals and waste include; the Basel Convention on the Control of the Trans-boundary Movement of Hazardous Wastes and their Disposal,[63] the Bamako Convention,[64] the NESREA Act, the Harmful Waste (Special Criminal Provisions etc.) Act,[65] and the National Environmental Protection (Management of Solid and Hazardous Wastes) Regulations 1991.[66]

In order to provide for effective enforcement of environmental standards, regulations, rules, laws, policies, guidelines and general environmental protection, the Minister of Environment is empowered to make regulations for the general purposes of carrying out or giving full effect to the functions of the Agency under the NESREA Act.[67] The Regulations of the Agency that are aimed at environmental protection in Nigeria and which ultimately affect the use of nuclear sources for power generation in Nigeria, and which further in their own separate ways provide for environmental protection from damage resulting from the operation of a nuclear power plant are;

a. National Environmental (Wetlands, River Banks and Lake Shores) Regulations, 2009.[68]
b. National Environmental (Watershed, Mountainous, Hilly and Catchment Areas) Regulations, 2009.[69]
c. National Environmental (Sanitation and Wastes Control) Regulations, 2009.[70]
d. National Environmental (Permitting and Licensing System) Regulations, 2009.[71]
e. National Environmental (Mining and Processing of Coal, Ores and Industrial Minerals) Regulations, 2009.[72]
f. National Environmental (Ozone Layer Protection) Regulations, 2009.[73]
g. National Environmental (Noise Standards and Control) Regulations, 2009.[74]
h. National Environmental (Soil Erosion and Flood Control) Regulations, 2011.[75] Purpose: to protect human life and the environment; minimize losses due to flood and erosion and their effects on vulnerable areas by controlling earth-disturbing activities.
i. National Environmental (Base Metals, Iron and Steel Manufacturing/Recycling Industries Sector) Regulations, 2011.[76] This is aimed at preventing and minimization of pollution from all operations and ancillary activities of the sector in the Nigerian environment, especially the release of priority air pollutants.
j. National Environmental (Coastal and Marine Areas Protection) Regulations, 2011.[77] This is to provide the

regulatory framework for preserving the natural ecological conditions of the estuarine system, barrier islands system and the beaches so as to safeguard and perpetuate their natural productivity and their biological, economic and aesthetic values.

k. National Environmental (Construction Sector) Regulations, 2011.[78]
l. National Environmental (Non- Metallic Minerals Manufacturing Industries Sector) Regulations, 2011.[79]
m. National Environmental (Surface and Groundwater Quality Control) Regulations, 2011.[80] This is to restore, enhance and preserve the physical, chemical and biological integrity of the nation's surface and ground waters; and to maintain existing water uses.

The bottom line however, is that the twenty-four regulations identified above provide the regulatory framework to address all the broad environmental protection problems being accorded highest priority in Nigeria, namely, ensuring sustainable use of natural resources and the adoption of sustainable and environmental friendly practices in both industrial and general sanitation nationwide.

4.7 Nigerian Emergency Management Agency (NEMA)

The National Emergency Management Agency (NEMA) was established via Act 12 as amended by Act 50 of 1999, to manage disasters in Nigeria. NEMA currently has a number of existing disaster response plans and agreements aimed at or that may be adapted to mitigation of nuclear disasters, which include;

a) National Disaster Response Plan (NDRP) – 2001
b) National Contingency Plan on Infrastructural Resuscitation (NCPIR) – 2010
c) National Disaster Management Framework (NDMF) – 2011
d) National Contingency Plan (NCP) – 2012
e) National Emergency Management Agency Standard Operating Procedures – 2012
f) Guidelines for use of Military assets and personnel during disasters – 2012

g) Memorandum of understanding between National Orientation Agency, NESREA and NEMA – 2013

The Nigerian Nuclear Regulatory Authority (NNRA) is collaborating with National Emergency Management Agency (NEMA) for the integration of its National Radiological Emergency Response Plan (NRERP) into the nation's emergency management plan[81]

In Nigeria, NEMA adopts a the multi-scenario based Contingency Plan, which ensures the coordination of Humanitarian Players and resources towards effective management of disasters under established guidelines as provided in the National Disaster Management Framework (NDMF).[82] It is hoped that the same multi-pronged approach would be adopted in cases of nuclear disaster preparedness in the country.

4.8 Energy Commission of Nigeria Act 1979

The Energy Commission of Nigeria Act of 1979 established the Energy Commission of Nigeria (ECN). It is the governmental organ that is charged with the responsibility for the coordination and systematic development of various energy resources in Nigeria and the implementation of comprehensive and integrated energy policies.[83]

ECN has been involved in the strategic planning of Nigeria's nuclear power development and advising the government on the best approach to take, in line with its mandate.[84] It proposed in the National Energy Policy in 2003 the development of nuclear power in the nation's energy mix. In the policy, the ECN proposed objectives and strategies for achieving national electricity goals, with a view to making sustainable electricity available to 75 percent of the population by the year 2020. [85] It is important to note that in order to increase the efficiency and effectiveness of energy delivery in the country, there is a need to develop the technological capabilities envisioned by the Energy Commission of Nigeria in its various Energy Policies and Master Plans to cope with the challenges of future energy development.[86]

4.9 Transmission Company of Nigeria (TCN)

The Generation of electricity must flow in line with its transmission. There is an urgent need to look into opening up the

transmmission facet of the electricity sector to private investors as this area of the electricity sector was not privitised under the EPSRA 2005. Currently ,the distribution facet of the electricity production chain has had a distribution capacity increase, which was 5758 MW in 2010 and is currently 9230 MW inclusive of many NIPP Projects some of which are yet to be utilized.[87] As such, there is a need for the expansion of the elctricity transmission grids, which is currently been operated by TCN and the maintance of new ones also, so as to meet up with the proposed injection of power into the national grid by nuclear power plants. The privatisation of this facet will allow an influx of investors, to develop capital intensive transmission grids while allowing for private ownership of grid systems that can evacuate the proposed increase in the generation capacity of the nation, using nuclear power plants.[88]

5. Analysis and Recommendation

In 2008, Professor Omorogbe raised and answered the very important question, 'Why we have no Energy.'[89] In 2017, Nigerians are still asking why Nigeria as a nation has no energy. Other questions raised include whether citizens of Nigeria, the giant of Africa do not deserve 24 hours of electricity supply? Or do businesses not need electricity to run, or factories and industries?[90] One factor that will start to answer these questions, begin with first getting adequate and sustainable generation of electricity, to which nuclear power offers a solution. To efficiently harness nuclear power and adopt it in our energy mix, the Nigerian Senate has promised to assist the IAEA establish laws governing nuclear energy in Nigeria.[91] To this end however, Nigeria must/needs to urgently include principles of nuclear law in its national laws.[92] The following basic concepts, often expressed as fundamental principles in nuclear law are therefore recommended if Nigeria would safely and successfully operate nuclear power plants.

a) **The safety principle:** National laws must emphasize that safety is the primary requisite for the use of nuclear energy. In discussions on nuclear safety and in environmental law, a number of subsidiary principles have been articulated.[93] One such principle has been labelled the "prevention principle" or "Pre-cautionary Principle". It holds that, given the special character of the risks of using nuclear energy, the primary

objective of nuclear law is to promote the exercise of caution and foresight so as to prevent damage that might be caused by the use of the technology and to minimize any adverse effects resulting from misuse or from accidents. It is worthy to note that the fundamental purpose of any regulatory regime is to balance social risks and benefits. Where the risks associated with an activity are found to outweigh the benefits, priority must be given to protecting public health, safety, security and the environment. Of course, in the event that a balance cannot be achieved, the rules of nuclear law should require action favouring protection. It is in this context that the concept commonly referred to as the 'precautionary principle' (i.e. the concept of preventing foreseeable harm) should be understood. In applying these related and overlapping safety concepts, it is always important to return to the fundamental requirement that both the risks and the benefits of nuclear energy be well understood and taken into account with a view to achieving a sensible balance in the framing of legal or regulatory measures.[94]

b) **The security principle:** In developing a regulatory framework for nuclear power, it may be useful to recall that the modern development of nuclear technology had its origins in the military programs of several States. Just as certain nuclear material and technologies pose health and safety risks if diverted to non-peaceful ends, they also pose risks to the security of persons and social institutions. Lost or abandoned radiation sources can cause physical injury to persons unaware of the associated hazards. The acquisition of radiation sources by terrorist or criminal groups like *Boko Haram* and the *Niger Delta Avengers*, could lead to the production of radiation dispersion devices, to be used to commit malevolent acts. As such, laws on the physical protection of nuclear plants, emergency preparedness and response, transport of radioactive material, safeguards and export and import controls must be made.[95]

c) **The responsibility principle:** The use of nuclear energy typically involves numerous parties, such as research and development organizations, processors of nuclear material, manufacturers of nuclear devices or sources of ionizing radiation, medical practitioners, construction companies,

operators of nuclear installations, and regulatory bodies. With so many parties potentially engaged in a nuclear related activity, the question that arises is: "Who is primarily responsible for ensuring safety?" In a sense, of course, all entities having some control over a nuclear related activity bear at least part of the responsibility for safety. However, the entity that has been consistently identified as primarily responsible is the operator or licensee who has been granted the authority to conduct specific activities related to nuclear energy or ionizing radiation. Legal arrangements would have to be developed under which a part or all the financial liability for the damage that could result from nuclear related activities may be assigned to different parties. However, the starting point for such arrangements is the fundamental principle that the operator or licensee should bear the burden of ensuring that its activities meet the applicable safety, security and environmental protection requirements as provided for by the NNRA and NESREA.[96]

d) **The permission principle:** As a consequence of the special risks associated with nuclear technology, nuclear law normally requires that prior permission be obtained for activities involving fissionable material and radioisotopes. Various terms have been used for such permission, including 'authorization', 'licence', 'permit', 'certificate' or 'approval'. However, the regulatory authority always retains the ability to revoke such general authorizations if information comes to light suggesting that the risks of the activity are excessive. It must also be borne in mind that the issuance of an authorization to conduct a nuclear related activity can and typically does have practical and legal implications for third parties. For example, the rights of persons living in the vicinity of a proposed nuclear power plant could be affected by the issuance of a licence to construct the installation.[97]

e) **The continuous control principle:** Even in circumstances in which an authorization (typically in the form of a licence) has been granted to conduct certain activities, the NNRA as the regulator must retain a continuing ability to monitor those activities so as to be sure that they are being conducted safely and securely and in accordance with the terms of the authorisation. This principle means that national nuclear

legislation must provide for free access by regulatory inspectors to all premises where nuclear material is being used and stored.[98]

f) **The compensation principle:** Depending on various technical factors, the use of nuclear energy poses the risk of major damage to persons, property and the environment. As preventive measures cannot completely exclude the potential for such damage, there is a need that Nigeria adopts measures to provide adequate compensation in the event of a nuclear accident.[99]

g) **The sustainable development principle:** A number of instruments in the field of environmental law have identified a duty for each generation not to impose undue burdens on future generations. The principle in question is that economic and social development can be 'sustainable' only if the world's environment is protected from degradation. It has particular applicability in the nuclear power generation, because some fissile material and sources of ionizing radiation can pose health, safety and environmental risks for very long periods of time. However, the very long lived character of these materials has made it difficult to determine which current measures are necessary in order to protect generations adequately in the very remote and unpredictable future. One approach in applying the sustainable development principle to urge that the current generation does whatever is possible for long term safety, but without foreclosing options for future generations and without relying unduly on long term forecast, which are unlikely to be accurate over the extended timescales involved.[100]

h) **The compliance principle:** It has been proven that many human activities taking place within the territory of a State can result in damage beyond its borders[101] and nuclear energy has been deemed to involve particular risks of radiological contamination transcending national boundaries. As a result, both regionally and globally, bilateral and multilateral instruments are needed to build an international law of nuclear energy. To this extent, Nigeria will need to adhere to the international legal regimes in place and national nuclear law must also reflect the obligations that they contain. This calls for domestication of such international laws or treaties by the national assembly.[102]

i) **The independence principle:** At this point it is sufficient to note that nuclear law places particular emphasis on the establishment of a regulatory authority, whose decisions on safety issues are not subject to interference from entities involved in the development or promotion of nuclear energy. Given the significant risks associated with nuclear technology, other interests must defer to the regulator's independent and expert judgment when safety is involved.

j) **The transparency principle**: The transparency principle requires that bodies involved in the development, use and regulation of nuclear power make available all relevant information concerning how nuclear energy is being used, particularly concerning incidents and abnormal occurrences that could have an impact on public health, safety and the environment.

k) **The international co-operation principle:** The international dimension of nuclear power is based on several factors. First, in the area of safety and the environment, the potential for trans-boundary impacts requires governments to harmonize policies and develop co-operative programs so as to reduce the risks of damage to their citizens and territories, the global population and indeed to the planet as a whole. Also, lessons learned in one State about how to enhance safety can be highly relevant to improving the situation in other States. It is vital to achieving improvements in the safety of nuclear activities and facilities worldwide that such lessons be promptly and widely shared.

Second, the use of nuclear material involves security risks that do not respect national borders. Threats of terrorist acts and the threats associated with illicit trafficking in nuclear material and the proliferation of nuclear explosives have long been recognized as matters requiring a high level of international co-operation.

Third, a large number of international legal instruments have been promulgated to codify the obligations of states in the nuclear field. Not only must governments comply in good faith with those obligations, but the terms of those instruments may limit the discretion of legislators in framing national legislation concerning some matters covered by them. Fourth, the increasingly multinational character of the nuclear industry, with frequent movements of nuclear material and equipment

across national borders, makes effective control dependent on parallel and joint approaches by both public and private entities. For all these reasons, national nuclear power legislation should make adequate provision for encouraging public bodies and private users of nuclear energy to participate in relevant international activities in the nuclear field.

6. Conclusion

This paper examined the justification (arguments for and against Nuclear Power in developing countries) and reviewed the laws and policy for operating Nuclear Power Plants in Nigeria. The paper noted that since 2014, Nigeria has specifically included nuclear energy in its draft Energy policy: thus it is no more debateable whether it should be included or not. Furthermore, the paper identified the advancements in nuclear technology which addresses some of the concerns on nuclear safety. The basic principles of nuclear law which should be included in future nuclear policies and legislation are expounded. There is no doubt Nigeria needs to diversify its energy mix. Nuclear energy is one way to do so and safely too, as long as the national legal framework incorporates the basic nuclear law principles already enshrined in international law.

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[43] Section 96 EPSR Act gives the Commission powers to make regulations and orders that bind its licensees
[44] Section 32 (2) (g), 62, 96 (2) (n) EPSR Act gives the commission powers to ensure compliance to the act, its Regulations and Orders using sanctions, fines and penalties.
[45] Unlike other MYTO before it, the MYTO 2015 takes into consideration Aggregate Technical, Commercial and Collection (ATCC) losses, some of which are passed down to the consumer taking into account the rate of inflation, foreign exchange rates, cost of fuel (Gas Prices) and actual level of available generation capacity.
[46] Section 6.3 of the MYTO methodology provides that major review will be undertaken at less than 5 years intervals if industry participants can demonstrate to NERC (i.e. through extraordinary tariff review application process) that industry parameters have changed from those used in the MYTO to such an extent that a review is required urgently to maintain industry viability.
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