A Critique of the Legal Interventions on the Challenges to the Development of Renewable Energy Development in Nigeria

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Abstract

Energy poverty in Nigeria undermines national development. In addition, the heavy reliance on fossil fuel powered energy sources continues to devastate the Nigerian environment and to threaten ecosystem functionality. RE which provides promising alternative remains largely undeveloped. The aim of this paper was to contribute to RE development and deployed in Nigeria. The paper adopted the doctrinal method of research. Textual analysis of the provisions of relevant statutes and legal instruments was used. This was complimented with judicial decisions and opinions expressed in articles and books. The paper found that challenges to RE development in Nigeria are intermittency, investment costs, grid access and grid security and lack of technical and technological know-how. It identified and discussed the following legal interventions to the challenges: feed-in-tariff, funding interventions, access to land and research and development. The paper concluded that the legal interventions are grossly inadequate to effectively promote RE development in Nigeria. It recommended the enactment of a Renewable Energy Act to address the challenges.

Keywords: Renewable Energy, Laws, Nigeria.

1. Introduction

The importance of energy security to both national development and national security cannot be overemphasised. It is in this regard, that Nigeria seeks to develop its energy market to be competitive and to adequately regulate generation, transmission, distribution and supply of energy.[2]

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[2] Electricity Power Sector Reform 2005, long title.

The fact remains that energy is one of the most crucial determinants of sustainable development.[3] The United Nations' Secretary-General's Advisory Group on Energy and Climate Change,[4] states the relationship between energy and development thus:

> Clean, efficient, affordable and reliable energy services are indispensable for global prosperity. Developing countries in particular need to expand access to reliable and modern energy services if they are to reduce poverty and improve the health of their citizens, while at the same time increasing productivity, enhancing competitiveness and promoting economic growth.

All businesses and all economic activities are driven by energy. Energy drives education, transportation, communication, health, security, construction and all the sectors of the economy. In other words, the economy is fundamentally an energy based system consisting of energy flows and conversions that culminate precisely in the production of goods and services, and energy as a key source of economic growth, industrialization and urbanization.[5] Energy supports the provision of basic needs. Energy also fuels productive activities including agriculture, commerce, manufacturing, industry, and mining. Conversely, a lack of access to energy contributes to poverty and deprivation and can contribute to the economic decline.[6] Accordingly, energy is widely accepted as the most important primary factor of production.[7]

Within the global energy mix, two factors make RE particularly attractive. First, RE is a strategic approach to addressing the disturbing patterns of the negative effects of fossil fuel based energy on the environment. Consequently, the replacement of energy from fossil fuel with energy from

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3 I Arto and Others, 'The Energy Requirements of a Developed World" [2016] (33) *Energy for Sustainable Development* 1.

4 United Nations, 'Secretary-General's Advisory Group on Energy and Climate Change 'Energy for Sustainable Future; Reports and Recommendations' [2010] <http://www.un.org/millenniumgoals/pdf/AGECCsummaryreport[1].pdf > Accessed 23 October 2022.

5 K Imran and M M Siddiqu, 'Energy Consumption and Economic Growth: A Case Study of Three SAARC Countries' [2010] (16)(2) *European Journal of Social Sciences* 206.

6 C Nnaji and Others (eds), 'CIA World Factbook, Nigeria' < http://www.cia.gov/library/publications/the-world-factbook/geos/ni.html > Accessed 23 October 2022.

7 N Georgescu-Roegen, *The Entropy Law and the Economic Process* (Harvard University Press 1971) 1975.

low carbon renewable sources has become a global urgent necessity.[8] This is particularly with deference to threatening climate change,[9] and its consequential effects such as global warming, rising sea level, crop failures, changing rain patterns, flood and other health hazards as a result of carbon emissions from fossil fuel.[10]

Second, RE aligns squarely with the promotion of sustainable development.[11]

Unfortunately, in terms of energy consumption per capital, Nigeria remains one of the poorest countries globally. It is estimated that power outages result in loss of over #126 billion annually. Apart from the huge income loss, it has also resulted in health hazards due to the exposure to carbon emissions caused by constant use of 'backyard generators' in different households and business enterprises, unemployment, and high cost of living leading to a deterioration of living conditions.[12]

Since Nigeria is blessed with abundant renewable energy resources such as hydroelectric, solar, wind, tidal, and biomass, there is a need to harness these resources and chart a new energy future for Nigeria. Today, over 60 percent to 70 percent of the Nigerian population does not have access to electricity. There is no doubt that the present power crisis afflicting Nigeria will persist unless the government diversifies the energy sources in domestic, commercial, and industrial sectors and adopts new available technologies to reduce energy wastages and to save cost.[13]

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[8] A Dumitrescus, 'The Trends and Long-Term Scenarios in EU and the member States Concerning Renewable Energy [2014] 6(2) *Journal of Global Economics* 96.

[9] R Macrory, 'The UK Climate Change Act – Towards a Brave New legal World?' [2014] *Regulation, Enforcement and Governance in Environmental Law* 261.

[10] B Guler and J Nathwani, 'A "Regional Energy Hub" for Achieving a Low-carbon Energy Transition [2018]113 *Energy Policy* 376.

[11] N Wosu and Awajigbana Paul Alfred, 'The Role of Professionals Groups in the Sustainable Development of Ethnic Societies' in C A J Chinwo (ed), *Opening and Enriching the Channels of Justice in the Nigerian Society* (Life, Law and Grace Bookhouse 2018) 109.

[12] S O Oyedpo, 'Energy and Sustainable Development in Nigeria: The way Forward' [2012] (2)(15) *Oyedepo Energy, Sustainability and Society* 1.

[13] *Ibid*.

2. The National Challenges to Renewable Energy

Although the potentials of RE in promoting energy security in Nigerian and boasting the national economy is well acknowledged, there are several challenges which limit the development of RE in Nigeria. These challenges include intermittency, high investment cost, grid access difficulty and lack of technological know-how.

2.1 Intermittency of Renewable Energy

Intermittency refers to variations in RE output. This variation is caused by changes in wind speed, solar irradiance and fluctuating tidal levels which ultimately result in fluctuations in the power output of RE. The intermittent nature of RE result in variable power generation and hinders their large scale integration in the power system. By the intermittent nature of RE, matching their input to energy demand which is necessarily for grid stability is very difficult when compared to fossil fuel powered plants. Unlike like fossil fuel, wind, solar and tidal levels are beyond human determination. Prediction is often inaccurate also. Hydropower may also be affected by either flooding or draught while crops used in production of biomass may also suffer failure.[14]

From the above, the output capacity of RE suffers from inconsistency. This further increases cost of integration into the energy mix. The difficulty of matching RE supply with demand is more complex in electricity network and transmission systems. Even in circumstances where demand is fairly constant, supply of RE has the nature of sudden fluctuations. This problem does not arise with fossil fuel generating plants that can be easily scheduled for production and output effectively controlled. Thus, integration of fossil fuel sources of challenging is less challenging. In addition, back up plants are easy to establish and maintain for fossil fuel power plants unlike RE plants.[15]

The consequence is that integration of RE into the national energy mix comes with additional cost implications and technical requirements. Based

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[14] S Asiaban and Others, 'Wind and Solar Intermittency and the Associated Integration Challenges: A Comprehensive Review Including the Status in the Belgian Power System' [2021] (14) *Energies* 2630.

[15] D Timmons and Others, *The Economics of Renewable Energy* (Global Development And Environment Institute 2014) 20.

on this additional cost, transmission and distribution system operators are not favourably disposed to RE in the system.[16] Intermittency puts the entire electricity network at risk due to sudden fluctuations in load base. This way, security of the system may be put at risk.[17] Intermittency makes integration of RE into the energy very costly. In addition, measures and technologies are required to guarantee the security of the system against sudden changes in load base due to intermittency.[18] For example, the intermittency from solar energy increases the variance of the energy supply. This increased variance in turn adds risk to the electricity system because the inability to provide adequate supply to meet demand can result in a system outage where a large number of customers do not receive power with large welfare losses. The intermittency of renewable energy is seen as among the biggest hurdles to the large scale adoption of RE in the energy portfolio. In the short run, operators may need to schedule additional reserve generation to avoid a system outage. In the long run, they may need to invest in backup fossil fuel generation capacity to be used at times when demand is high but solar output is low. In practice, generators employ operating reserves or backup capacity arrangements.[19]

Another important alternative is the investment in energy storage technologies which allow excess RE during peak generating hours to be stored to use to counter balance a drop in the load base during low generation periods.[20] All of the above impose additional cost burdens for system stability.[21] It is therefore argued that if the planner did not change decision- making policies for operating reserves, demand curtailment, and backup investment when large-scale RE is adopted then the associated cost of RE in the energy portfolio would be almost 10 times as high as

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[16] P Denholm and R Margolis, 'Evaluating the Limits of Solar Photovoltaics (PV) in Traditional Electric Power Systems' [2007] (35) *Energy Policy* 2852.

[17] D Fay and J Ringwood, 'On the Influence of Weather Forecast Error in Short-term Load Forecasting Models' [2010] (25) *IEEE Transactions on Power Systems* 84.

[18] P Joskow, 'Comparing the Costs of Intermittent and Dispatchable Electricity Generating Technologies' [2011] (100)(3) *American Economic Review: Papers and Proceedings* 241.

[19] R Glennon and A M Reeves, 'Solar Energy's Cloudy Future' [2010] (1)(1) *Arizona Journal of Environmental Law & Policy* 91, 137.

[20] H Zsiborács and Others, 'Intermittent Renewable Energy Sources: The Role of Energy Storage in the European Power System of 2040' [2019] (8) *Electronics* 729.

[21] G Gowrisankaran, S S Reynolds and M Samano, *Intermittency and the Value of Renewable Energy* (NBER Working Paper No. 17086 2011) 2.

under our optimizing approach, mostly due to high system outage probabilities.[22]

2.2 Investment Cost

Another challenge to RE development is the high investment costs required. In all indices of cost calculation, RE is far more expensive compared to traditional fossil fuel plants. First is the high initial cost of design, development and installation of RE generating plant especially at commercial level when compared with fossil fuel powered plant of equal generating capacity. This is a huge challenge which discourages the development of RE.[23]

Due to this, the average cost per KW of electricity generated by the plant becomes equally expensive. Cost recovery through electricity tariff also becomes therefore difficult.

Practically, RE is at a cost disadvantage and this provides economic incentives for investors to be more favourable disposed to fossil fuel power plants. In practical terms, average electricity tariff in Nigeria is put at about #6.75 per KW-h. Average cost of typical sources of renewable power for mini hydro power plant, biomass power, wind power and solar plants are above the average tariff recoverable. Accordingly RE will require fiscal incentives in order to be a profitable business. Such incentives imposes increased marginal cost on the national economy and thereby discourages governments from comprehensive transition to RE. Fossil fuel powered plants accordingly remains more economically attractive.[24] Moreover, in comparison, the initial capital cost of wind, photovoltaic, and hydropower often comprise nearly 90 percent of total project costs. In contrast, the initial investment of gas projects represent only one-third of the total discounted lifetime costs.[25]

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22 *Ibid*.

23 E Omorogiuwa and E E Adesaanu, 'Challenges and Way Forward of Renewables in Developing Energy Economy: Today and Tomorrow' [2020] (7)(4) *International Journal of Recent Engineering Science* 14, 16.

24 Renewable Electricity Policy Guidelines 2006 para 1.4(b).

25 D Nelson and G Shrimali, *Finance Mechanisms for Lowering the Cost of Renewable Energy in Rapidly Developing Countries A CPI* (Climate Policy Initiative 2013) 1.

Another factor in cost computation which makes RE expensive is the short lifespan of RE power generating systems. Unlike fossil fuel, most RE investments have an average life span of 20 years. This way, the marginal cost per unit electricity generated over the short lifespan of the RE facility becomes too huge. Relatedly, cost recovery through electricity tariffs becomes also difficult. On the hand, fossil fuel powered plants such as gas turbines have a life span of over 50 years. When cost is spread across its lifespan, it becomes very cheap. In addition, the cost of decommissioning RE facility is equally expensive.[26]

Moreover, accidents associated with RE such as nuclear reactors can have extensive adverse impacts. Example is the Fukushima accident. Scientists insists that no nuclear technology can be completely safe, and many of the more efficient nuclear power systems require isolating plutonium, an extremely toxic material that can also be used in production of weapons of mass destruction such as thermonuclear war heads.[27]

The investment costs of RE is further compounded by its unsuitability for bank loans. Banks are more favourably disposed to financing projects that are short term. This is because banks rely on deposits by its customers which are usually for short term. Consequently, where banks finance long term investments such as RE development, there will be a mismatch in maturity of the loan vis-à-vis the demands of depositors for their deposits. Moreover, RE due to its cost as already discussed is not profitably attractive. Consequently, financing through bank loans is very difficult.[28]

2.3 Grid Access and Grid Security

The ability of RE generators to access the grid in order to sell their electricity is another major problem. One of the reasons is that integration of RE poses a risk to the security of the grid. The Nigerian national grid system poses serious challenge integration of RE. Currently, the national grid network of Nigeria is very weak. In fact it can only transmit a maximum

[26] P A Kharecha and J E. Hansen, 'Prevented Mortality and Greenhouse Gas emissions from Historical and Projected Nuclear Power' [2013] (47)(9) *Environmental Science & Technology* 4889.

[27] D Butler, 'Energy: Nuclear Power's New Dawn' [2004] (429) *Nature* 238.

[28] H Peimani, *Financial Barriers to Development of Renewable and Green Energy Projects in Asia* (ADBI Working Paper 862 2018) 6.

of half of existing generating capacity.[29] Put differently, the grid system is already overstretched. This has resulted in incidences of collapse of the grid. It therefore lacks the capacity to accommodate RE. Experts observe that the design of the grid and load make it vulnerable to outages. This is in addition to aging and lack of proper maintenance.[30] Other grid challenges include inadequate infrastructure, high losses along the lines and obsolete ancillary installations.[31]

The above make access to the grid for RE very difficult. Moreover, due to the intermittent nature of RE, their integration into the electricity grid is a challenge, since the existing grids and their capacities were established to accommodate less or non-variable energy sources, dispatchable power generation, and predictable load base.[32] Intermittency significantly affects the voltage, frequency and power quality of the electrical systems. This will make the grid more vulnerable to collapse and compromise the security of the grid.[33] This is because intermittency results in fluctuations of voltage and creates disequilibrium in the network system. For a national grid system like that of Nigeria which is not designed to accommodate such sharp voltage fluctuations, RE potentially puts the security of the grid system at risk.[34]

Furthermore, as already pointed out, the primary goal of the grid system operator is to reliably match the electric generation and demand at the lowest possible cost at all times. The intermittent nature of RE impacts on the grid system and depending on the flexibility and size of the grid, it may collapse the grid. The impacts of the varying output power of wind

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29 O Alao and K Awodele, *An Overview of the Nigerian Power Sector, the Challenges of its National Grid and Off-Grid Redevelopment as a Proposed Solution* (IEEE 2018) 179-180.

30 A S Sambo and Others, 'Electricity Generation and the Present Challenges in the Nigerian Power Sector' [2012] (6)(7) *Journal of Energy and Power Engineering* 1050.

31 A Aroge, *The Smart Grid and Renewable Energy Integration in Nigeria* (Global Energy Network Institute 2014) 11.

32 R A Rodríguez and Others, 'Transmission needs across a fully Renewable European Power System' [2014] (63) *Renewable Energy* 467.

33 D Suchet and Others, 'Defining and Quantifying Intermittency in the Power Sector' [2020] (13) *Energies* 3366.

34 D V Bozalakov and Others, 'Possible Power Quality Ancillary Services in Low- Voltage Grids Provided by the Three-Phase Damping Control Strategy' [2020] (10) *Applied Science* 7876.

and solar on the grid can be classified into two main groups – short-term, which includes balancing the power system at the operational time scale (minutes to hours), and long-term, which incorporates providing sufficient power during peak load situations.[35]

The short-term influence on the power system is the negative impact of RE on grid system reserves. Generation and demand need to be balanced at all instants. There is risk of power output exceeding the amount that can be absorbed and utilised safely by the grid system. The distance of the RE generating station to the grid system also increases connection cost and lose of electricity in the course of the long distance transmission.[36] In general, today's electricity grids are able to handle a low increase in load as a result of newly built-in RE capacities, but a massive load increase can cause discrepancies in the grid system. Flexibility of the grid system is very important for handing constraints caused by intermittent RE generation during the peak and low hours of generation. This comes at huge additional costs which grid operators are not willing to assume.[37]

2.4 Technological and Technical Know-how

The design, construction and operation of RE electricity systems involve cutting edge technological and technical know-how.[38] The integration of RE into the electricity grid involves complex technologies to counter intermittency for instance electricity storage technologies and mart grid systems which have the capacity to balance load with extensive flexibility in load variations.[39]

These technologies are not available in Nigeria and the cost of acquisition is exorbitant. Nigeria has no significant manufacturing capacity for components of renewable energy technologies. The existing capacity in solar PV and small hydro plants is limited. Significant supply chain

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[35] T Ackermann, (ed), *Wind Power in Power Systems* (Vol 140, Hoboken 2005) 1-13.
[36] *Ibid*.
[37] J Bertsch and Others, 'Flexibility in Europe's Power Sector – An additional Requirement or an automatic Complement?' [2016] (53) *Energy Economic* 118.
[38] R Zafar and Others, 'Prosumer based Energy Management and Sharing in Smart Grid' [2018] (82) *Renewable Sustainable Energy Review* 1675.
[39] Y Yang and Others, 'Battery Energy Storage System Size Determination in Renewable Energy Systems: A Review' [2018] (91) *Renewable Sustainable Energy Review* 109.

constraints include long project implementation periods, high import tariffs, bottle-necks in the customs clearing of goods and the issue of corruption. There are also logistical challenges in procuring equipment and maintenance support for renewable electricity projects.[40]

3. Possible Legal Interventions in Nigeria

In view of the discussed challenges to the development of RE, Nigeria has employed several mechanisms to promote the development of RE. The mechanisms are hereunder discussed.

3.1 Feed in Tariff Intervention

The National Electricity Regulatory Commission (NERC) is empowered to make regulations prescribing the method and manner of charging electricity tariffs in Nigeria.[41] In order to address some of the challenges associated with RE development, the NERC adopted a feed-in-tariff model (REFIT).[42] To assess the effectiveness of the REFIT framework, it is necessary to highlight its relevant objectives and balance it against its provisions. This is because effectiveness refers to the quality of a thing to deliver on its objectives. This way, effectiveness does not exist in a vacuum but must be understood in the context of specific objectives.[43]

Three objectives of the NERC Renewable Energy Feed-in-Tariff Regulation 2015 are particularly relevant to the REFIT scheme. They are as follows:

(a) Enhance the attainment of the national targets on renewable energy sourced electricity;

(b) Encourage greater private sector participation in power generation from renewable energy technologies, by providing investment security and market stability for investors; and

(c) Establish a guaranteed price for electricity generated from renewables for a fixed period that provides a stable income stream and an adequate return on investment.[44]

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40 (n 11).

41 Electricity Power Sector Reform Act 2005 s 9(2)(g).

42 NERC Renewable Energy Feed-in-Tariff Regulation 2015.

43 H Xanthaki, 'On Transferability of Legislative Solutions: The Functionality Test' in C O Stefanou and H Xanthaki (eds), *Drafting Legislation: A Modern Approach* (Ashgate 2008) 17.

44 (n 41) reg 3(b), (c) and (f).

It needs to be pointed out that REFIT applies only to renewable energy sourced electricity of capacity above lMW that is connected to the transmission grid or the distribution networks. The RE electricity generator must therefore be connected to the grid or distribution network before he can benefit from the REFIT. Regulation 5(a) of the NERC Renewable Energy Feed-in-Tariff Regulation 2015 mandates the Off-taker to connect to accredited plants generating electricity from eligible renewable energy sources, subject to the costs being met by the developer.[45] It clearly puts the cost of connection of the RE on the developer and the duty of the Off- taker to connect the RE developer only arises where the developer has assumed the costs of connection. This is because where a legal obligation is "subject" to any condition it does not arise until the condition has been satisfied.[46]

Regulation 5(e) provides more specifically that "the costs of connection, including the costs of construction, upgrading of transmission/distribution lines, substations, and associated equipment shall be borne by the developer." This imposes undue financial burden on the RE developer and limits his ability to access the grid. The imposition is unfair. First, the RE is not the owner of the electricity grid, transmission and distribution systems. Second, the cost of developing the RE system is already high for the developer. Requiring the RE developer to bear the burden of the cost of constructing and upgrading transmission systems including substations and ancillary installations is economically overreaching. When this cost is added to the initial cost of construction of the RE system and balanced against the short lifespan of the project, the RE development becomes unprofitable.

Furthermore, regulation 5(g) provides that the Distribution Licensees shall be obliged to provide access and connect licensed embedded renewable energy electricity generation plants accredited under the scheme to the distribution network in their areas of operation where technically and economically feasible. What this means is that if it is not technically or economically convenient to the electricity distributor, he has no binding obligation to connect RE generator to the distribution network. As already

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45 *Ibid*, reg 2 defines Off-taker as the Buyer of electrical energy for the purpose of selling the electricity to customers connected to the national grid or off-grid.

46 *Adesegun A v Biyi* (2016) All FWLR (Pt 851) 1328, 1354-1356.

pointed out, due to intermittency of RE which raises concerns over security of the grid system and increases cost of integration, both transmission and distribution network operators have no economic incentive to integrate RE. What the regulation has achieved is to provide legal justification for discrimination against RE generators in access to transmission and distribution networks.

Another worrisome concern is that under the Regulation, off- grid RE generators are not entitled to REFIT.[47] Thus, without accessing the grid, there is no tariff incentive for RE developers and to access the grid, the RE generators must bear all the costs including grid upgrade expenses. The Regulation therefore attempts to exploit the RE developers to finance grid upgrade and provision of other ancillary grid installations. Moreover, the burden of funding REFIT is to be borne by electricity consumers being members of the public. Increasing electricity tariffs for RE will encourage public opposition to RE development in favour of fossil fuel power generating plants which will guarantee them lower electricity tariffs. It is submitted therefore that the mechanism of REFIT does not provide adequate boost for the development of RE in Nigeria. It fails to cure any of the challenges faced by RE developers.

4. Funding Intervention

Considering the huge cost of RE development, adequate funding interventions will be crucial to promoting RE. The major legal intervention for funding RE development is the Renewable Energy Trust Fund which is a sub-fund under the Rural Electrification Fund.[48] The RETF seeks to provide support to the following:

(i) Construction of independent renewable electricity projects, especially in rural and remote areas;

(ii) Establishment of domestic production of technologies for the development and utilization of renewable electricity;

(iii) Provision of resources for micro financing to stand-alone systems under 20kW capacity;

(iv) Support to research and development and construction of pilot projects;

[47] (n 41) reg 6(b).

[48] Renewable Electricity Policy Guidelines 2006, para 6.0.

(v) Promote training and capacity building in renewable electricity technology and business development;

(vi) Encourage public awareness initiatives; and

(vii) Provision of surveys and assessments of renewable electricity resources and other relevant information.[49]

The sources of revenue for the Fund are:

(i) Monies appropriated by the National Assembly;

(ii) Revenue from surcharge on eligible consumer of electric power as may be determined by the NERC; and

(iii) Donations, gifts and loans from all eligible local and international sources.

The considered view of this paper is that the funding intervention is very weak. First, there is total absence of any binding funding obligation. The funding intervention is a mere policy of the government. Polices are cosmetic statements of good intentions and do not create any legal right or legal obligations- *Adewole v Jakande*.[50] In the case of Nigeria, Egonmwan,[51] submits that policy is "whatever government chooses to do or not to do". Moreover, the fact that government chooses to do a thing does not in fact mean that government will do it. On the contrary, Nigerian government has been noted for policy summersault, lack of policy implementation and lack policy continuity.[52] A policy approach to funding RE development is therefore very weak.

Furthermore, there is no stated financial commitment to the Renewable Energy Trust Fund. A minimum annual contribution by the government to the Trust would have provided strong index for monitoring, transparency and implementation. In addition, the source of funding the Trust is equally weak. First source is monies appropriated by the National Assembly.

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[49] *Ibid*, para 6.1.
[50] *Adewole v Jakande* (1981) 1 NCLR 152.
[51] J A Egonmwan, *Public Policy Analysis: Concepts and Applications* (S M O Aka & Brothers Press 1991) 1.
[52] A Ikelegbe, *Public Policy Analysis: Concepts, Issues and Case* (Imprint Services 2005) 2.

An executive Policy cannot mandate the National Assembly to appropriate monies for RE development. A more reasonably approach under the Nigerian law would have been a mandate on the Ministry of Power to include funding of RE development in its annual budget estimates to be submitted to the president. The second funding strategy is surcharging electricity consumers. As already pointed out, such approach increases public opposition to RE development. The last funding approach is reliance on donations. This is a fluid strategy to fund a sector as critical as RE. Donations are irregular, indeterminate and therefore cannot adequately fund capital intensive developments such as RE. The funding intervention is therefore not adequate for addressing the investment cost challenge to RE development in Nigeria.

5. Legal Intervention in Access to Land for RE Development

Access to land does not generally pose a challenge to exploration of fossil fuel such as crude oil and gas. This is because the entire ownership and control of petroleum is vested in the federal government.[53] In addition, the definition of land excludes minerals.[54] Accordingly, a petroleum prospecting or exploration licence for instance entitles the holder to enter upon land. This is however not the case for RE development. Where a generation licensee which includes a RE generation licensee, requires any land in connection with its obligations under its licence or a proposed licence, such licensee may apply to the NERC for a declaration that the land is required for purposes of generation of electricity.[55]

The NERC after holding enquiries as it deems fit including granting to any person having an interest in the land under consideration an adequate opportunity to make representations against such declaration, may declare that the land identified by the licensee, with such modifications to its boundaries as the NERC may specify, is required for the purpose of generation of electricity.[56] Following a declaration by the NERC, the President, shall issue a notice in the Gazette to the effect that the land is required by the Government of the Federation for the public purposes of the Federation.[57]

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53 Petroleum Industry Act 2021 s 1.
54 Interpretation Act 1964 s 18.
55 (n 40) s 77(1).
56 (n 40) s 77(3)-(4).
57 *Ibid*, s 77(6).

Where the President issues a notice, the Governor shall, in accordance with the provisions of section 28 (4) of the Land Use Act, revoke the existing right of occupancy respecting the land and grant of certificate of occupancy in favour of the concerned licensee in respect of the land identified and the grant of such certificate, the right of occupancy over the land shall vest in such licensee to the exclusion of the previous holder of the right of occupancy respecting the land, who shall be entitled to claim compensation in accordance with the provisions of the Land Use Act.[58]

The provision effectively addresses the issue of access to land for Re development. The requirement of land for RE development is a public purpose. The developer is saved the burden of having to privately source for land for development of RE. In addition, he is merely required to pay compensation, not to negotiate or bargain cost of the land. Once NERC declares the land as acquired for generation, the president is mandated to issue a notice accordingly in the Gazette. Upon the issuance of the notice, the governor is mandated to revoke any existing right of occupancy over the land and grant same to the electricity generator.

The operative word in both cases is "shall". In *Sogbesan v Chief of Naval Staff*,[59] the Court held that the use of the word "shall" in a Statute or Rules expresses command and makes it mandatory that the provision must be obeyed unless there is a qualification to it. In *Salik v Idris,*[60] it was held thus:

> The word "shall" denotes obligation or a command and gives no room for discretion. By its nature, it is mandatory and one cannot wriggle out same. It imposes a duty. Where a thing shall be done, it goes without equivocation that a pre- emptory mandate is enjoined.

It is submitted that the law makes adequate provision for ensuring accelerated to land for RE electricity development.

6. Legal Intervention of Research and Development

In order to fill the technological and technical gap in RE development, the importance of research cannot be overemphasised. The Energy

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[58] *Ibid*, s 77(9).
[59] *Sogbesan v Chief of Naval Staff* (2015) All FWLR (Pt 803) 1918.
[60] *Salik v Idris* (2015) All FWLR (Pt 790) 1307, 1318.

Commission of Nigeria has several functions which include serving as a centre for solving any inter-related technical problems that may arise in the implementation of any policy relating to the field of energy.[61]

Accordingly, the Commission has a department for training and manpower development.[62] The importance of research is captured thus:

> The crucial dependence of the sustainable socio-economic advancement of any nation on research, development and training activities is now universally acknowledged. This dependence is applicable also to the development of vital sectors of the national economy, including the renewable energy and energy efficiency sub-sector. For this sector therefore, it is important that research, development and training are given adequate attention with regards to key issues such as energy resources development and utilization.[63]

Accordingly, in order to promote RE development, Nigeria aims to initiate and promote renewable energy and energy efficiency related research and development programs and promote participation in research and development by Nigerians in all areas of energy exploration, development and utilization.[64]

Despite the above aims, Nigeria has failed to establish and equip any research centre for RE technology or any RE training centre for manpower development. Existing legal framework which is a mere broad statement of good intentions is therefore inadequate to deliver the research needs of Nigeria in RE development to cure the challenges of lack of technological know-how.

7. Conclusion

The legal interventions to addressing the challenges of RE development in Nigeria are grossly inadequate to engineer large scale development of RE. Funding mechanism to counteract the high cost of RE is very weak. This is further acerbated by the legal burden on the RE developer to bear the cost of grid access including grid upgrade. In addition, there is no effective framework to advance research and development to make-up

[61] Energy Commission of Nigeria Act 1979 (as amended) s 5(b).
[62] *Ibid*, s 1(2)(c).
[63] National Renewable Energy and Energy Efficiency Policy 2015 para 4.1.
[64] *Ibid*, para 4.1.1.

for the lack of technological and technical know-how. Commitment to RE development is therefore largely a cosmetic statement of good intentions. This is inadequate to promote effective energy transition to a low or zero carbon RE. This explains the poor level of RE development in Nigeria especially at a large commercial scale.

8. Recommendations

In order to address the challenges to RE development, it is recommended that the National Assembly should enact a Renewable Energy Development Act (REA) which will address the following particular issues:

(a) The REA should mandate the NERC to upgrade existing grid system to allow for easy integration of RE. The REA should establish a Renewable Energy Fund which should be financed by between 2-5% of petroleum tax. The Fund should provide long term loan for RE developers at low interest rates. This will address the challenge of high cost of RE development.

(b) It is further recommended that under the REA, cost of integration of RE generators into the grid should be borne by the NERC through the Renewable Energy Fund and not the RE developer. In addition, the REA should establish an Institute of Research and Development of Renewable Energy. This institute will be responsible for bridging the technological gap and developing manpower.