



Regulating Energy Transition in Nigeria: Articulating A Development Policy Approach

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Fellowship Programme



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1.0 Introduction

Energy transition refers to the shift from fossil fuel-based systems of energy production and consumption, which for decades had been dominated by hydrocarbon, natural gas, and coal, to non-fossil fuel or renewable energy sources such as wind, solar, and hydrogen.¹

Energy transition has been described as an attempt to facilitate a major structural shift in the global energy systems. The shift to sustainable energy is an effective process for dealing with the climate crisis, which demands urgent and radical measures to avoid/reduce carbon emissions or the release greenhouse gas (GHG) into the atmosphere. While science and international politics seem substantially aligned on the scale of the crisis and its risks to humanity, different approaches have been canvassed to respond.

Similarly, there is a difference of views on the effects of the proposed strategies on the national development priorities of developing countries, particularly African nations, and the extent of Africa's involvement in GHG emissions reduction obligations. Policymakers in Nigeria and other African countries are concerned that the net-zero emissions target by 2050 may not be attractive because of Africa's peculiar challenges.² If Africa is made to follow the net-zero emissions development

pathway as its strategy for combating the climate change crisis strictly, the concern is that the pace of Africa's industrial development may be undermined to the detriment of the continent.

The energy industry is considered the primary source of GHG emissions globally hence the call for a transition from fossil fuels to cleaner sources of energy to address the climate change crisis.³ In the case of Nigeria, the energy industry is a major revenue source but is said to contribute about 65 percent of greenhouse gas (GHG) emissions. Whilst climate change is a global problem, the developing countries need for economic development and the fact that Africa's contribution to GHG emissions is still less than 3.8 percent have led to the call for a low-carbon development pathway instead of the net-zero emission by 2050 proposed by most of the developed countries.⁴

This perspective leads to the just energy transition debate. Therefore, this research, inter alia, identifies the many challenges that Nigeria, being a developing country with several social and economic problems, will be confronted with as the country seeks to join the rest of the world to make the transition from a fossil fuel-dependent economy to one anchored by clean energy sources.

¹International Energy Agency, 'Net Zero by 2050: A Roadmap for the Global Energy Sector', available at: <https://iea.blob.core.windows.net/assets/deebef5d-0c34-4539-9d0c-10b13d840027/NetZeroBy2050-ARoadmapfortheGlobalEnergySector_CORR.pdf> Accessed January 28, 2022.

²African Development Bank Group, 'Africa in Search of a just energy transition', available at: <<https://www.afdb.org/en/news-and-events/africa-search-just-energy-transition-47252>> accessed January 28, 2022.

³The United Nations, 'Theme Report on Energy Transition: Towards the Achievement of SDG 7 and Net-zero Emissions', available at: <https://www.un.org/sites/un2.un.org/files/2021-twg_2-062321.pdf> accessed January 28, 2022.

⁴African Development Bank Group, 'Africa in Search of a just energy transition', supra, No. 2

1.1 Research Gap and Research Objective

The concept of just energy transition has not been sufficiently interrogated, nor has the potential implications of a net-zero emission by 2050, as largely being canvassed by the developed countries, been adequately explored. Likewise, as contemplated or contained in the National Energy Policy (NEP), the low-carbon development pathway is yet to sufficiently be explored as a rational policy choice consistent with the country's commitment to environmentally responsible resource utilisation for national development goals.

Among other things, this research seeks to consider the potential policy options for Nigeria towards meeting its energy needs

and achieving national development goals. The research will examine the extent and the impact of Nigeria's emission reduction obligations on the energy industry, given it's a major contributor to Nigeria's economic development objectives. Furthermore, this research will consider the policy goal to deepen or expand access to reliable, affordable, and modern energy. Such an inquiry will provide credible research data to policymakers in formulating an evidence-based energy transition policy that will align with national socio-economic development goals and contribute to the global GHGs emission mitigation effort. It also seeks to analyse fiscal policies' role in actualising just and sustainable energy transitions.

1.2 Research Design and Method

Thus, this paper aims to:

- a. Explore the concept of just energy transition from a developing country's perspective;
- b. Examine the implications of the energy transition and the call to achieve net-zero emissions by 2050 for Nigeria's socio-economic development and industrialization goals; and
- c. Propose measures that may be considered by policymakers in designing Nigeria's energy transition policy that will be able to address the problem of poor energy access and supply security aspirations of Nigeria while contributing to the global effort against climate change.⁵ It also analyses the contributions of fiscal policies toward just and sustainable energy transitions.

1.3 Research Aims

The study uses exploratory and descriptive research to examine the concept of just energy transition within Nigeria's energy policy objectives of deepening access to affordable, reliable, and modern energy for domestic consumption and national economic development. It explores the existing literature on just and sustainable energy transitions,

the adoption of renewable energy, and the conversations on the role of fiscal policies in achieving energy transition. Given that this is a relatively new area of discourse, especially as it pertains to Nigeria, comparative analyses of events and considerations in other developed and developing countries will be of great relevance to the paper.

⁵The United Nations, 'Theme Report on Energy Access: Towards the achievement of SDG 7 and Net Zero Emissions available at: < https://www.un.org/sites/un2.un.org/files/2021-twg_1-061921.pdf> accessed January 28, 2022.



2.0 Literature Review

The concept of just energy transition has not been sufficiently interrogated, nor has the potential implications of a net-zero emission by 2050, as largely being canvassed by the developed countries, been adequately explored. Likewise, as contemplated or contained in the National Energy Policy (NEP), the low-carbon development pathway is yet to sufficiently be explored as a rational policy choice consistent with the country's commitment to environmentally responsible resource utilisation for national development goals.

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Nigeria's energy policy instrument is contained in two principal documents, the National Energy Policy (NEP) and the National Energy

Master Plan (NEMP).⁷ One of the NEP's policy objectives is to "guarantee an adequate, reliable and sustainable supply of energy at appropriate costs and in an environmentally friendly manner, to the various sectors of the economy, for national development." This provision highlights the essential elements of Nigeria's priorities. This means that Nigeria's national priorities are to ensure the security of the supply of affordable energy resources required for social, economic, and industrial advancement.⁸ Also, the NEP refers to environmental responsibility in producing and consuming energy resources. The reference to environmental responsibility acknowledges the current climate crisis and the need to pursue the goal of national, social and economic development in an environmentally safe way. In other words, the national policy direction envisages the prudent and responsible exploitation and utilisation of all the energy sources available to reduce energy poverty, ensure access to reliable, affordable, modern energy to every citizen, leveraging the blends of energy sources to achieve a low-carbon development pathway in keeping with the country's climate change/energy transition responsibilities. Similarly, the NEMP recognises the requirements of the global climate crisis and the country's role in reducing the world's carbon emission level in line with international agreements.⁹

⁶Barry D. Solomon, and Karthik Krishna 2011 The coming sustainable energy transition: History, strategies, and outlook, *Energy Policy*, Volume 39, Issue 11, 2011, Pages 7422-7431, ISSN 0301-4215, <https://doi.org/10.1016/j.enpol.2011.09.009>.

⁷The Energy Commission of Nigeria, 'National Energy Masterplan', available at: <https://rise.esmap.org/data/files/library/nigeria/Clean%20Cooking/Supporting%20Documentation/Nigeria_National%20Energy%20Master%20Plan%20Draft.pdf> accessed January 25, 2022.

⁸Energy Commission of Nigeria, 'National Energy Policy', available at: <http://rea.gov.ng/wp-content/uploads/2017/09/National_Energy_Policy_Nigeria.pdf> accessed January 27, 2022.

⁹Ibid

2.1 Just Energy Transition

According to the World Economic Forum, a just transition is a transition away from fossil fuel-based energy resources to cleaner renewable sources implemented in a way that addresses not only environmental sustainability but also provides decent work, enhances social cohesion, and helps to eradicate poverty.¹⁰ This notion of just energy transition focuses on sectoral equity. Sectoral equity in energy transition refers to the fair distribution of costs and benefits of transitioning to a low-carbon economy among different sectors of society, including marginalized communities, to prevent further social inequality.¹¹

Policymakers should ensure that internal disruptions caused by the shift away from traditional energy sources should be implemented to minimize job losses, social and economic dislocation, and the exacerbation of poverty.

That is, policymakers should prioritize policies and incentives that support economies, workforces, and the wider society as countries shift to low-carbon energy systems. Transitioning towards a more equitable and sustainable energy system encourages countries to consider fiscal transfers, expanded welfare, and social protection measures. Also, it covers workforce-related schemes such as reskilling and training to support affected sectors, communities, or groups.

However, this notion of just transition did not address the intergenerational equity concerns of developing countries in Africa that suffer the adverse consequences of climate change caused by the development choices of the developed economies whose industrialization approaches have contributed significantly to the concentration of greenhouse gases (GHG) and anthropogenic substances in the atmosphere. This second idea of just transition questions the equitability of low-carbon energy measures imposed on African countries needing economic development by the international legal framework for GHG emissions reduction. In other words, just energy transition in the second sense argues that it may be inequitable for the question of socio-economic development by developing African countries to be constrained by the requirements of low-carbon energy systems.

Nevertheless, this does not necessarily mean that African countries should insist on following the unsustainable and environmentally damaging path taken by the developed economies. This argument is potent in examining and assessing the suitability and effectiveness of support mechanisms in the international legal framework for poor, developing, and technologically less advanced countries toward achieving low-carbon economic transformation.

¹⁰World Economic Forum, 'Fostering Effective Energy Transition- 2021 Report', available at: <https://www3.weforum.org/docs/WEF_Fostering_Effective_Energy_Transition_2021.pdf> accessed June 28, 2022.

¹¹Becker, S., & Naumann, M. (2019). Energy democracy: Mapping the debate on energy alternatives. *Energy Research & Social Science*, 48, 77-87. <https://doi.org/10.1016/j.erss.2018.09.017>



3.0 Facts and Overview of Energy Structure

3.1 Brief Overview of Energy Mix in Africa

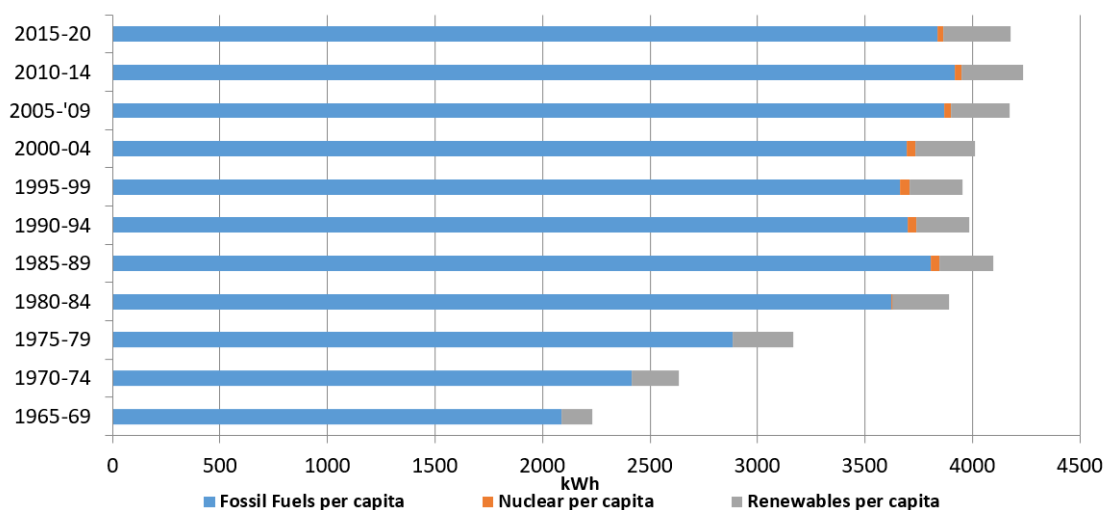
The proportion of primary energy types or sources to meet the energy requirement or need in a given geographical location differs from country to country or region to region. Generally, it includes fossil fuels (oil, natural gas, and coal), nuclear energy, and many sources of renewable energy (bio-energies, hydro, wind, solar and geothermal).

Since the industrial revolution, fossil fuels have majorly driven global economic development. In 2018, the collective contribution of coal, oil, and gas to the global energy composition stood at approximately 85 percent. Meanwhile, hydroelectric power comprised 6.8 percent, and nuclear energy accounted for 4.4 percent. It is important to note that nuclear energy was not introduced until the 1960s. In contrast, other renewable sources like solar and wind power were introduced in the 1980s, collectively constituting around 4 percent of the global energy mix.¹² The burning of fossil

fuels, gas, oil, and coal is responsible for around three-quarters of global greenhouse gas emissions, also a major contributor to pollution. Transitioning from Fossil fuels is key to achieving a sustainable and equitable energy structure.

According to the BP Statistical Review of World Energy, fossil fuel has also been the major energy source in Africa, accounting for about 93 percent, while renewable accounts for only 7 percent. However, nuclear energy wasn't introduced until the mid-1980s, but even till date, it accounts for less than 1 percent. Furthermore, Figure 1 shows that Africa's per capita energy consumption has consistently risen. The growth rate of energy consumption per person was higher in the 1960s to mid-80s at about 20 percent. Subsequently, it declined to about 5 percent. More recently, it stands at 4200kWh per capita.

Figure 1: Africa energy mix (per capita energy consumption)



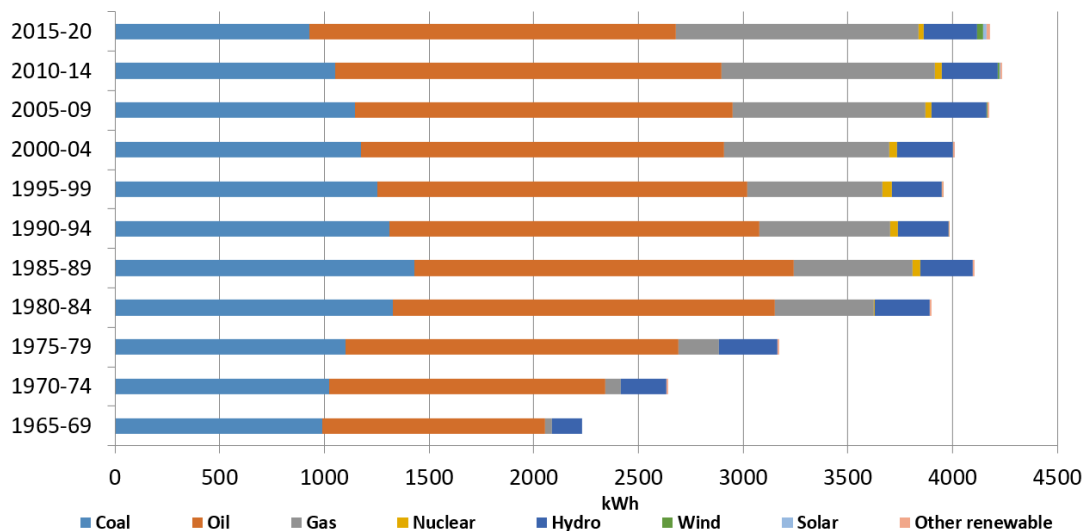
Source: Our World in Data based on BP Statistical Review of World Energy

¹²Hannah Ritchie, Max Roser, and Pablo Rosado, (2020) 'Energy', available at: OurWorldInData.org. Retrieved from: <https://ourworldindata.org/energy'> Accessed on may 15, 2023

As of 2020, more than 40 percent of Africa's fossil fuel energy mix is from oil. Figure 2 reveals a marginal decline from about 50 percent in 1960-the 80s, followed by coal and gas. With coal, usage significantly declined from 45 percent in the mid-60s to 20 percent in 2020. On the other hand, gas experienced a quantifiable increase

from about 1 percent in the mid-60s to around 30 percent in 2020. Together, these three (3) sources currently account for over 90 percent of the fossil fuel mix in Africa. It is important to note that hydro accounts for about 6 percent all through these periods.

Figure 2: Africa fossil energy mix (Per capita primary energy consumption by source)



Source: Our World in Data based on BP Statistical Review of World Energy

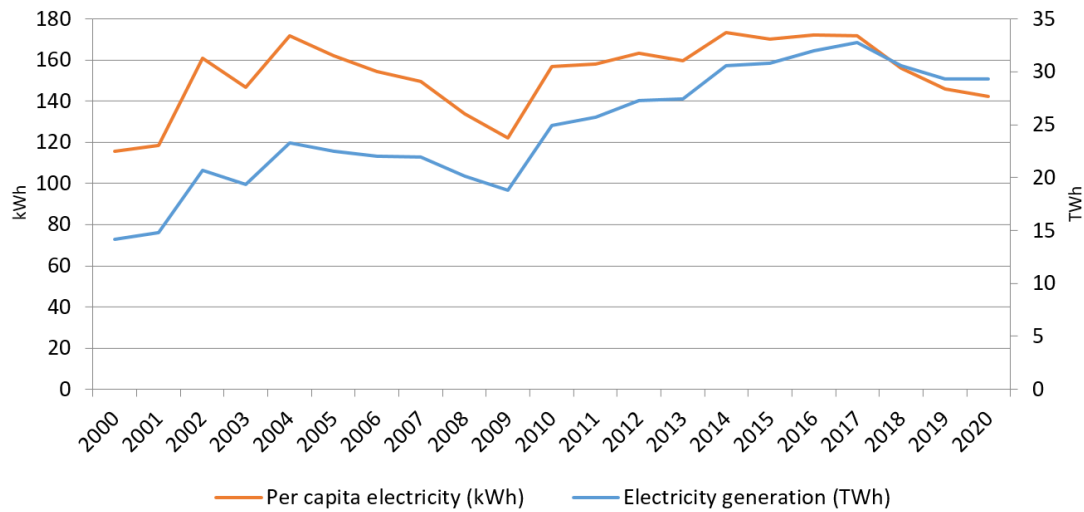
3.1.1 Nigeria's Energy Mix

A critical look into Nigeria's energy mix shows that the country's position is not so different from the energy position and mix in Africa. The source of the energy supply and consumption is increasingly becoming vital as most economies are in the process of moving away from the use of fossil energy to low-carbon energy, given that fossil fuel-based energy is unsustainable, causes pollution, which affects human health, contributes to rising temperature, and is also economically inefficient as it is subject to economic volatility and fluctuation in the oil market.

The energy generation in Nigeria, presented in Figure 3, reveals the total and per capita electricity generated. The total electricity generated, according to the BP Statistical Review of World Energy, improved slightly over the period, with a major dip in 2009, which was caused by various factors, including the drop in water levels of the country's hydroelectric dams, inadequate maintenance of power infrastructure, shortage of natural gas, and transmission constraints.¹³ After that, it maintained an upward trend and peaked in 2017 at 32.79 TWh. Following 2017, the TWh in Nigeria has been on the decline.

¹³Adaramola, M. S., Paul, S. S., & Oyewola, O. M. (2011). An overview of the Nigerian power sector. *Renewable and Sustainable Energy Reviews*, 15(9), 4705-4716. <https://doi.org/10.1016/j.rser.2011.07.045>
Energy Mix Report. (2009, December 3). Nigeria: Causes of 2009 power crisis. <https://energymixreport.com/nigeria-causes-of-2009-power-crisis/>

Figure 3: Energy generation in Nigeria

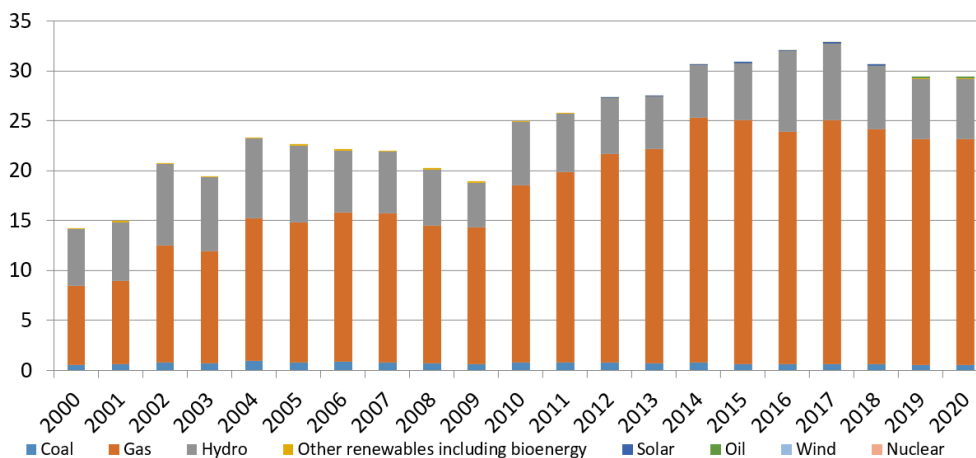


Source: Our World in Data based on BP Statistical Review of World Energy

A disaggregated insight into the energy generated in Nigeria reveals that as of 2020, 77 percent of power generation in Nigeria comes from gas and 20 percent from hydro, while most of the remainder comes from coal, as seen in Figures 4 and 5 below. However, in the early 2000s, only about 55 percent was from fossil fuel and gas, the proportion of which increased to 77 percent as of 2020. Hydro energy has been Nigeria's

second contributor to energy generation, accounting for 40 percent in 2000. It has since then experienced a steady decline to 17.4 percent in 2017. This decline has been due to several factors, including drought, poor dam infrastructure maintenance, inadequate water management, and climate change.¹⁴ However, the hydropower contribution has since 2017 maintained a steady fluctuation, at about 21 percent in 2020.

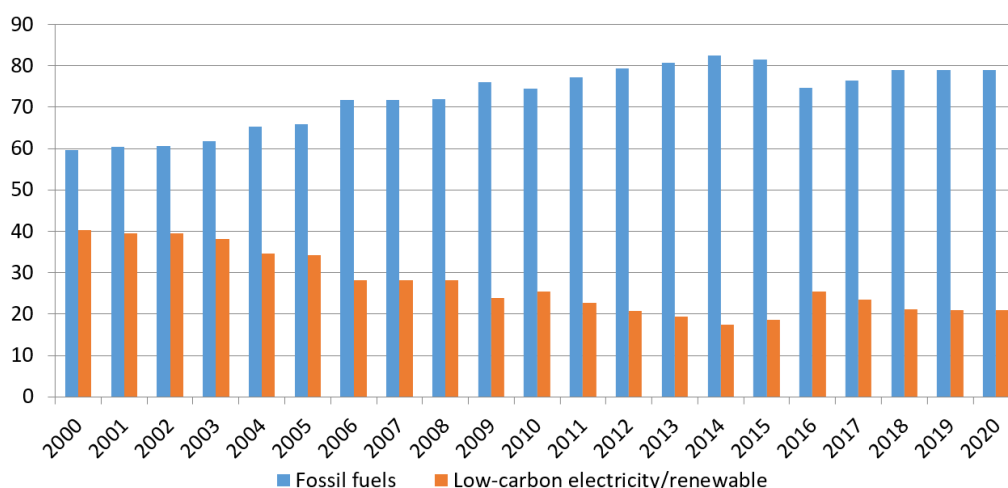
Figure 4: Energy sources in Nigeria (TWh)



Source: Our World in Data based on BP Statistical Review of World Energy

¹⁴Adaramola, M. S., Paul, S. S., & Oyewola, O. M. (2011). An overview of the Nigerian power sector. *Renewable and Sustainable Energy Reviews*, 15(9), 4705-4716. <https://doi.org/10.1016/j.rser.2011.07.045>

Figure 5: Energy share of renewable and non-renewable (percent)



Source: Our World in Data based on BP Statistical Review of World Energy

The above analysis of the energy mix reveals the crucial need for an energy transition that considers the environmental and social impacts of our current energy demand, consumption and supply patterns and seeks to shift towards more sustainable and equitable forms of energy production and consumption. To reduce exposure to local air pollution and CO₂ emissions, there must be a deliberate effort to transition towards low-carbon sources. Hydropower, a low-carbon renewable energy source, is a substantial energy source in Nigeria. However, there are cheaper and more efficient renewable energy sources, such as Solar, which the country is currently pursuing.

The general acceptance of the need to reduce CO₂ emission from energy-related sources and the uptake of energy transitioning policies and roadmap as agreed under the

Paris Climate Agreement is modelled to move the energy sector from fossil fuel to a cleaner and zero-carbon energy by 2050. While there is a general need for a speedy and assertive transition approach, developing nations, particularly economies highly dependent on fossil fuels such as Nigeria, should adopt a more flexible and cautious transition scheme.

To foster sustainable growth and development amid high energy poverty in Nigeria, there is a need to pursue transitioning from fossil fuel energy sources to low carbon / renewable energy. According to Ashurst and Redcliff Energy,¹⁵ Nigeria is progressively investing in renewable sources, mainly solar, while still using fossil fuels (natural gas). Likewise, it is crucial to prioritize investment in low-carbon energy while gradually divesting from funding hydrocarbon projects.

¹⁵Ashurst and Redcliff Energy (2022), Nigeria's Energy Transition Redcliff energy, available at: <<https://redcliffenergy.com/wp-content/uploads/2022/03/Nigerias-Energy-Transition.pdf>>, accessed March 28, 2022.

3.2 Overview of Energy Transition Policy

Energy transition is a significant part of the global efforts to reduce the level of the emission of GHGs into the atmosphere and the attempt to reverse the harmful impacts of climate change.¹⁶ The need to address climate change is the main trigger for the push to transition from traditional energy sources to cleaner energy alternatives. Energy transition seeks to transform the energy sector by substituting or replacing the existing fossil fuels dominated sources with cleaner renewable energy sources such as solar, wind, nuclear, and thermal.¹⁷ Also, it highlights the need for innovative approaches to meeting the world's energy needs and sustained investment in technologies that enhance or stimulate renewable energy adoption and adaptation and promote efficient energy use.

According to a 2021 United Nations report, the energy sector is critical to climate change reversal or remediation action because fossil

fuel energy sources are currently the main emitters, with about 65 percent of greenhouse gases in the atmosphere, hence the need to transit to cleaner, efficient and less harmful sources.¹⁸ Energy transition offers opportunities to address the problem of climate change by drastically avoiding and reducing the emission of greenhouse gases into the atmosphere through sectional, national, and multilateral undertakings to cut emissions and take steps to mitigate the adverse impacts of climate change.¹⁹

Furthermore, Energy transition offers opportunities for lasting economic development, social inclusion, energy security, improved health, job creation, and other societal benefits if carefully planned and cautiously implemented.²⁰ More so, it suffices to say that such opportunities will be achieved only if the transition is implemented just and inclusive.



¹⁶Frans Berkhout, Peter Marcotullio, and Tatsuya Hanaoka, 'Understanding energy transitions' *Sustain Sci* (2012) 7:109–111.

¹⁷Shell Plc (2020) 'Shell Sustainability Report 2020' available at: <<https://reports.shell.com/sustainability-report/2020/servicepages/downloads/files/achieving-net-zero-emissions-shell-sr20.pdf>> accessed June 28, 2022.

¹⁸United Nations, 'Theme Report On Energy Transition: Towards The Achievement of SDG 7 And Net-zero Emissions', available at: <https://www.un.org/sites/un2.un.org/files/2021-twg_2-062321.pdf> accessed June 25, 2022

¹⁹*ibid.*

²⁰World Economic Forum, 'Fostering Effective Energy Transition- 2021 Report', *supra*, at no.8.

3.2.1 Global CO₂ Emissions

Just transition means or suggests that the shift away from fossil fuels and other kinds of energy production and consumption which contribute to the environmentally unsustainable emissions of GHG into the atmosphere should be carried out to address environmental sustainability concerns.

It is quite essential to note that GHG emissions are not the same as CO₂; the former encompasses the latter and comprises other gases (besides CO₂) such as methane, hydrogen sulphide, chlorofluorocarbon, water vapour, Ozone, and Nitrous Oxide. The latter has been adopted to define GHG emissions due to its ubiquity and unique global warming potential (GWP).

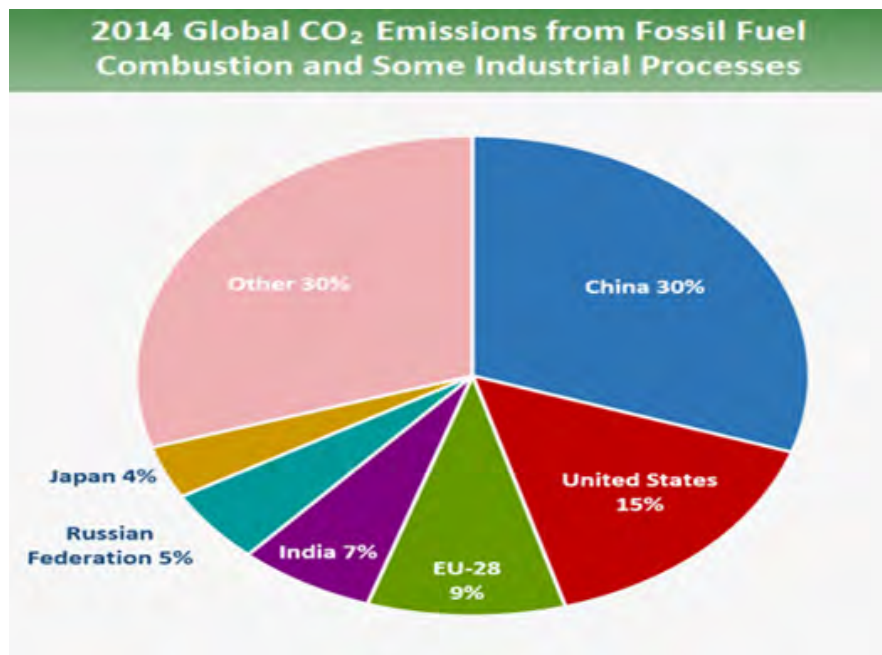
Moreso, the processes adopted should ensure the provision of decent work, advance social inclusivity, and reduce the challenges of poverty. In other words, countries are allowed to regulate or manage the pace of their transition to avoid the collapse of internal social and economic systems. This is the first limb of the just transition argument. The second limb looks

at national CO₂ emissions by different countries and their contributions to global warming and then determines the respective obligations to reducing GHG through the energy transition. Therefore, it is fair and equitable that countries that contributed minimally to climate change should not unnecessarily prejudice their growth and development paradigms.

Thus, reviewing current data on CO₂ emissions by countries and examining GHG reduction responsibility mechanisms under the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement is essential. These will provide valuable lessons to guide the energy transition policy framework for Nigeria and other developing African countries. According to the US EPA, since 1970, CO₂ emissions have increased significantly, with emissions from fossil fuel combustion and industrial processes contributing about 78 percent of the total GHG emissions. Similarly, the data suggests that agriculture, deforestation, and other land-use changes constitute the second-largest contributor.



Figure 6: CO₂ Emission Data 2014



Source: US Environmental Protection Agency 2022

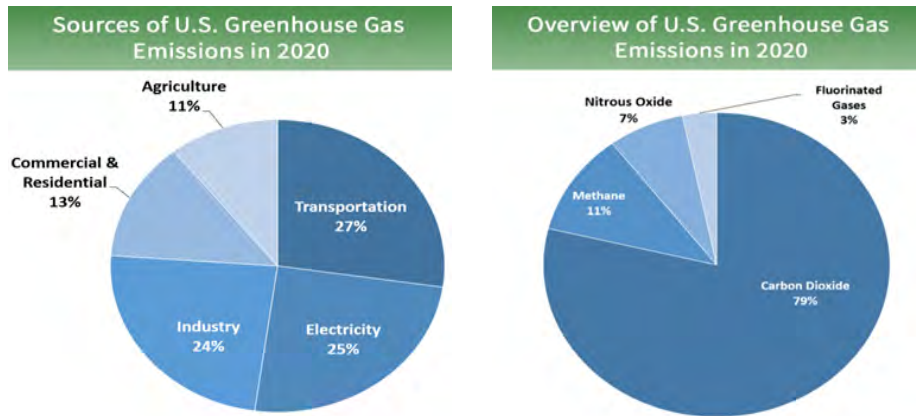
3.2.2 CO₂ Emissions Data

Current data shows that the top CO₂ emitters are China, the United States, the European Union, the Russian Federation, India, and Japan (US Environmental Protection Agency 2022). The source of GHG emissions from these countries are mainly fossil fuel combustion, cement manufacturing, and gas flaring, and together, these sources constitute the largest proportion of global emissions.²¹

Also, these countries share important characteristics of being industrialised and technologically advanced countries. Conversely, the United States and Europe have more environmentally sustainable land use practices. As a result, variations in land utilization associated with human pursuits have the net effect of absorbing CO₂, partly counterbalancing or neutralizing the emissions from deforestation in other regions of the world.

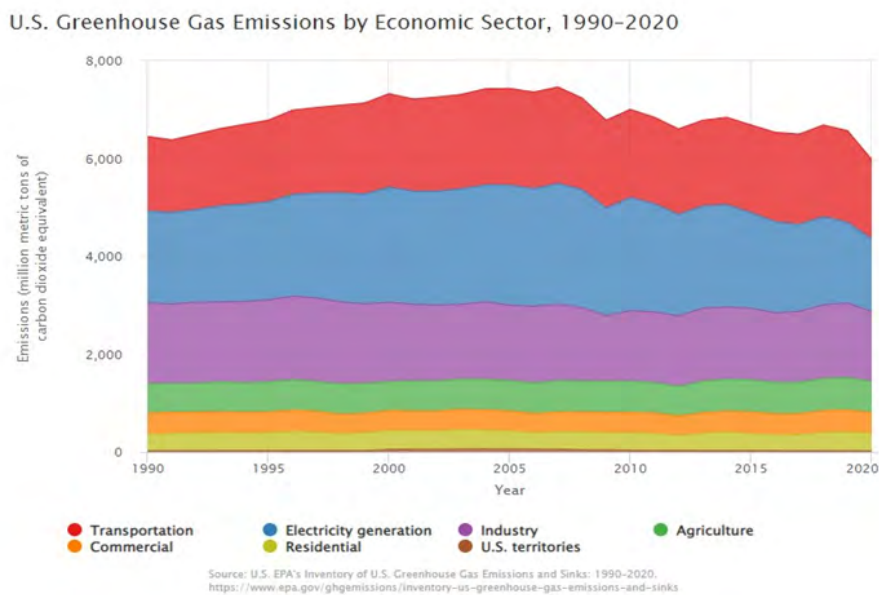
²¹US Environmental Protection Agency, 'Global Greenhouse Emissions Data' available at: <<https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data>> accessed June 15, 2022.

Figure 7: Emissions Contributors in the United States



Source: US EPA, 2022.

Figure 8: US GHG Emission by Economic Sector, 1990-2020



Source: US EPA's Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2020



3.2.3 Emissions from Nigeria and the Rest of Africa

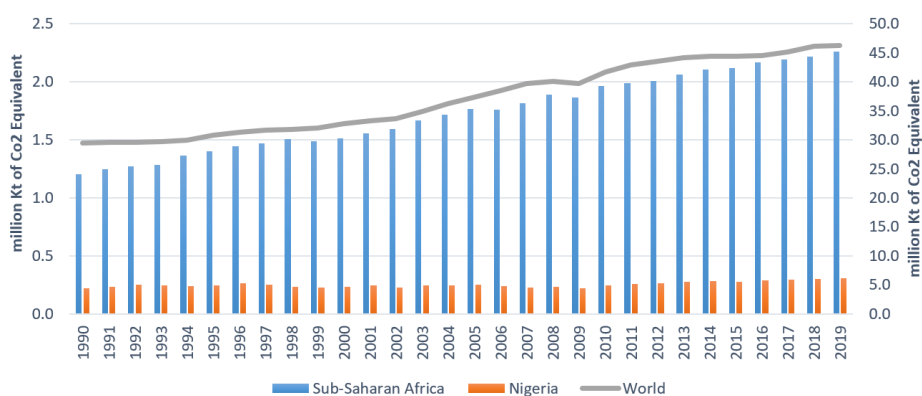
Another US Environmental Protection Agency (EPA) 2019 report, which projected the level of emissions in Africa from 1990-2030, observed that the pattern of emissions in Africa was more significantly nuanced than in other regions.²² It noted that the sources with significant non-CO₂ emissions such as methane, hydrogen sulphide, chlorofluorocarbon, water vapour, ozone, and nitrous oxide include savannah burning, biomass burning, natural gas and oil, stationary and mobile combustion, and landfills, among others. Furthermore, the report stated that emissions from Africa will increase by 34 percent from 2005 to 2030, while the gross domestic product (GDP) will experience a three-fold growth within the same period.²³

Also, Nigeria’s updated National Determined Contribution (NDC), released in 2021, contained current estimated emissions figures upon which the 2021 update NDC was benchmarked.²⁴ The report established that the energy sector, Agriculture, Forestry & Other Land Uses (AFOLU), Waste, and Industry processes & Other Product Uses (IPPU) are the main sources of emissions with

the following figures 60 percent, 25 percent, 9 percent and 5 percent, in that order. In 2018, the annual estimated emissions from the energy sector alone were 209 million tonnes of carbon dioxide equivalent (MtCO₂e), while the current total GHG emission was 347MtCO₂e. This total number is projected to increase to 453MtCO₂e by 2030.

Similarly, the World Development Indicators (WDI), as seen in Figure 9 below, indicates total GHG Emissions in the World and SSA have been on the rise since the early 1990s when it was 29million and 1.2million kilotons, respectively, to about 46 million and 2.2 million kilotons in 2019. These have experienced an average growth of 1.6 percent and 2.2 percent, respectively, through these periods. The SSA emission accounts for about 4.6 percent of the world’s GHG emissions. The GHG emission in Nigeria has also been on the rise, accounting for about 15 percent of the SSA emission and 0.6 percent of the total world GHG, however, the growth of GHG emissions in Nigeria falls below that of SSA and the World at 1.3 percent between 1990 and 2019.

Figure 9: Total Greenhouse Gas Emissions (Kt of CO₂ Equivalent)



Source: World Bank Development Indicators 2023

²²US Environmental Protection Agency, 'Summary Report: Global Anthropogenic Non-CO₂ Greenhouse Gas Emissions: 1990-2030,' available at: <https://www.epa.gov/sites/default/files/2016-08/documents/summary_global_nonco2_projections_dec2012.pdf> accessed June 12, 2022.

²³ibid.

²⁴The Ministry of the Environment, 'Nigeria's Nationally Determined Contribution 2021,' available at: <https://climatechange.gov.ng/wp-content/uploads/2021/08/NDC_File-Amended_112222.pdf> accessed May 25, 2023.

These data show that, unlike the developed economies of the West, whose industrialization was propelled by fossil fuels, Africa's GHG emissions footprint from industrial and fossil fuel combustion activities is relatively insignificant because of the relative under-development. The policy challenge for Nigeria and the rest of Africa needs to focus on how

to galvanize available resources for Africa's socio-economic development while, at the same time, identifying and phasing out non-productive emissions sources such as those identified in the EPA report by a combination of mechanisms such as innovations, technologies, and lifestyle change.

3.2.4 Developing Countries' Climate Commitment

Under the existing international framework, Nigeria and the rest of the developing countries are required to develop a response action plan and make national commitments toward the global resolve to address the catastrophic atmospheric concentrations of GHGs. However, because of the earlier stated vulnerability of developing countries, concerns have been raised concerning the equitability of measures requiring countries who have made minimal and insignificant contributions to climate change to sign up for potentially constraining containment measures.

In response to this concern, the UNFCCC made the following provisions. Paragraph three of the preamble to the UNFCCC provides that:

"Noting that the largest share of historical and current global emissions of greenhouse gases has originated in developed countries, that per capita emissions in developing countries are still relatively low, and that the share of global emissions originating in developing countries will grow to meet their social and development needs,"

This provision recognises the role played by developed countries in the accumulation of GHGs and anthropogenic substances in the atmosphere. It also acknowledges the minimal contributions of developing countries and their growth and development

needs to meet essential national socio-economic aspirations. Nevertheless, developing countries cannot be encouraged and should not thread the environmentally unsustainable path developed countries take towards industrialisation. This is because climate change is a global crisis that affects every country regardless of the roles played in creating the catastrophe.

As a result, the widest possible cooperation by all countries is crucial to galvanising an effective global response based on differentiated responsibilities consistent with national capacities, social and economic circumstances, and historical and current liabilities in the atmospheric concentrations of GHGs.

As a result, Article 3 of the UNFCCC and the Kyoto Protocol espoused the principle of common but differentiated responsibilities as one of the Convention's implementation principles. By this principle, countries were classified into different annexes with common but differentiated responsibilities concerning the obligation to reduce GHGs and anthropogenic substances.

Similarly, Article 3 of the Paris Climate Agreement introduced Nationally Determined Contributions (NDCs).²⁵ Parties to this Agreement are mandated to the set NDCs

²⁵United Nations, 'Paris Climate Agreement,' available at: <https://unfccc.int/sites/default/files/english_paris_agreement.pdf> accessed June 24, 2022.

representing progressive emissions reduction targets. As noted earlier, 2021 updated NDC speculates the national approaches to meeting this obligation.

Nigeria's energy transition policy needs to acknowledge and articulate NDCs toward a

progressive reduction of GHG emissions. Any such approach must reflect Nigeria's national growth aspirations, and social and economic development priorities, including the urgent need to reduce energy poverty and identify new pathways for job creation and expansion of economic opportunities.

3.2.5 Comparative GHG Emissions Data

According to the World Population Review, carbon footprints measure the total GHG emissions induced or caused by individuals, communities, organisations, or nations.²⁶ These gases are usually carbon dioxide or methane. They absorb and emit thermal radiation, creating the "greenhouse effect" of trapping heat near the earth's surface and warming the planet. Scientists posit that GHGs in the appropriate quantity are essential to human existence because they help maintain the earth's habitable temperature.²⁷ However, the excessive release and presence of GHGs in the atmosphere disrupt the earth's carbon cycle accelerating global warming.

Carbon footprint is defined as the total amount of greenhouse gases, mainly carbon dioxide, emitted from human activities such as transportation, energy production, and industrial processes that contribute to global warming and climate change.²⁸

This section reviews the carbon footprints (national GHG emissions levels) of select countries from the heavy emitters of GHGs and developing African countries. Carbon footprint count is useful for exploring the contributions of different countries to global warming through the historical emissions of GHGs, assessing national responsibility for GHG emissions, and the extent of

commitment required to reverse the trend. Additionally, exploration is useful to developing African countries in understanding their contribution to crisis and the sources through which GHGs are emitted to determine the steps and the extent of measures required in reducing emissions. This is important because the global push towards energy transition could have some damning consequences for developing countries in the absence of data on Africa's contribution to climate change, the effects of the energy transition on national economic growth and development goals except the right, data-driven, and national interest guided policies are implemented. This reality informed the agreement reached under the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement.

Thus, under the UNFCCC, the principle of common but differentiated responsibilities was adopted to recognise the varied contributions of developed and developing countries. The principles followed the fact that the developed countries were/are the heavy polluters of the human environment. Western industrialisation was powered by fossil fuels to develop their economies. However, it led to heavy emissions of GHGs into the atmosphere. Developing African countries like Nigeria are now expected to

²⁶World Population Review, 'Carbon Footprint by Country 2022', available at: <<https://worldpopulationreview.com/country-rankings/carbon-footprint-by-country> > accessed May 22, 2022.

²⁷Ibid.

²⁸Intergovernmental Panel on Climate Change (IPCC). (2014). Climate Change 2014: Mitigation of Climate Change. Available at https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_full.pdf

sign up for energy transition towards reducing GHG emissions and reversing climate change. This emissions reduction obligation inures African countries to the disadvantaged position of under-development, weak economies, technologically less advanced, and the eventual inability to maximise the benefits of their natural resources towards their development.

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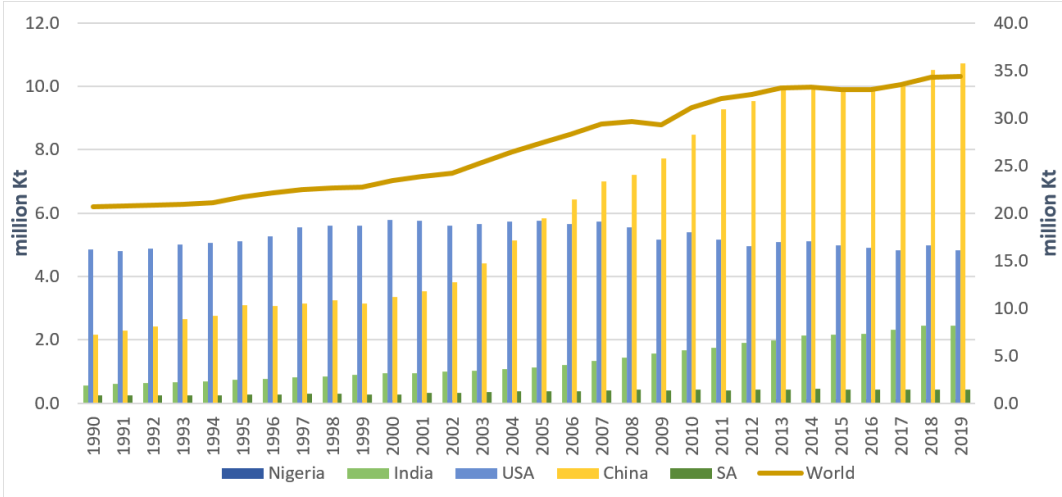
3.2.5.1. Carbon Footprints: Nigeria, South Africa, China, United States of America, and India

World Bank emissions data for reveal that Nigeria’s 2019 GHG emissions is 354.33 MtCO₂e.²⁹ Figure 10 represent a more than 12 percent increase from 2017’s emission figure 340.2MtCO₂e. In Africa, South Africa has the highest CO₂ emissions rate of 562.19MtCO₂e, while countries such as Malawi, Gabon,

Liberia, and Ghana are still below 20MtCO₂e by the 2019 data.

The WDI, 2023, also supports this position. According to the figures below, Figures 10 and 11.

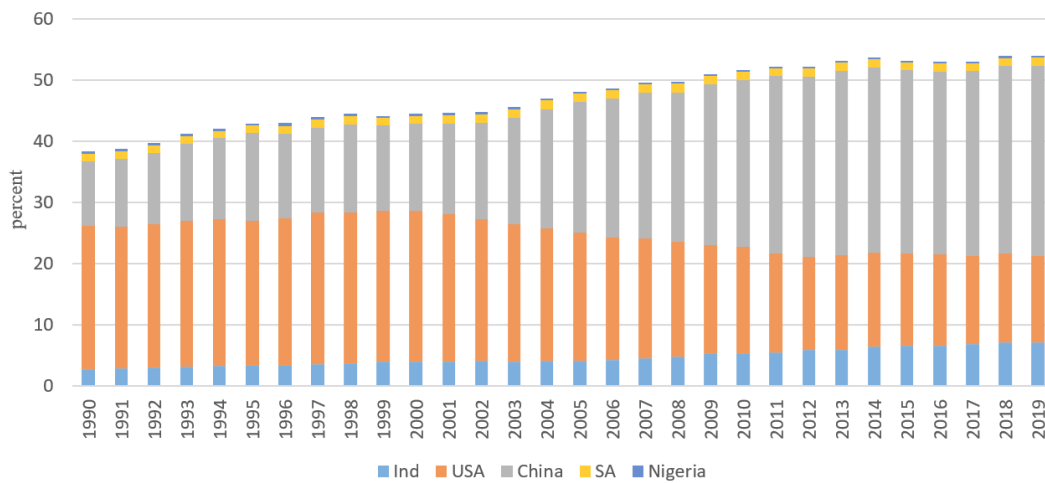
Figure 10: CO₂ emissions (kt)



Source: World Bank Development Indicators 2023

²⁹The World bank, 'Climate Watch Historical GHG Emissions 2022', available at: <<https://data.worldbank.org/indicator/EN.ATM.CO2E.KT?locations=ZG> or <https://www.climatewatchdata.org/ghg-emissions>> accessed May 25, 2023.

Figure 11: Proportion to world CO₂ emissions (kt)



Source: World Bank Development Indicators 2023

This can be contrasted with the position of China and other Western industrialised nations. China, America, and India are currently the highest CO₂ emitters, with 11,680.42 MtCO₂, 4535.30 MtCO₂, and 2411.73 MtCO₂, respectively.

From the above, China and the USA account for above 20 percent of global emissions individually. In comparison, India accounts for about 5 percent, South Africa, the highest in Africa, accounts for about 1.3 percent, and Nigeria accounts for about 0.36 percent.

The foregoing figures show that although Africa suffers significantly from the consequences of climate change, its contribution to the crisis is insignificant, judging by these numbers and that of the other continents. Although this does not and should not absolve Nigeria and other African countries from joining the move to reverse the adverse impact of climate change through the efforts to reduce GHG emissions, the figures show that the greatest responsibilities lie with these advanced countries and other industrialised, and technological developed western nations who gained economic and technological mileage over the rest of world on the back of heavy GHG emissions.³⁰



³⁰Osman-Elasha, Balgis; Velasco, Diego Fernandez de, 'Drivers of Greenhouse Gas emissions in Africa: Focus on agriculture, forestry and other land use,' available at: <https://blogs.afdb.org/climate-change-africa/drivers-greenhouse-gas-emissions-africa-focus-agriculture-forestry-and-other> > accessed June 22, 2022.



4.0 Just Energy Transitioning in Nigeria

4.1 Legal Considerations and Challenges for a Just Energy Transition

The discussion around just energy transition is a constitutional one. This mandates that proposals and reforms must meet the constitutional dictate. For example, chapter 2 of the 1999 Constitution of the Federal Republic of Nigeria (as amended) mandates the State to guarantee the citizenry's health, protect the environment, eliminate poverty, and bring about even development in a non-discriminatory manner. Specifically, section 20 of the Constitution provides that the State shall protect and improve the environment and safeguard Nigeria's water, air and land, forest, and wildlife. It also urges the State to guarantee the security and welfare of the people. In addition, it establishes that the Federal Republic of Nigeria shall be a State based on the principles of democracy and social justice. Thus, any conversation on just energy transition must achieve these mandates and uphold the Constitution.

The effects of climate change on humanity are disastrous and threaten the survival of humans. As put by President Buhari during his speech at the Major Economies Forum on Energy and Climate Change, held on June 18, 2022, "In Nigeria, we have witnessed several environmental challenges including creeping land degradation, desertification and drought in the Northern part, wanton deforestation, land encroachment, invasion of coastal lines, biodiversity loss, flooding and coastal erosion in the Southern region of our country", significantly threatening the peaceful co-existence of the citizenry and livelihood of many. Therefore, many have called for

countries to transition to a clean energy mix in a just manner that guarantees fair and equitable treatment for all.

Just energy transition implies a shift to a clean energy mix in an inclusive manner without impoverishing others. The discussion on a just energy transition has been accepted as the primary and most important approach to addressing climate change.³¹ Amongst experts, current energy sources account for a significant percentage of global warming and inform the climate change conversation. It explains why governments meet regularly to commit to addressing climate change by reforming their energy consumption composition. Adewuyi et al., (2020). posit that a sustainable energy transition implies "developing robust, effective and efficient energy sectors in a particular country or region without compromising the present and future socio-environmental security."³² Thus, just energy transition embraces energy mixes that save the planet from destruction. It further implies taking action to satisfy present needs without sabotaging the future of our world. Many strongly argue that human actions lead to the destruction of our planet, and if care is not taken, we may not have a planet to call ours. To this end, under the Paris Climate Agreement, countries have pledged to limit the global average temperature increase to well below 2°C above pre-industrial levels, with a further commitment to limit the temperature increase to 1.5°C. Countries are to further implement this pledge through their nationally determined contributions (NDCs).³³

³¹Norbert Edomah, "The Governance of Energy Transition: Lessons from the Nigerian Electricity Sector"

³²Oludamilare Bode Adewuyi, Mark Kipngetchi Kiptoo, Ayodeji Fisayo Afolayan, Theophilus Amara, Oluwatobi Idowu Alawode and Tomonobu Senjyu, "Challenges and prospects of Nigeria's sustainable energy transition with lessons from other countries' experiences"

³³Thomas Hirsch, Manuela Matthes and Joachim Funfgelt, "Guiding Principles & Lessons Learnt for a Just Energy Transition in the Global South" (2017)

However, for many African countries, the discussion on just energy transition is not only a politico-economic one but one of survival. With an abundance of oil and gas in many African countries and the significant contribution of oil and gas to the economy of these countries, demanding a transition to clean energy may imply economic woes and instability. Some governments have voiced against the call for just energy transition for African countries, claiming that Africans contribute less to global warming and should not be prevented from benefiting from oil and gas, which helped build the economies of developed countries. Furthermore, despite the abundance of oil and gas, many African countries still need access to affordable, stable, and efficient energy for day-to-day activities. Requiring a transition to other energy sources away from oil and gas poses significant economic woes if not meticulously planned and implemented with viable alternatives.

Energy poverty is a bane of development in many African countries. With its proven and unproven oil and gas reserves, Nigeria falls short of meeting its energy needs, plunging the country into darkness. As of 2021, NERC³⁴ reported that the average daily energy sent out (i.e., the actual electricity supplied to consumers) was about 3,900 MW, compared to an average demand of about 28,000 MW at the peak period. As such, Nigeria's priority, it must be stated, has not been focused on achieving zero emissions, notwithstanding its pledges and commitment. This is evident in the recent passage of the Petroleum Industry Act (PIA) 2021, which seeks further to maximize the country's oil and gas resources, though the country, in the same year 2021, passed the Climate Change Bill into law. The dilemma is obvious. On the one hand, the country is committed to addressing energy poverty by maximizing its oil and gas resources. On the other hand, it is mindful of the contribution of exploiting its oil and gas resources to society.



³⁴Nigerian Electricity Regulatory Commission (NERC). (2021). Nigerian Electricity Supply and Demand: An Overview. Retrieved from <https://www.nerc.gov.ng/index.php/library/documents/other-reports/3230-nigerian-electricity-supply-and-demand-an-overview/file>

4.1.1 Legal Challenges to Just Energy Transition

There are multiple challenges to Nigeria's just energy transition. These challenges may be categorized as cultural, economic, political, and legal. This section will focus on the legal challenges to just energy transition.

a. Absence of a holistic legal framework for just energy transition

While Nigeria may have expressed interest in just energy transition, the country still needs a holistic legal framework for energy transition. This claim recognizes policies and regulations and energy reform. However, a legal framework for energy transition needs to be included. The recently enacted Climate Change Act does not fill the vacuum.

The Climate Change Act 2001 codifies Nigeria's commitment to reducing GHG emissions and attainment of net-zero GHG emissions in Nigeria.³⁵ The Act applies to government ministries, departments, and agencies and covers public and private entities within the territory of Nigeria.³⁶ The Act further establishes the National Council on Climate Change, to be chaired by the President of the Federal Republic of Nigeria,³⁷ and a Secretariat to be headed by a Director-General.³⁸ Section 15 of the Climate Change Act establishes the

Climate Change Fund, into which shall be paid: appropriated funds by the National Assembly; subventions, grants and donations, fees and charges for services rendered; funding from International Organisations and funds due to Nigeria for meeting her NDCs; fines and charges from private and public entities for flouting their climate change mitigation and emissions trading; carbon tax and emissions trading; and such other funds, as the Council may prescribe from time to time.

The Climate Change Fund shall be applied towards the cost of administration of the Council; payment of emoluments, allowances, and benefits of members of the Council; payment of salaries, remunerations, or allowances of the staff of the Council; development and maintenance of property vested in or owned by the Council; climate change advocacy and information dissemination; funding innovative climate change mitigation and adaptation projects; supporting climate change advocacy and information dissemination; defraying the fees of auditors and other expenses incurred by the Council; conducting an assessment of climate change impact on vulnerable communities and populations; incentivizing private and public entities for their efforts towards transiting to clean energy and



³⁵S. 1 of the Climate Change Act

³⁶S. 2 of the Climate Change Act

³⁷S. 3 of the Climate Change Act

³⁸Ss. 7 and 10 of the Climate Change Act

sustaining a reduction in GHG emissions; and any other expenditure in connection with any function of the Council under the Act.

The Act empowers the Federal Ministry for Environment, in consultation with the Federal Ministry for National Planning, to set and revise the carbon budget for Nigeria, with a bid to keep average increases in global temperature within 2°C and to further limit the temperature increase to 1.5°C above pre-industrial levels for Environment, in consultation with the Federal Ministry for National Planning, to set and revise the carbon budget for Nigeria, with a bid to keep average increases in global temperature within 2°C and to further limit the temperature increase to 1.5°C.³⁹ The Secretariat of the Council is saddled with the responsibility of formulating a Climate Change Action Plan every five-year cycle.⁴⁰ The Act provides for public consultation on the Action Plan before its presentation to the Council and the Federal Executive Council (FEC). The Action Plan shall include an articulate carbon budget for the five-year-cycle, an articulated annual carbon budget for each of the years, historical information on GHG emissions, historical and current information on climate mitigation and adaptation measures, and details on the level of compliance with international climate commitments and proposed incentives for private and public entities.

As stated above MDAs and private entities employing 50 people and above are requested to adhere to the carbon emission reduction targets allocated under the Action Plan.⁴¹ The Act stipulates penalties for failure to meet targets set. Section 27 of the Act enjoins the Council to promote and adopt nature-based solutions to reducing GHG emissions and mitigating climate change issues in Nigeria.

While the enactment of the Climate Change Act is laudable, it is however limited in its scope

and influence. Furthermore, the Act does not represent the realities of the current legal framework in Nigeria. For instance, the Act provides for a carbon tax and emissions trading to contribute to the Climate Change Fund, even though the country does not currently have any carbon tax regime or emissions trading structure. Only when a carbon tax regime is enacted, or an emissions trading structure is implemented will contributions from those sources be expected to be made to the Fund.

Also, using the Fund belies Nigeria's commitment to climate change. From the provision of the Act, the Fund will be applied significantly to administrative costs with no direct impact on addressing climate change. Compared to the Climate Change Act of Kenya, the Climate Change Fund shall only be used to provide grants for climate change research and innovation, grants and loans to stakeholders, finance the implementation of climate change adaptation and mitigation actions, and provide technical assistance to country governments. Funding for the Council of Climate Change and the Directorate shall be through their relevant State departments.⁴²

While the Kenyan climate legislation is not perfect and may reflect each country's peculiarities, the restriction on Funds utilization provides a very useful guide on a climate-focused approach to the application of Funds. Thus, it is imperative that each country adopts an approach that is tailored to its unique circumstances and peculiarities.

Furthermore, the Act does not provide for just energy transition; it references clean energy and mitigating measures. It is important to note that climate change is caused by factors other than energy, as such, it will be inaccurate to conclude that any reference to climate change automatically refers to energy transition. S. 27 of the Climate Change Act, which promotes

³⁹S. 19 of the Climate Change Act.

⁴⁰S. 20 of the Climate Change Act.

⁴¹Ss. 22, 23 and 24 of the Climate Change Act.

⁴²See, s. 25 of the Climate Change Act of Kenya.



and adopts nature-based solutions to reducing GHG emissions, could have gone further to refer to the adoption of renewable energy in the energy mix. In any case, experience has shown that just energy transition requires its legal framework for effective implementation.

A case in point is Kenya. Though Kenya enacted its Climate Change Act in 2016, in 2019, it passed an Energy Act focused on the energy mix and use for Kenya, providing the legal framework for a just energy transition. Nigeria will be best served in its pursuit of a just energy transition by enacting an Energy Act akin to Kenya's, which provides an Action Plan for a just energy transition. A renewable/clean energy act will acknowledge Nigeria's large renewable energy sources and capacities, given the country's abundance of sunlight and wind energy. It has been argued that Nigeria can produce approximately 1850 X 10³ Gigawatt hours per year (GWh/yr) of solar power from its abundance of sunlight, which is renewable.⁴³

Conversely, one may argue that the Nigerian Energy Roadmap, the National Renewable Energy Action Plan, and the National Renewable Energy and Energy Efficiency Policy have substantially closed the regulatory gap. For instance, the National Renewable Energy Action Plan (NREAP) targets to increase the renewable energy contribution to electricity generation to 16 percent by 2030 from the 2012 level of 0.8 percent.⁴⁴

b. Incentives for Transition to Clean Energy

Nigeria will honour its commitment to climate change by incentivising producers, sellers, and clean energy consumers. It is trite that you fund that which you are interested in. Nigeria is an excellent example of a country that incentivises the production and consumption of products. Samples are contained in the tax laws of the country, which grant allowances and exemptions for expenses and costs borne by manufacturers, sellers, and consumers. Also, mention must be made of the petrol subsidy, which remains controversial and drains the country of resources which could be used in more impactful areas. However, the petrol subsidy has been phased out by the new government of President Tinubu. As such, Nigeria must match its commitment to addressing climate change by incentivising the production, sale, and use of clean energy. This can be achieved by granting import duty waivers to manufacturers and sellers of clean energy technologies. It can also subsidise the cost of production, sale, and consumption of clean energy. In addition, it can directly fund research and innovation in clean energy. Without incentives for clean energy, Nigeria may be paying lip service to its commitment. In the context of an Energy Act, a legal framework would contain the incentives for transitioning to clean energy. The Climate Change Act fails in that respect. The Energy Act should incentivise investments in solar, thermal, photovoltaics, bioenergy, hydro, tidal, wind, wave, and

geothermal energy sources, in addition to other clean and renewable energy sources.⁴⁵

c. Disincentives for Use of Dirty Energy

Just as important as it is to incentivize energy transition, it is also important to disincentivize the use of dirty energy. This the government can achieve through economic costs, such as tradable carbon emission permits (cap and trade system), Polluter Pays Principle and carbon tax. A market structure is created in a cap-and-trade system where entities exceeding their emission limits can buy from others underutilizing their emission quotas. This is largely a private sector-driven structure, and the economic benefits accrue to the private entities engaged in the trade.

On the other hand, Polluter Pays Principle prices for the actual cost of GHG emissions on the environment, the economy, and the collective purse of the state. It imposes such a price on the polluter. When imposed, it increases the cost of energy uses, thereby dissuading the continuous use of that energy, consequently changing or directing the polluter to use cleaner energy. A carbon tax is a policy instrument that can implement the Polluter Pays Principle in the context of greenhouse gas emissions. In addition, it imposes a tax on the carbon content of fossil fuels such as coal, oil, and gas, thereby providing a financial incentive for individuals and businesses to reduce their use of these fuels and transition to cleaner, more sustainable energy sources.

A carbon tax is already used in Canada, Chile, Norway, South Africa, Sweden, etc. Some of the benefits of imposing a carbon tax on polluters are its contribution to the revenue needed

by governments to tackle climate change, as evident in the Climate Change Act of Nigeria, which provides for carbon taxes to contribute to the Climate Change Fund; its low compliance costs since existing structures, such as the value-added tax (VAT) system and licensing regimes can be adapted in the implementation of a carbon tax; its potential to lead to innovation in clean energy, since emission entities would be incentivized (through increased costs of business) to seek cleaner energy, leading to innovations in cleaner energy.

As stated above, Nigeria currently has no carbon tax regime, notwithstanding its reference to the Climate Change Act. Therefore, the first step will be to introduce the regime through an act of parliament. The right carbon tax regime will capture all emitting entities, price carbon emissions at a high price to dissuade emitters, provide palliatives for people experiencing poverty to encourage the use of cleaner energy and ensure the administration of the carbon tax regime is flexible, convenient, and efficient. This, we understand, is a herculean task.

d. Centralization of Energy Provision in Nigeria

Before March 2023, the power sector, like many other sectors, had largely been controlled under the exclusive prerogative of the Federal Government of Nigeria. The wider implication was that reforms are hard to agree upon and implement since all federating units must be consulted and catered to. The greater implication is that energy sources peculiar to federating units are not utilized for their energy use, such as solar power from the Northern part of the country, given its rich amount of

⁴³Olusola Joshua Olujobi, "The Legal Sustainability of Energy Substitution in Nigeria's Electric Power Sector" Renewable Energy as Alternative"

⁴⁴ICREEE, 'National Renewable Energy Action Plan (2015-2030)', available at: <https://www.se4all-africa.org/fileadmin/uploads/se4all/Documents/Country_PANER/Nigeria_National_Renewable_Energy_Action_Plans_.pdf>, accessed May 25, 2023; See also, Federal Government of Nigeria, 'the Nigerian Energy Transition Plan', available at: <<https://energytransition.gov.ng/>>, accessed May 25, 2023.

⁴⁵Samuel Adams and William Asante, "Politics of Renewable Energy in Africa: Nature, Prospects, and Challenges"

sunlight. In the country's quest to address energy poverty, the federal government must be willing to let go of its hold on the power sector, decentralize it, and encourage off-grid generation, transmission, and power distribution. The challenges of the centralized control of the power sector and the need for devolution of authority have now been constitutionally recognized. In the latest round of constitutional amendment, power has now been removed from the Exclusive Legislative List and placed in the Concurrent List.⁴⁶ With this alteration, the Federal Government and the federating units are now competent to legislate on and implement their power strategy.

In Kenya, the Energy Act of 2019 devolved the provision of energy services by giving County governments the power to design and implement energy plans, while the national

government harmonizes the individual County energy plans into a national plan.⁴⁷ Devolving the energy control to the federating units will promote inclusiveness and equity, as federating units can structure their energy needs to their sources, use, and unique attributes. Also, devolving the power sector will open financing opportunities for the sector as states can negotiate directly with the financing institutions, using their unique resources as collateral for financing. Achieving devolution of the power sector will require constitutional changes to the powers of the federal and state governments to situate the power sector in the concurrent and residual lists of the Constitution. Also, the introduction of an Energy Act will further decentralize energy generation, transmission, and distribution and empower federating units to meet their energy needs.⁴⁸



⁴⁶The Guardian, 'DAWN Commission lauds Buhari over removal of electricity, railway from Exclusive List', available at: <https://guardian.ng/news/dawn-commission-lauds-buhari-over-removal-of-electricity-railway-from-exclusive-list/>, accessed May 25, 2023.

⁴⁷Lois Gicheru, "Policy Reform for Energy Transition in Kenya"

⁴⁸Andrea Ajibada, "National Strategies to Promote Renewable Energy Development: Whither Nigeria?"

4.2 Nigeria: Relevant Socio-Economic Context

A World Bank report published on October 13, 2019, suggests that Nigeria's population is approximately 202 million people, and it has one of the largest youth populations in the world.⁴⁹ The same World Bank report confirms Nigeria's status as Africa's biggest oil exporter, holder of the largest natural gas reserves on the continent, with abundant natural resources.⁵⁰ Another report published by the World Bank states that over 80 million Nigerians lack access to electricity, including nearly 60 percent of those in rural areas.⁵¹

Similarly, this report suggests that over 80 percent of Nigerian businesses identified power-related challenges as the most significant obstacle to doing business in Nigeria. As a result, more than US\$25 billion is lost in the economy annually. These problems constitute significant challenges because of the perennial governance issues and weak institutions. In December 2022, the Nigerian Ministry of Finance stated that the country would require about \$150 billion annually for the next ten years to solve the infrastructure deficit and other challenges identified in the above World Bank reports.⁵²

Like many natural resource-rich developing countries, Nigeria heavily relies on its minerals, such as hydrocarbon, gas, and solid minerals, for budget financing and other government social and economic activities. Additionally, exporting these resources provides the steadiest source of foreign exchange earnings. As a result, natural resource-dependent developing countries are most likely to be adversely affected by an inequitably implemented energy transition whose key objective is discouraging fossil fuel consumption, ultimately making hydrocarbon

resources unattractive globally. If this outcome crystalizes, these commodities will lose their economic value and cease to be foreign exchange-earners. And unless Nigeria and the rest of Africa take advantage of the short window to transform their countries socially and economically, the energy transition will exacerbate poverty, lack of jobs and other economic opportunities, and energy poverty, among others.

However, African countries may be allowed to use their natural resources domestically. The UNFCCC recognizes the sovereign right of parties to pursue national development objectives using all resources available to that party. According to this Convention and the Charter of the United Nations, every country has a sovereign right to exploit its resource endowments consistent with its own environmental and developmental policies provided that such activities do not cause damage to the environment of other nations.⁵³

Thus, it is recommended that responses or climate actions should be integrated with socio-economic development processes to avoid adverse impacts on these countries. Nigeria firmly falls within this category and needs to take advantage of these provisions to pursue, albeit responsibly and efficiently, its growth and development priorities by leveraging its stock of natural resources.

Similarly, energy transition requires economic and social transformation. Technologies are essential for transforming from a fossil fuel-dominated socio-economic order to renewables. And while the developed countries have this capacity and the

⁴⁹The World Bank, Nigeria's Country Overview, available at: <https://www.worldbank.org/en/country/nigeria/overview> accessed May 25, 2023.

⁵⁰Ibid

⁵¹Jonathan Coony, Leveraging Finance for the Nigeria Off-grid Solar Market, (Nov. 09, 2018: World Bank website) available online at: <https://blogs.worldbank.org/psd/leveraging-finance-nigerian-grid-solar-market> > accessed May 25, 2023.

⁵²The Cable, 'Nigeria Needs \$150 billion Annually to Close Infrastructure Gap, Says the Minister', available at: <<https://www.thecable.ng/nigeria-needs-150bn-annually-to-close-infrastructure-gap-says-minister>> accessed May 26, 2023.

⁵³United Nations, 'The United Nations Framework Convention on Climate Change', available at: <https://unfccc.int/files/essential_background/background_publications_htmlpdf/application/pdf/conveng.pdf>

wherewithal for more technological innovations, Nigeria and the rest of Africa are not similarly placed. Moreover, the energy transition-related technology gap will fundamentally impact Nigeria's capability to make the social and economic transformation as quickly and efficiently as required. In other

words, there is an urgent need to invest more in research and development by leveraging the UNFCCC and Paris Climate Agreement frameworks' technological funding support to acquire the new technologies essential for efficient transition without compromising domestic socio-economic goals.

4.3 Nigeria: Potential Effects of Energy Transition

4.3.1 Loss of Foreign Exchange Receipts

If properly administered, the energy transition will offer Nigeria an excellent opportunity to rapidly address some of its major challenges, particularly to reduce energy poverty by leveraging the abundant opportunities of renewable energy sources. Also, the Nigerian Energy Transition Plan projects that about 340 thousand jobs will be created by 2030 and up to 840 thousand by 2060, subject to the right policies and expected private sector investment flow⁵⁴.

Conversely, it is safe to assert that Nigeria will, in the short and medium term, face a significant

decline in revenues because of its dependence on mineral rents and an impending shift away from hydrocarbon resources. Nigeria will lose the potential to continue to earn from the sale of its minerals on the international market.⁵⁵ This will affect the country's ability to fund the national budget and support national growth and development plans. And without the further diversification of the government's revenue streams, the efficient running of governments will be affected, and the payment of salaries of public servants will be more burdensome.⁵⁶

4.3.2 Job Losses

The oil and gas sector employs thousands of Nigerians both directly and indirectly. Although no figure was given, the Nigerian Energy Transition Plan acknowledges that the expected decline of the petroleum sector will eventually lead to job losses. Energy transition could exacerbate difficult social and

economic conditions for a country with high youth unemployment and endemic poverty. However, it is expected that investments in renewable energy will lead to job creation and re-balancing opportunities in the Nigerian economy. This will require re-skilling and training of workers to acquire the right skills.

⁵⁴The Federal Government of Nigeria, 'Nigerian Energy transition Plan' available at: <https://www.energytransition.gov.ng/#Plan>, accessed May 25, 2023.

⁵⁵El-Rufai, Rukaiya; Agbeyi, Emuesiri; Aminu, Mohammed; Alabi, Olanrewaju, 'Decarbonising Nigeria's Economy,' available at: <https://www.pwc.com/ng/en/assets/pdf/decarbonising-nigerias-economy.pdf>

⁵⁶ Ibid

4.3.3 Constraints of National Development Objectives

Because of Nigeria's dated dependence on resource rent from the petroleum sector, the country's ability to deal with a developing economy's social and economic problems will be adversely affected by the transition from fossil fuels to cleaner energy sources. Long term, the country could be unable to maximize the benefits of its oil and gas resources because of the reduced demand for petroleum globally. With the move away from fossil fuels, the introduction of electric vehicles, and the increasing focus on renewable energy sources, crude prices will continue to decline. This means less revenue receipt for the country. Also, the prevailing foreign exchange conundrum will grow dire unless Nigeria quickly transits to a producing economy with a strong export capacity. In the short and medium term, Nigeria will continue to explore and produce oil and gas resources for domestic consumption. However, according to the government's energy transition plan, Nigeria has committed itself to achieving a net-zero emissions target by 2060.⁵⁷

Although it is not yet clear how this will be achieved and the combination of measures to be implemented towards meeting this target. In the long term, the government's plan suggests that Nigeria will not rely heavily on its oil and gas resources to meet its domestic energy needs. If this assumption is correct, can the country depend on renewable energy sources such as solar, wind, and thermal energy sources to meet its development needs?

4.3.4 Funding Energy Transition

The 2021 NDC update estimates 177 billion United States Dollars covering the implementation period 2021-2030, enabling the country to deliver the conditional NDC target.⁵⁸ About 122 billion of this total amount will be channelled towards investments in the electricity generation sector, which is

Furthermore, there seems to be little literature on how energy transition affects a resource-dependent developing country. As a developing country, Nigeria has significant gaps in infrastructure and needs to diversify its economy, create jobs for its teeming youth population, and create social and economic opportunities. All these require that the country maximizes all available resources if these needs are achieved. In addition, Experts, Intergovernmental Panel on Climate Change (IPCC) and even the UNFCCC and the Paris Climate Agreement agree that energy transition requires new technologies for successful implementation. These technologies may not yet be available in Nigeria. This raises important questions. Can Nigeria depend on local resources for these new technologies, or will it rely on the developed countries? If it has to acquire or impose these new technologies from abroad, then who pays for them? If Nigeria has to pay to acquire them, where will it generate the foreign exchange needed for imports in the absence of revenues from oil and gas export? Answers to these and many more questions are important in creating a transition policy for Nigeria and other developing countries. And indeed, there is insufficient data to determine whether a developing country may solely depend on renewables for industrial development and to power other heavy industries.

considered a development priority for the government. According to the report, it is essential that this investment is made within 10 years of the report. Furthermore, significant additional investments are needed in energy efficiency, transport, agriculture and oil and gas. Nigeria's ability to meet its 27 percent

⁵⁷Ibid

⁵⁸See The Ministry of the Environment, 'Nigeria's Nationally Determined Contribution 2021', at No.25.

additional contribution in the 2021 NDC is contingent on making these investments.

Additionally, the Nigerian Energy Transition Plan projects that it would need 10 Billion United States Dollars in new investment annually from 2023 to 2060, totalling about US\$1.9 trillion by Net Zero in 2060⁵⁹. Certainly, Nigeria does not have much money and will be unable to make these all-important investments without the support of domestic and international commercial investors, development partners, both bilateral and multilateral the support of the government of the advanced economies.

To this end, both UNFCCC and the Paris Climate Agreement noted that energy transitions and the attendant social and economic transformation would require funding and that developing countries may be unable to fund the changes and new technologies needed for a just and smooth transition. In particular, article

3 of the UNFCCC and Articles 2, 10, and 11 of the Paris Climate Agreement acknowledge the peculiar handicap of developing countries and note the importance of providing strategic financing to support these countries in making the adjustments essential for the transition process. Additionally, at the COP26 in Glasgow and COP 27 in Egypt, the Nigerian President highlighted the country's key requirements to make the transition when he noted that funding would be critical to Nigeria's energy transition plans as the country lacks funding to urgently finance its energy transition and climate action agenda due to debt distress in the country.⁶⁰ This funding gap is anticipated to widen by the expected loss or reduction in foreign exchange receipts from oil and gas. Therefore, the Nigerian energy transition policy must acknowledge this reality and equally articulate ways of closing the short, medium, and long-term gap.



⁵⁹See The Federal Government of Nigeria, 'Nigerian Energy transition Plan', at No.57.

⁶⁰Rural Electrification Agency, 'Unveiling of Nigeria's Energy Transition Plan at COP26,' available at: <<https://rea.gov.ng/the-unveiling-of-nigerias-energy-transition-plan-at-cop26/>> accessed June12, 2022.



5.0 Policy Considerations for Transition

This section explores the essential constituents of a potential Nigerian energy transition policy. The previous sections of this paper considered the national and international regulatory framework that forms the foundation for energy transition, particularly the basis for the principle of common but differentiated responsibilities of parties to the UNFCCC based on the developed country's contributions to climate change, differences in economic power, and technological capabilities.

Similarly, Nigeria's energy transition policy should take cognizance of Nigeria's developing country status with needs for industrialization, economic diversification, the creation of socio-

economic opportunities, and job creation. In designing the policy, one of the objectives is to ensure that the country is not denied the right to pursue its industrialization and socio-economic development goals.

This is because the developed countries' development decisions, choices, and consequences of Western industrialization should not limit the rights of developing countries to pursue their development albeit more responsibly. With this context in view, the Nigeria energy transition policy should be directed to the following areas.

5.1 Emission Reduction

Nigeria's energy transition should target emissions reduction, particularly from sources where cuts can easily be made without significant impacts on national development objectives. One major source of emissions from the petroleum sector is the flare of natural gas from oil and gas companies. Gas flares in Nigeria constitute an act that does not add any value to the national development goals. On the contrary, it adds to the concentrations of anthropogenic substances in the atmosphere. Policymakers address this substantially through the Flare Gas (Prevention of Waste and Pollution) Regulation of 2018 which now prohibits the flaring and venting of natural gas.⁶¹ Also, the Regulations imposed a duty on companies to maintain flare gas data and stipulated financial penalties for gas flare.

This has significantly reduced the amount of flare in the petroleum industry. Furthermore,

according to Osman-Elasha and Velasco (2020) and The United Nations (2021), 65 percent to 73 percent of global GHG emissions come from the energy industry. The remaining 27 percent comes from agriculture, forestry, other land uses, industry processes, and waste management. Also, agricultural practices, deforestation, bush burning, and forest degradation in developing African countries contribute 56 percent of GHG emissions. With targeted policy measures, these emission sources which do not contribute to national development can be eliminated or substantially reduced. However, to ensure accurate inventorying of GHG emissions and measure avoidance and reduction from various sources, it is crucial to establish and sustain a transparent and efficient data architecture rather than relying primarily on estimates.

⁶¹FGN, 'Flare Gas (Prevention of Waste and Pollution) Regulations 2018', available at: <https://ngfcp.nuprc.gov.ng/wp-content/uploads/2022/09/FGN-Official-Gazette-on-Flare-Gas-v2.0-002.pdf> accessed May 30, 2023.

5.2 Lifestyle Adjustment Measures

Nigeria could consider policy measures, such as incentives and disincentives to clean and dirty energy usage, discourage unsustainable lifestyle choices and encourage climate-friendly adjustments relating to basic human activities. For example, an aggressive policy to increase sustainable, cheaper, and efficient access to energy for powering homes, offices, and domestic activities such as cooking and a reliable and efficient public transportation

system designed to discourage or drastically reduce the volume of private vehicles on Nigerian roads. This could include removing VAT for certain sustainable products and imposing an additional tax for the consumption of environmentally harmful products, less or no VAT for energy-efficient appliances & buildings. In addition, companies with significant investments in energy-efficiency technologies should benefit from tax holidays or rebates.

5.3 Economic and Social Transformation

The energy transition requires structural adjustment and adaptation of the socio-economic structures to align with the energy transition process. The existing socio-economic systems were designed to run without consideration for the need for energy efficiency and without sufficient regard for the need to protect the sanctity of the human environment. So, an energy transition policy must outline measures to transform the

existing social and economic systems through socio-economic policies, skills development, and workforce reskilling. The solar energy sector is beginning to act in this area through a number of interventions of the Federal Government to power universities, hospitals and markets through off-grid measures. However, more integrated and coordinated measures will be required to extend to all parts of the country.

5.4 Technology Adoption

According to the World Economic Forum report, technological innovation would be key to implementing the energy transition.⁶² The developed countries are committing considerable investment into low-carbon technologies like hydrogen, carbon capture, utilization, and storage (CCUS).⁶³ Unlike the oil and gas sector with abundant local capacity, Nigeria will have to invest in research and development of low-carbon or new technologies that will support its transition process. Another option may be to depend on the developed countries to supply low-carbon technologies. Since Nigeria may face

major challenges regarding reduced foreign exchange earnings because of the shift away from hydrocarbon resources, how will the country pay for these technologies? In other words, Nigeria's current foreign exchange difficulties are expected to worsen with the energy transition. A policy decision must be made concerning whether the country should pursue NDCs through self-sustaining measures or rely solely on foreign support, as suggested by the UNFCCC and the Paris Climate Agreement, and ensuring the effective implementation of these policies should be of utmost importance.

⁶²World Economic Forum, 'Fostering Effective Energy Transition- 2021 Report', supra, at no.8.
⁶³Ibid

From the recent lesson learned concerning vaccine nationalism, during the Covid-19 pandemic where developed countries expectedly concentrated on vaccine production for domestic use instead of sharing vaccines with developing African countries who often relied on the generosity of friendly Western nations. Therefore, Nigeria will need to develop a strategy to implement its NDCs by adopting local solutions.

Another major challenge in the literature relates to a potential problem concerning the supply security of raw materials needed to manufacture low-carbon technologies. The production of minerals such as graphite, lithium, and cobalt is projected to increase by nearly 500 percent by the year 2050

to match the growing demand for clean energy technologies. These rare minerals are produced in conflict-prone developing West and Central African countries with challenging social and environmental conditions. However, there are fears that the scramble to acquire the minerals by a few influential, diplomatically savvy countries raises supply risk concerns and will most likely constrain the ability of the weak countries to implement agreed carbon reduction measures. However, as envisaged under the UNFCCC and the Paris Climate Agreement, Nigeria and other developing nations must be prepared to seek and secure the parties' cooperation to these instruments to facilitate the sharing of capabilities, experiences, technical information, and funding support.

5.5 Other Areas Transition Policy

In addition to the foregoing, energy transition policy thinking should include a renewable energy integration Policy to systematically integrate renewables into the energy system,

including the choice systems; a renewable energy deployment support policy; and a policy to enable the implementation of the energy transition.

5.6 Energy Transition Index Framework

The WEF has developed a comprehensive index or matrix for measuring a country's energy transition progress.⁶⁴ The matrix assesses current energy system performance as well as the preparedness of such to undertake or effectively pursue the transition. In other words, the matrix is designed to enable every country to evaluate its energy system, internal peculiarities such as supply

security status, available energy infrastructure, the effectiveness of energy sector governance, regulations, and political commitment rules application, and the level of investment in critical energy infrastructure, among others. The index encapsulates certain indicators grouped into system performance imperatives and transition readiness.⁶⁵

⁶⁴World Economic Forum 'Fostering Effective Energy Transition- 2021 Report', supra, at no.8.

⁶⁵Energy tracker Asia, 'Global Energy Transition Index-Quantifying Progress,' website accessed on 28 January, 2023: <https://energytracker.asia/global-energy-transition-index/>

5.6.1 System Performance Imperatives

The system performance imperative (SPI) determines and reviews the efficiency or how well the existing energy system is performing. The SPI postulates that an effective energy transition, and energy system, should be evaluated based on three tests or criteria.

First, to be effective, energy transition and the supporting energy system must support economic development and growth⁶⁶. This suggests that to determine a country's preparedness for energy transition, the current energy system and the transition process should be able to support economic development and growth. This is an important requirement for the energy transition for a developing country such as Nigeria, which still grapples with the basic issues of social and economic development and the need to ensure stable growth. The current situation in Nigeria suggests that economic development and growth are essential to create jobs and increase socio-economic opportunities for the

millions of unemployed and under-employed Nigerians.

The second SPI relates to energy access and security of supply. This suggests that to be effectively implemented, universal access to a secure and reliable energy supply is essential for the energy transition to occur. In other words, countries with poor and unreliable energy access must take steps to ensure that energy transition does not exacerbate these challenges. Thus, in Nigeria, energy transition should be encouraged and pragmatically pursued, in the first instance, to ensure access to a secure and reliable energy supply essential to develop economically and facilitate the growth needed for the Nigerian economy. Lastly, the SPI underscores that energy transition will likely be effectively implemented where the energy system includes the applicable regulatory framework if environmental sustainability exists across the energy value chain.

5.6.2 Transition Readiness

Transition readiness is the second matrix of the energy transition index framework. It looks at the country's social, economic, political, and regulatory environment to see the extent to which they promote or support energy transition and the preparedness for renewable energy systems.⁶⁷ Transition readiness consists of six enabling dimensions that could assist a country in deciding or determining whether it is ready or capable of making the transition effective. The six transition readiness enabling dimensions are energy system structure; human capital and consumer participation; infrastructure and innovative business environment; capital and investment; institutions and governance; and regulation and political commitment.

In other words, the enabling dimensions are diagnostic tools designed to assist any country in self-evaluating and determining its readiness for an effective and efficient energy transition. One of the rationales for these enabling dimensions is to avoid a premature or unplanned energy transition with the risk of socio-economic disorientation. Since one of the socio-economic advantages of the energy transition is the significant potential to create new opportunities, increase investments and facilitate or spur economic growth and development, SPI and the transition readiness enabling dimensions are designed to support effective transition to achieve these benefits of the energy transition. Therefore, the risk that a sudden energy transition has the potential to damage or imperil social and economic

⁶⁶World Economic Forum, 'Fostering Effective Energy Transition- 2021 Report', supra, at no.8.

structures, particularly in developing countries, exacerbating the already challenging social and economic conditions.

Thus, the WEF defines effective energy transition as “a timely transition towards a more inclusive, sustainable, affordable and secure energy system that provides solutions to global energy-related challenges while creating value for business and society, without compromising the balance of the energy triangle.”⁶⁸

- » **Energy system structure:** Nigeria relies heavily on fossil fuels and a central grid system for electricity transmission and distribution. The power, transport, and industrial sections rely on fossil fuel-based energy sources. The electricity generation and transmission systems are historically centralised with systemic and structural inefficiencies. The various elements of the energy system infrastructure would need to be analysed and evaluated for their suitability and readiness for energy transition.
- » **Human capital and consumer participation:** Energy transition is technology and innovation-driven. Thus, investment and capacity development is required in many areas, including research and development and technology incubation. This entails the need to build human capacity and re-skilling transition personnel in new technologies and clean energy tools. Also, the energy transition will affect energy product consumers. Therefore, the engagement and participation of current and future energy consumers would be essential for an effective energy transition. Thus, the Energy Transition Plan must articulate a plan for women and girls, particularly in rural areas, to create suitable pathways to provide

alternative energy sources for cooking and other domestic uses.

- » **Infrastructure and innovative business environment:** Energy transition requires new and additional investment toward clean energy system infrastructure and the modernisation of fossil fuel-based infrastructure. Also, energy transition entails aggressive investment in innovation and facilitating, enabling the business environment to stimulate the flow of private sector investment and incubate innovative clean energy businesses.
- » **Capital and investment:** Creating the enabling environment for energy transition requires a huge injection of capital and strategic investment by the public sector designed to stimulate and unlock the various opportunities for a clean energy sector-induced economic development. The Federal Government of Nigeria projects that Nigeria would require well above US\$600 billion for its energy transition plans. However, the major challenge is how and where to find such huge financial resources to enable the country to finance the transition. Mobilising local and international financial capital providers from the private and public sectors is critical to ramping up investments for the transition.
- » **Institutions and Governance:** Based on the lessons from the European Union, an effective energy transition that will deliver all the social and economic potentials of the clean energy economy requires strong institutional support and governance. Strong institutions and governments ensure that energy sector institutions are strengthened to understand the imperatives of the

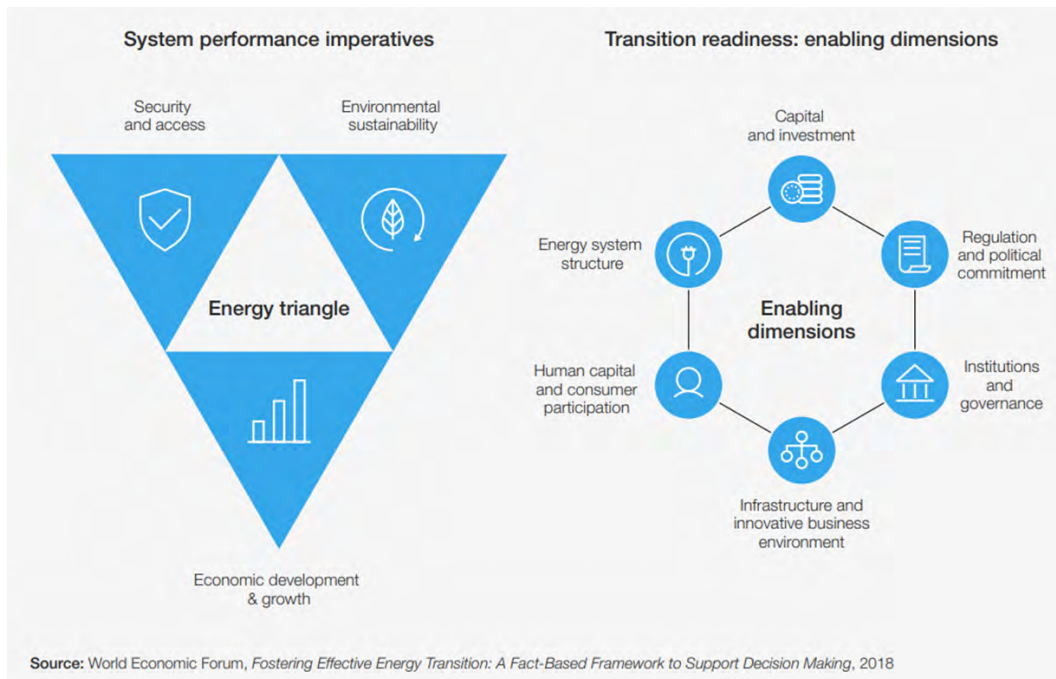
⁶⁷Ibid
⁶⁸Ibid

energy transition and the clean economy and acquire the capacity to support the process.

- » **Regulation and political commitment:** Effective regulatory support and political will are crucial to achieving or realising all the social and economic benefits possible with energy transition without damaging the socio-economic structures of developing countries. This is very evident from the experiences of the implementation approaches in the United States and EU countries. In Nigeria, the Climate Change Act

came into force in 2021. The Act made many important provisions on climate change commitments, mitigation strategies climate financing. Also, it established the National Council on Climate Change, which is empowered to develop relevant policies around climate change mitigation measures, the council was inaugurated, and a work plan has been approved to fulfil not only its responsibilities related to climate change but also develop appropriate policies for energy transition and implementation strategies that address the many issues outlined in this paper.

Figure 12: Energy Transition Index



Source: World Economic Forum, 2021



6.0 Conclusion

The most important achievement of a successfully implemented transition is to salvage the planet from the danger of a difficult climate crisis. Also, energy transition is gradually creating what is now referred to as the green economy. There are indications that the transition processes will lead to the evolution of new economies, the creation of a new renewable industrial sector, and the development of new technologies. These will contribute to the national gross domestic product (GDP), create jobs, and spur new businesses.

Therefore, a just and inclusive transition is implemented in a way that reflects the realities about the origin of the climate crisis, the apparent inequities between developed and developing countries, and the differing capacities between developed and developing countries to transit to low carbon systems in terms of technologies, funding and the carrying capacity of each country's economy. In acknowledgement of its role in the emergence

of the climate crisis, the developed world should follow through with the UNFCCC and the Paris Climate Agreement's promises in funding, technological support, and cooperation with developing countries to facilitate an equitable energy transition. Finally, Nigeria and other African countries should prioritise their development priorities and deepen energy access and security of the supply of energy resources.

While this study focuses on the potential policy option for Nigeria towards meeting its energy needs and the achievement of national development goals, including political structure, we have not comprehensively examined the political economy of energy transitioning in Nigeria due to a lack of sufficient data and information on the political-economic structure on the energy industry. Therefore, this is an area for future research.

6.1 Recommendations

From the foregoing, it is recommended as follows:

- a. The Federal Government of Nigeria should harmonise relevant Plans and Strategies into a coherent policy document and framework that is a workable, comprehensive, inclusive, and top-down policy framework, containing strategies and milestones for the country's energy transition agenda. In addition, the policy has to identify and outline strategies for implementing the transition readiness enabling dimensions and the SPI as enunciated in the WEF documents and explained in this paper.
- b. This paper also noted the importance of clean technologies in implementing energy transition and the danger of

dependency on foreign technologies in the era of declining foreign exchange revenue receipt from oil and gas exports. Thus, the policy and strategies must reveal the pathway for the domestication of clean energy technologies through innovation, research, and development to reduce undue dependency.

- c. Private investment and the active cultivation of the private sector are central to the strategies adopted in developed economies. Thus, there is a need to create a robust enabling environment needed to stimulate and sustain private sector participation. In this area, efficient regulations and incentivisation of market forces will be essential in driving economic development and growth

in Nigeria. This will require regulatory flexibility and a regular interface between the public and the private sectors. This regulatory approach was critical in incubating, growing, and developing the clean energy market in the United Kingdom and other European countries.

- d. In the area of Institutional and political commitment, it suffices to add that stability of the relevant institutions, political authorities, and other relevant stakeholders is essential to achieve the right outcomes. Deliberate steps must be taken to ensure that changes in political leadership or administrators of public institutions do not lead to a shift in focus away from the objectives.
- e. Energy transition entails or requires changes in lifestyle and behavioural adjustments in several ways. Also, citizens will have to make some difficult and potentially life-changing decisions in areas such as construction, housing, transport system, and consumption of technological goods. Considering the foregoing, consumer awareness of how energy transition may affect their choices and lifestyle and the likely cost implications of these choices will be essential and should be encouraged and sustained.
- f. Energy transition policy, strategies, and plans must be rooted in the relevant data guiding policy formulation, policy direction, and implementation strategies and plans. For instance, there is a need to have accurate and current data on GHG emissions by sectors, businesses, and domestic uses. The availability of

such data will guide both the public and private sector stakeholders in the areas such as policy formulation, technological development, skill acquisition and reskilling, carbon capture, carbon reporting, business and investment decisions, as well as research, development, and innovation. Also, decisions regarding NDCs can be made to reduce national or sectoral carbon footprint without damaging the fundamentals of our economy. Furthermore, different types of modelling and analysis can be run to identify options and pathways to implementing energy transition consistent with national interests and priorities.

- g. Nigeria and other resource-rich developing countries need to take firm policy and principled positions regarding how, when, and the pace at which each country can pursue energy transition with regard to the national interest and national priorities, particularly in energy access, growth, and economic development. The recent decision of Western countries to review their policies on the use of coal for power generation in the interest of their economies and citizens should provide useful lessons to African countries.
- h. Access to reliable and affordable energy for industrial and other uses is still challenging for Nigeria. Thus, it is suggested that Nigeria's short- and medium-term goals should be to take advantage of renewables to improve access to energy.

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