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FINANCING THE NIGERIAN OIL AND GAS INDUSTRY IN THE ENERGY TRANSITION: CHALLENGES AND PROSPECTS

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Entek Integrated Resources Limited, 2024

ABTRACTS

Nigerian Oil and Gas Industry currently faces three major challenges – the energy transition, increasing competitiveness on the continent, and the environmental and social menace of crude oil theft and facilities vandalization, which have further made the cost of producing a barrel relatively higher than the competition globally, coming only behind the USA shale oil production cost. These challenges are the major cause of the dearth of investment and financing in the industry, despite its abundant oil and gas resources, and the pivotal roles these resources play in its economic development and transition from developing to developed economy. This paper therefore prescribed some solutions that can mitigate these challenges: it offered for Nigeria to scale up the ongoing wars on crude theft by involving all stakeholders from host community, the local, state and federal governments, and the industry players- operating and service providers to form an umbrella body that can monitor every corner of the Niger Delta in order to fish out the miscreants. The government should also create a special court system separate from the normal judicial system that will also involve the military to expeditiously and transparently prosecute any culprit brought before them. The paper also recommended that Nigeria vigorously pursues the full development of its downstream sector of the industry to become the continental hub for refinery and petrochemicals and blue hydrogen, from its vast natural gas for export as part of the transition fuel. Nigeria also needs to build its banking sectors to be able to secure funds for its oil and gas investments, while the indigenous players are encouraged to work on their corporate governance structure and ESG compliance requirements to attract foreign direct investment into the industry.

Keywords: Fossil fuel, Renewable energy sources, Energy Transition, Green House Gases, Crude oil theft, Pipeline vandalization, Environment, Social and Governance, Foreign Direct Investment,

1.0 INTRODUCTION

Historically, energy has experienced rapid evolution with human civilization as human economic and social development evolves with time. According to the first law of thermodynamics, energy cannot be created or destroyed, and therefore, can only be transformed from one form to another throughout the period of evolution. (Briannica, 2020). The transformation of energy from one form to another is driven by the need to guarantee energy security and to also meet the changing needs, consumption patterns, technological innovation, geopolitical dynamics and environmental implications, demand, and supply dynamics, and of course government policy directions. (World Economic Forum Insight Report, 2018). Energy is broadly categorized as renewable or non-renewable sources, which greatly depends on the capacity of that source to regenerate or replenish itself. Technically, all forms of energy sources

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originate from the sun besides that from nuclear energy, geothermal energy, and tidal power. Solar energy is the source of all bioenergy from biomass on the surface of the earth, and by extension fossil fuels. The Sun is also responsible for the world's winds; causes evaporation of water that is responsible for rain; waves and ocean thermal power are both a result of insolation. (Bhatia, 2014). Renewable energy sources are thus self-regenerative natural sources while non-renewable, though also exist in nature, are not self-replenishing in nature, but experience constant depletion with exploitation and production, such as fossil fuel, the generic name for petroleum crude oil, gas and coal. Fossil fuels are from organic remains of plants and animals or fossils, buried several millions of years, under the action of pressure and temperature in the presence of microbes. Renewable energy sources on the other hand are solar, geothermal, wind, biomass, bioenergy, and hydropower energy. However, nuclear energy can be classified either as non-renewable or renewable energy source depending on the school of thought. (IEA, 2021). Technically, either of the two energy sources, renewable or non-renewables, can become the alternative source at any point in the energy transition, in their quest for better energy quality in terms of energy density, storability, intermittently, transportability, availability, scalability, environmental externalities, and energy return on energy invested minus net energy. (Euanmearns, 2018). Besides these broad classifications, energy systems are also categorized as Green, Clean, or Sustainable: Green energy sources emit near zero greenhouse gases, radiation, or chemical contaminants, and only exerts localized impacts on the environment, as they rarely threaten plant or animal species with habitat loss, population reduction, or extinction. Clean energy does not pollute the environment nor increases the amount of greenhouse gases in the atmosphere, as it only emits negligible amounts of carbon dioxide, radiation, or chemical contaminants. It therefore has minimal to zero carbon and negligible impact on the environment, and this is the core objective of the current energy transition – from dirty and hazardous fossil fuel to cleaner energy sources, such as solar and wind and nuclear power. Green energy and clean energy have a very thin line that separates them: – clean energy is a degree higher than green energy as it literally does not produce greenhouse gas and thus have almost no negative consequences on the environment. (Shipley Energy, 2021). Sustainable energy on the other hand, describes energy sources that not only meet present economic and social needs, but also guarantees the energy requirements of future generations. Kukreja (2021), stated that an energy source requires three basic qualities to be classified as sustainable: (i) it must be naturally replenishable; (ii) ability to improve its energy efficiency through technology, and (iii) must be available in the long term. Sustainable energy sources must also meet economic, political, social, and environmental considerations, meaning that, it must be economically viable, politically supported, socially equitable, and environmentally acceptable. According to Owen and Garniati (2016), sustainable energy can be defined as any economically viable energy resource (not only electricity) that is not, in its lifecycle, a net contributor to climate change and does not have a substantially negative environmental or social impact (actual or potential). Such energy sources must meet a balanced criteria of achieving energy security, economic development, and environmental protection. To meet these requirements, sustainable energy must also be self-renewing such as solar and wind, across many generations. Tidal energy and geothermal heat energy can also be classified as sustainable since the interactions of the moon and the earth will always produce tides, and the mantle of the earth will always give off heat that we can access in regions of volcanic and tectonic activity

2.0 ENERGY TRANSITION

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The International Renewable Energy Agency (IRENA) defines energy transition as a pathway toward transformation of the global energy sector from fossil-based to zero-carbon by the second half of this century. Sovacool ,2017, however added that energy transition involves a particularly significant set of changes to the patterns of energy use in a society, potentially affecting resources, carriers, converters, and services'. Sovacool, 2017 definition presupposes that energy transition is a time dependent process between the first introduction of a new source of primary energy or prime mover, to the time when it captures significant or controlling share in the energy mix. This time dependency has evolved into two schools of thoughts; one group viewed energy transition as an inclusive system that involves not only the national sources of energy supply and their compositional changes, but also viewed energy transitions as involving different things such as the use of fuels, services, and end-use devices that have occurred quite quickly, within a few years. They cited examples such as the adoption of cookstoves, air conditioners, and flex-fuel vehicles (FFVs) at micro levels, and the almost complete transitions to oil in Kuwait, natural gas in the Netherlands, and nuclear power in France that took only a decade as instances of quick energy transition. The second group however, holds that sustainable energy transition generally takes much longer time, far beyond a decade, as to them, energy transitions are prolonged affairs that take decades to accomplish, and the greater the scale of prevailing uses and conversions, the longer the substitutions will take. They viewed that fast transition only occurs as anomalies and mostly in countries with small populations or under unique circumstances that can hardly be replicated elsewhere. The first energy transition from wood to coal occurred around 1600s in Europe due to scarcity of wood to meet the increasing energy demand with coal becoming the dominant enery source in the 1780s. The use of coal soon expanded with the invention of the first coal fired power plant in the world by the French in 1875. (Zou et al 2016). In the United States, though wood was being used side by side with coal, the demand for coal across the country quadrupled between 1880 and 1918 as large amounts of coal were needed in the production of iron and steel as well as in the railroad industry. (NDSU).

Coal soon began to pose environmental challenges at the onset of the 20th century, a condition that gradually paved way for a more qualitative energy source – petroleum in oil and gas. Petroleum was found to be more flexible and adaptable than coal, as kerosene that was refined from crude became more reliable and relatively inexpensive compared to "coal-oils" and whale oil for fueling lamps. Naturally, with these better qualities, and with innovative technologies in the 20th century, the second energy transition occurred with petroleum crude oil taking over from coal as the preferred fuel to power the global economy. Oil also became a strategic energy source and critical military asset in its role during World War 1 in powering ships, trucks and tanks, and military airplanes. (EKT Interactive, 2020, Oil 101). Ague and Oristaglio (2017), added that petroleum product actually became prominent as alternative fuel during World War I due to the invention and use of more advanced war fares; for instance, the British as at World War I in 1914 had only 800 military motor vehicles, which skyrocketed to 56,000 trucks and 36,000 cars by the end of the war after only four years. Just as for coal, the first member of the fossil fuel family, that initiated and powered the industrial revolution, petroleum products, mostly crude oil and gas in combination with coal, began to create severe climatic and environmental problems globally, with very devastating consequences. With more than 70% of the total global energy mix, fossil fuel – coal, oil and gas soon became the world's enemy to sustainable development, causing an increasing call for their replacement to much cleaner energy sources in the family of the renewables, solar, wind, and hydrogen fuels. This is the

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third energy transition and the current topic under discussions and investigation in this paper. (Rodrigue, 2020)

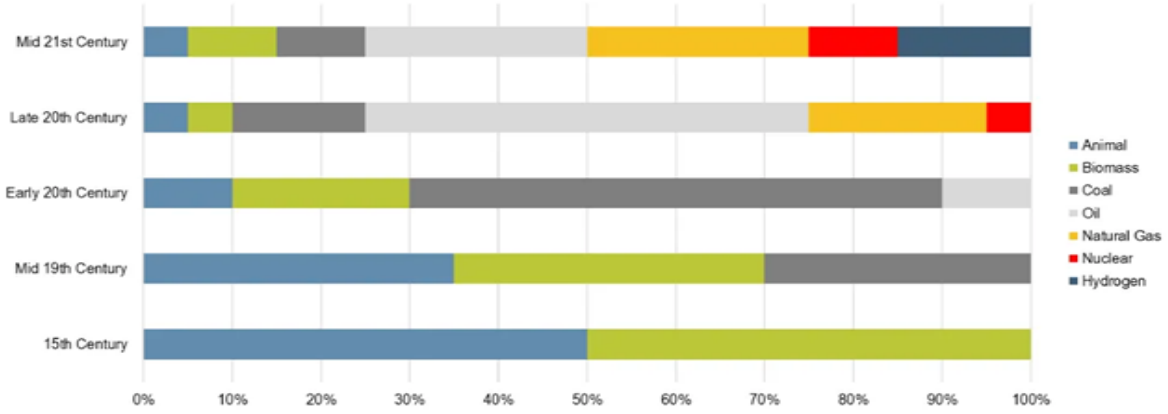

Figure 1: Historical Evolution and Use of Various Energy Sources. Sources: Rodrigue 2020.

3.0 CURRENT ENERGY TRANSITION.

The current energy transition is driven primarily to arrest the rising global temperature, which has resulted to extreme global warming and weather conditions due mainly to high carbon and methane and other greenhouse gas (GHG) emissions into the atmosphere. The transition to renewables is to limit the global average temperature within 1.5OC above pre-industrial level by the end of the century as agreed at the 2015 Paris Climate Summit (or COP21). The gases, five in number that are responsible for total global warming are: Carbon dioxide (CO2) which contributes about 52% of all global warming, Methane is a Shortlived Climate Pollutant (SLCP) that only remains effective for about 12 years in the atmosphere and contributes only 15% of global warming, it is about 84 times more potent than Carbon Dioxide in the first two decades in the atmosphere. The third gas are the Halogenated compounds such as CFCs, HCFCs, HFCs, PFCs, SF6 and NF3 contribute only 11 % of global warming. These are chemical products from diverse sources such as refrigeration, air conditioning, electrical and electronic equipment, medicine, metallurgy, etc., The next GHG are the Tropospheric ozone, which are gases produced from reaction between carbon monoxide (CO), nitrogen dioxide (NO_2) and VOCs (Volatile Organic Compounds), and contribute about 11% of global warming, and only last for a few months in the atmosphere, and finally, finally, nitrous oxide, a product from the use of fertilizers, fuel use, chemical production, and sewage treatment, contributes around 11% to the global warming. (Acciona, 2019). Lindsey and Dahlman (2020), remarked that the current rise in global temperature above the pre-industrial period of 1880-1900 is due to accumulated heat in the atmosphere, and considering the size and tremendous heat capacity of the ocean, this rise is very significant. It shows that the heat absorptive capacity of the ocean has been impacted seriously. This is what is now driving regional and seasonal temperature extremes, reducing snow cover and sea ice, intensifying heavy rainfall, and changing habitat ranges for plants and animals. Figure 2 is a chart of historical global average anomaly from 1870 to 2020, showing clear steep temperature rise from 1940,

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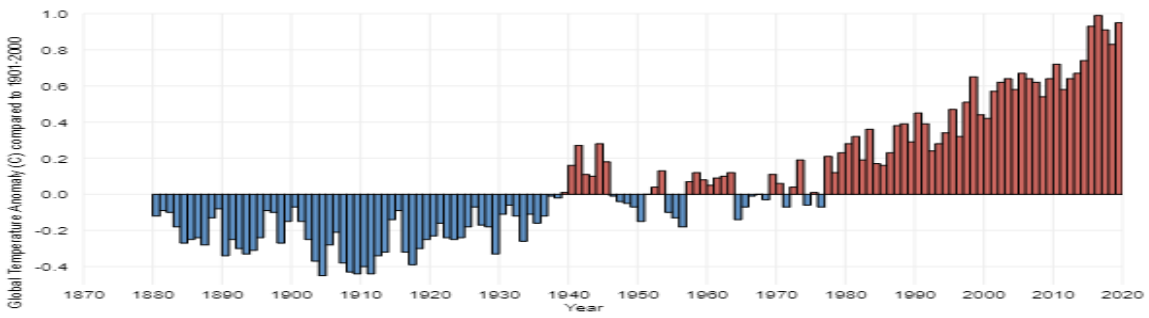

Figure 2: History of global surface temperature since 1880; Source: Lindsey and Dahlman (2020)

Figure 3 shows that the global-mean temperature figures provided by ERA5 breached the 1.5ºC limit in the first week of June 2023.

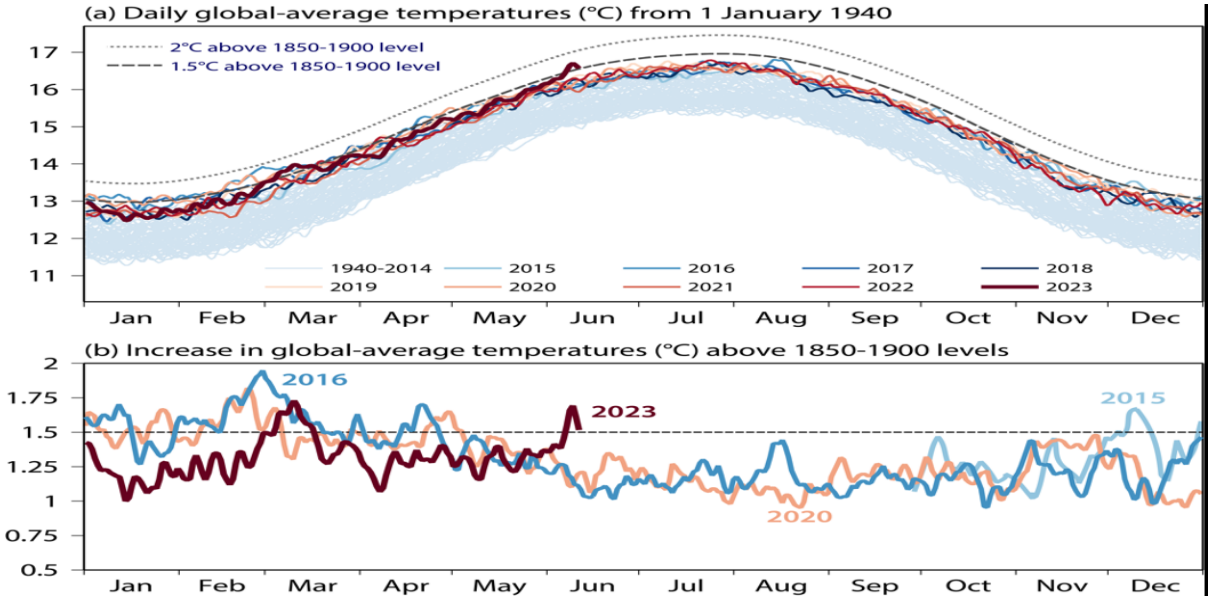

Figure 3 (a) Global-mean temperature (ºC) averaged for each day of ERA5 from 1 January 1940 to 11 June 2023 (b) Global-mean temperatures for 2016, 2020 and parts of 2015 and 2023 expressed as differences (ºC) from 1850-1900 levels. Source: ClimateCorpernicus, 2023

According to the European Union-funded Copernicus Climate Change Service (C3S) implemented by ECMWF, the earth just had its hottest three months – June, July and August 2023, on record, and that global sea surface temperatures are at unprecedented highs for the third consecutive month and Antarctic sea ice extent remains at a record low for the time of year. August 2023 as a whole saw the highest global monthly average sea surface temperatures on record across all months, at 20.98°C. Temperatures exceeded the previous record (March 2016) every single day in August 2023. This has elicited very critical comments from global leaders as compiled by World Meteorological Organization, WMO, on September 6, 2023

“Our planet has just endured a season of simmering -- the hottest summer on record. Climate breakdown has begun. Scientists have long warned what our fossil fuel addiction will unleash.

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Surging temperatures demand a surge in action. Leaders must turn up the heat now for climate solutions. We can still avoid the worst of climate chaos – and we don't have a moment to lose, " said UN Secretary-General António Guterres.

"The northern hemisphere just had a summer of extremes – with repeated heatwaves fuelling devastating wildfires, harming health, disrupting daily lives and wreaking a lasting toll on the environment. In the southern hemisphere Antarctic sea ice extent was literally off the charts, and the global sea surface temperature was once again at a new record. It is worth noting that this is happening BEFORE we see the full warming impact of the El Niño event, which typically plays out in the second year after it develops" says World Meteorological Organization Secretary-General Prof. Petteri Taalas.

"Eight months into 2023, so far we are experiencing the second warmest year to date, only fractionally cooler than 2016, and August was estimated to be around 1.5°C warmer than pre-industrial levels. What we are observing, not only new extremes but the persistence of these record-breaking conditions, and the impacts these have on both people and planet, are a clear consequence of the warming of the climate system," comments Carlo Buontempo, Director of the Copernicus Climate Change Service, ECMWF.

The IEA in its August 2023 update on GHG reported the emission trend from 1971 to 2021, which showed

That fossil fuels continued to represent 80% of the total energy supply (TES) globally, with oil comprising nearly 30%, followed by coal (27%) and natural gas (24%). Global emissions from fuel combustion were dominated by coal (44%), followed by oil (32%) and natural gas (22%). China and the United States together were responsible for 45% of the global fuel combustion emissions, followed by European Union, India, the Russian Federation and Japan.

Unfortunately, fossil fuel that powered global industrialization and economic growth and development has become its worst enemy due to the harsh environmental problems associated with its use. This has resulted in the current push for accelerated energy transition to arrest the global devastation caused by the greenhouse gas emissions. The transition is therefore to move away from fossil fuel or non-renewable energy sources to much cleaner renewable energy sources. According to the Intergovernmental Panel on Climate Change (IPCC), the United Nations body for assessing the science related to climate change, 25% of C02 emissions come from electricity and heat production, while a further 24% come from agriculture, forestry, and other land use. Industry accounts for 21%, and transportation 14%, and a whopping 60% of global greenhouse gas emissions are from fossil fuels, through the emission of greenhouse gas into the atmosphere that is slowly causing the global temperature to rise above pre-industrial levels. This has caused and is causing devastating effects on nature and humans such as rising sea levels, and extreme weather events like floods, droughts, and brushfires, and of course, debilitating health consequences, food insecurity, human migration from devastated environment to political consequences and civil unrest as witnessed in Nigeria between the cattle herdsmen and the indigenous farmers in the middle belt states of Benue and Plateau. It was in its attempt to arrest the deterioration that led the Intergovernmental Panel on Climate Change (IPCC) of the United Nations, to issue stern warnings that global warming from pre-industrial levels must not exceed 1.5°C to avoid irreparable damage to the planet. This further

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led to the coming together of 196 countries in 2015 to pledge to work together to slow global warming by cutting emissions and other steps under a collective Paris Agreement, the world's first comprehensive climate change agreement. The main goal of the Paris Agreement as stated in Article 2.1 a is to keep the global average temperature to well below 2 °C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 °C, while Article 4.1 emphasizes attaining Net Zero Emissions and Decarbonization in the second half the century. However, these efforts seem to look like a drop of water in an ocean as report by the European Union-funded Copernicus Climate Change Service (C3S) implemented by ECMWF, showed that the global temperature already breeched the 1.5oc in June 2023, with August 2023 as the hottest month in 2023 since 2016.

4.0 LOW CARBON TRANSITION AND NET ZERO EMISSION

Energy transitions are basically a shift away from the present production and consumption patterns using different technologies and sources, and so, a low-carbon energy transition is a conscious shift from high-carbon energy sources such as oil, gas and coal to low-carbon and zero-carbon energy sources such as renewables. Achieving this global shift to low carbon energy sources is seeking to comply with Article 2.1 of the Paris Agreement with a main goal keeping the global average temperature to well below 2 °C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 °C, while Article 4.1 emphasizes on attaining Net Zero Emissions and Decarbonization in the second half the century. However, the recent IPCC report of August 9, 2021 has resonated with how critical the global climatic situation has become, which is a clear testimony of the impact of global rising temperatures and the consequences in all the regions of the world. The report showed that, it is almost too late to stop the rising global temperature not to exceed the 1.5oC beyond the pre-industrial level, and therefore calls for immediate, rapid and large-scale reductions in greenhouse gas emissions. This report has created a sense of urgency among citizens, companies and politicians, as record heat, biodiversity loss, extreme weather and ice melting all point to the same conclusion: humanity is losing the fight against global warming. Scientific models have shown that emissions must fall between 25% and 50% through 2030 to limit warming to levels outlined in the Paris accord—below 2º Celsius above pre-industrial levels, or preferably 1.5°C. Emission levels fell a record 7% in 2020 due to coronavirus lockdowns. (Lombrana, 2021). The current transition is therefore to reduce as quickly as possible the quantum of GHG emissions into the atmosphere to arrest the imminent climatic apocalypse, and this would require a deliberate pathway that will achieve the low carbon transition and net zero emissions while also maturing renewables sources and making them readily available and adaptable. The pathway will also include carbon capture and storage technologies and other GHG leakages such as methane leaks into full gear. While the term "energy transition" implies a shift away from fossil fuels, the term "low carbon transition" is intended to suggest a focus on the overall lowering of GHG emissions from the energy sector independent of fuel or technology. On the other, "net zero emissions" or "Paris Agreement compliant" are rather too specific and exclude a wide range of industry and government actions that are moving in the direction of a low carbon transition, although not yet at a scale or intensity to reach net zero or the Paris Agreement's 1.5 degree scenario. (Johnson, 2020).

Technically, Net Zero Emissions means not adding new emissions to the atmosphere, while existing emission sources will be balanced by absorbing an equivalent amount from the

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atmosphere. The United Nations has set a Net Zero Target for 2050 and has been working with governments and organizations to make pragmatic commitments to achieve carbon neutrality, or "net zero" emissions within the next few decades. Though a huge task that requires immediate ambitious actions, it also requires that countries demonstrate how they will achieve these targets as submitted in their Nationally Determined Contributions, NDCs.(UN, 2020). In achieving the Net Zero Emissions, the focus is to eliminate or reduce these greenhouse gases; carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), sulphur hexafluoride (SF6) and specified kinds of hydro fluorocarbons and perfluorocarbons. These emissions are generally measured as kilotonnes of carbon dioxide equivalence (CO2-e), this is because carbon dioxide has been set as having a global warming potential of one. This means that one tonne of methane released into the atmosphere will cause the same amount of global warming as 25 tonnes of carbon dioxide, therefore the one tonne of methane is expressed as 25 tonnes of carbon dioxide equivalence, or 25 t CO2-e. (Clean Energy Regulator, 2021)

5.0 BRIEF ON NIGERIAN OIL AND GAS RESERVES AND PRODUCTION CAPACITY

According to the Chief Executive Officer of Nigerian Upstream Petroleum Regulatory Commission, NUPRC, Engr Gbenga Komolafe, Nigeria currently holds a combined 37.50 billion barrels of crude oil and condensate reserves as of January 2024, and a combined associated and non-associated gas reserves of 209.26 trillion cubic feet of gas as reserves. According to Engr Komolafe, Crude Oil and condensate were recorded at 31.56 billion barrels and 5.94 billion barrels, respectively, while the reserves of Associated Gas and Non-Associated Gas were reported at 102.59 TCF and 106.67 TCF, respectively. (NUPRC, 2024). These reserves figures represent 30 per cent and 34 per cent of the African oil and gas reserves respectively according to Engr Komolafe. (Nnodim, 2024). Notwithstanding these reserves, the federal government is working towards growing oil and condensate reserves to some 50 billion barrels in the short to medium term, with a daily production rate of 4 million barrels per day during the same period. (Ugbodaga, 2021).

The country's daily production as at October 31, 2024, stands at 1,538,129 barrels oil per day (made up of 1,333,322 barrels of crude oil per day, and 204,807 barrels of condensate per day), according to NUPRC crude oil and condensate production statistics for 2024. excluding condensates, as at September 2021 (Vanguard, 2021), while figure 4 shows the historical oil production with average production of 1.824 million barrels per day from 1973 until 2024, reaching an all-time high of 2.475 million barrels per day in November of 2005. The production has since hovered around 2 – 1.5 million barrels per day, due to several reasons, from the delay in passing the petroleum industry bill, to militancy in the Niger Delta region, and of recent restriction imposed by OPEC. However, Engr Komolafe has repeatedly assured Nigerians and the global oil market that the commission has been working assiduously to ensure that the Petroleum Industry Act is effectively implemented for growth in oil and gas reserves as well as achieving the national average daily production target set at 2.5 million barrels of oil and condensate per day in the near term. He stressed that the national technical production potential currently stands at 2.26 million bpd even though the current OPEC quota is 1.5 million bpd. He however, noted that closing the gap between the actual oil production and the technical potential presents a window of investment opportunities for investors and a significant

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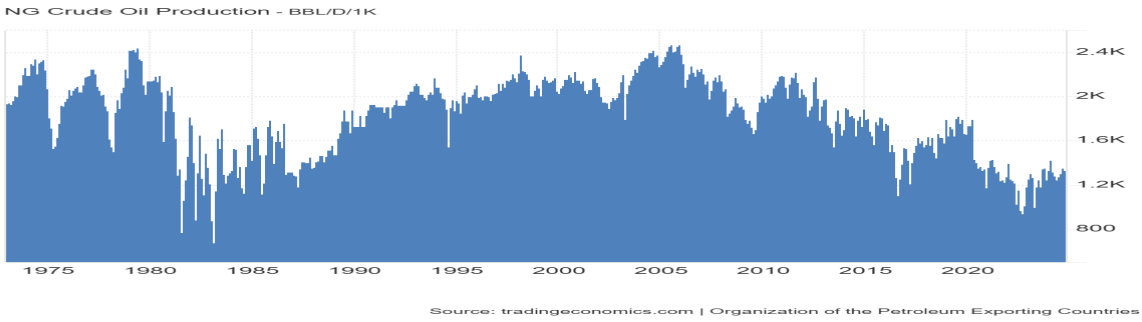
opportunity for Nigeria to unlock additional revenue streams, address the current foreign exchange gap and strengthen economic resilience. (Nnodim, 2024).



https://tradingeconomics.com/nigeria/crude-oil-production

Figure 4: Nigerian historical daily crude oil production.

In terms of gas production, Nigeria's recorded a daily average production of 220.396 bcf of gas in October 2024, made up of 134.524 bcf of associated gas, and 85.87 bcf of non-associated gas respectively. With gas reserve of 209.26 trillion cubic feet, and a potential of 600 trillion cubic feet of gas, Nigeria stands as 6th world gas reserves holder, and given this huge resources, the Federal Government in March 2021, declared 2021- 2030 as the "Decade for Gas" with a view to diversifying and uplifting the economy, and to also to make gas as the pivot of the industrialization of the Nigerian economy. The gas economy will leverage on Compressed Natural Gas, CNG, AutoGas and Liquefied Petroleum Gas, LPG, as alternative fuel sources to petrol, especially in the transition and to also curb the menace of fuel subsidy that is eating deep into the purse of the federal government. (Esiedesa, 2021).

6.0 DEVELOPING NIGERIA'S VAST OIL AND GAS RESOURCES

Nigeria sustainable economic growth and its ability to settle its ballooning national debt is tied to its oil and gas revenues, and if Nigeria must produce significant portion of its vast oil and gas reserves under the net zero transition period, it must engage all stakeholders in the industry to ensure that its oil and gas operations comply with net zero protocols. Otherwise, according to the study by Welsby et al, 2021 which projected that 60% of global oil and gas reserves will have to be left in the ground if the world would serious pursue the 1.5OC temperature profile, Nigeria stands the risk of leaving substantial volume of its hydrocarbon reserves unproduced. Since the country is projecting to have 50 billion barrels of oil reserves, with a daily production projection of 4 million barrels of oil per day, it must involve the stakeholders in the entire value chain to achieve these feats. Besides, decarbonization of the atmosphere, there is also the recent Methane Pledge championed by the EU and the US and other major global players to cut down methane by 30% by 2030 and knowing that methane is a major component of natural gas, this will further put a lot of pressure on the national hydrocarbon sources.

6.1 Mitigating Green House Gas Emissions

To optimally produce its vast hydrocarbon resources under the global net zero emission scenarios, the country must mitigate both carbon dioxide and methane emissions, which will

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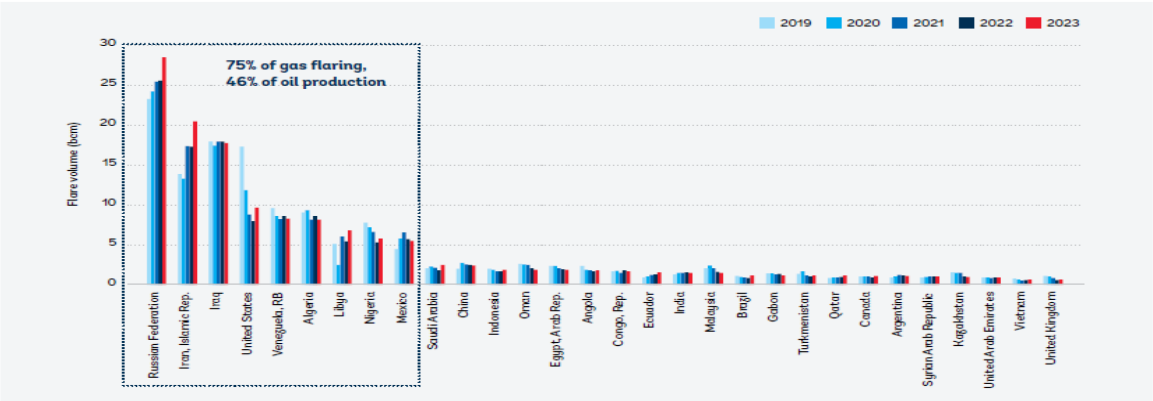
involve capital investment, and this is where it must open up its business environments for inflow of funds and technologies. It will also require well-policed policies and clear enforcement protocols, to ensure that oil and gas companies- IOCs, Nigerian Independents, and the Marginal Field operators, and associated industries such as refineries, fertilizer plants, etc, collaborate with the National Oil Company, NNPC, and the regulatory authorities to combat the GHG emissions from the Oil and Gas industry. Consequently, the Nigerian Upstream Petroleum Regulatory Commission (NUPRC) as part of its sustainability drive in the oil and gas industry, hosted a delegation from the U.S. Department of State's Bureau of Energy Resources and Deloitte on December 5, 2024, to deepen collaboration on methane abatement, decarbonisation, and emissions management in Nigeria's upstream operations. During the engagement, Engr Komolafe outlined NUPRC's initiatives aimed at reducing carbon emissions, such as establishment of the Energy Sustainability and Carbon Management Division, and collaboration with multilateral agencies, development institutions, and US-based entities (such as the US Department of Energy, and the Net-Zero World Initiative). Engr. Komolafe also highlighted the evolving regulatory framework on gas flaring and emissions reduction in Nigeria's upstream operations which resulted in the issuance of the methane management guidelines in 2022 and the Flaring and Venting Regulations in 2023. He further mentioned other areas of cooperation to support Nigeria's decarbonization plans including Carbon Capture and Storage (CCS) solutions and the development of carbon credits earning framework to incentivize decarbonisation and emission reduction projects. (NUPRC, 2024). One way of ensuring Net Zero Compliance in the oil and gas industry is to demand that oil and gas companies submit Environment, Social and Governance, ESG, documentations, similar to the requirements by financial institutions, as part of every field development programmes (FDP), and as part of all applications for permits and approvals in their work programme activities. The government must also seek the collaboration of the financial institutions and their regulators in this, just as is done in other jurisdictions to support the Net Zero emission programme in Nigeria. These steps are necessary as the country continues to struggle with its Zero Gas Flare targets including the 2020 target under its National Gas Policy. Based on the June 2024 World Bank report on gas flaring, the Russian Federation, the Islamic Republic of Iran, Iraq, the United States, República Bolivariana de Venezuela, Algeria, Libya, Nigeria, and Mexico remain the top nine flaring countries in 2023. Together, these nine countries are responsible for 75 percent of global gas flaring, but just 46 percent of global oil production

Figure 5. Flare volumes in the top 30 flaring countries, in order of 2023 flare volume with the top 9 flaring countries indicated, 2019–23



Source: Payne Institute and Colorado School of Mines, National Oceanic and Atmospheric Administration (NOAA), World Bank.
Note: bcm = billion cubic meters.

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Figure 5: Flare volume in the top 30 flaring countries and top 9 flaring countries indicated for 2019-2023

The Nigerian government had, as part of its strategic plan to eliminate flaring, launched the Nigerian Gas Flare Commercialization Programme (NGFCP) on December 13, 2016, with the objective of not only putting out the flares but to also commercialize the flare gas from identified flare sites in the country. However, in furtherance of its mandate in Section 7 (e) and Section 105 (2) of the Petroleum Industry Act, 2021, the Commission, in the third quarter of 2022, restructured the NGFCP and re-launched the programme to align with the provisions of the PIA, as well as reflect prevailing economic and operational realities. Consequently, the NGFCP has awarded 42 indigenous oil and gas companies so far to manage 49 flare sites in the 2022 Nigerian Gas Flare Commercialization Programme (Akintayo, 2023)

6.2 Value chain optimization of Nigerian hydrocarbon resources

Another major challenge that stares Nigeria in the face is the fact that most of the major buyers of its crude in Europe and Asia – Netherlands, Indonesia, France, India, Spain, are themselves strong advocates of energy transition from fossil fuel to renewables. Data from Nigerian Bureau of Statistics, NBS showed France overtaking the Netherlands (a major European refining hub), as the biggest buyer of Nigerian crude oil, purchasing products worth N2.5 trillion in the first quarter of 2024, while Nethe lands imports from Africa's top producer was valued at N1.5 trillion. Spain and India occupied second and fourth positions as they purchased Nigerian crude worth N1.72 trillion and N1.3 trillion respectively as of March 2024. (Oladehinde, & Ibrahim (2024). One of the top buyers, India has since indicated its full support to double its efforts in renewable energy to secure energy supply and self-reliance. The transition has also influenced corporates in India who have also shifted focus to clean energy to decarbonise their operations. Investors in the conventional India's energy industry had invested about $6.6 billion in renewables sector in the first four months of 2021, which could easily overtake the record of $8.4 billion in 2020, according to the Institute for Energy Economics and Financial Analysis (IEEFA). Also, India's financial institutions like State Bank of India (SBI) and Power Finance Corporation (PFC) now include more renewable energy assets than fossil fuels, a trend that has picked up significantly in the last one to two years. Apart from India, other major consumers of Nigeria's crude oil such as Spain, Netherlands, and France are no longer considering petrol as a priority, due to the ambitious European Union plan to speed up the switch to zero-emission electric vehicles (EVs) as part of a broad package of measures to combat global warming.(Oladipo, 2021). Besides their investments in renewable energy, most of these traditional buyers are also shifting their attention towards cheaper US, Russian and Latin American oil because they see the Nigerian grades as relatively pricey, with traders reluctant to offload the country's cargoes. For instance, India purchased only N1.3 trillion of Nigeria's crude oil in the first quarter of 2024, a decline from an average of N2 trillion purchased between 2018 and 2021. (Oladehinde, & Ibrahim (2024)

6.2.1 Refining Capabilities

Coincidentally, the coming on stream of Dangote's 650,000 barrels per day refinery plant, and the NNPCL owned refinery plants, places Nigeria in a very advantageous position to process most of its produced crude oil in country and export the excess over domestic consumption to

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earn foreign exchange for the country. These developments also enviably position Nigeria as potential Africa's refined product hub that can readily bridge the supply gap on the continent. According to the 2021 BP Statistical Review of World Energy, while Africa produces between 7.6 – 10 million barrels of oil per day, it consumes marginally between 3.4-4 million barrels of oil per day, out of which it imports between 1.5 – 2 million barrels per day, also due to limited installed refinery capacity which stands at 2.2 million barrels per day. For the first time in several decades, Nigeria became an exporter of petroleum products as Dangote Refinery successful exported petrol to Cameroon, Ghana, Angola, and South Africa among others. According to the Vice President of Oil and Gas, Dangote Industries Limited, Dr. Devakumar Edwin, the group have also exported several metric tonnes of Diesel to several destinations internationally, while their jet fuel is being heavily exported to European markets. (Apkan, 2024).

6.2.2 Petrochemical Opportunities

Besides producing petroleum fuels from its oil and gas resources, Nigeria can also take advantage of the growing demands of petrochemical products globally. According to a report by IEA in 2018, petrochemicals are found across a vast range of modern products from plastics, fertilizers, packaging, clothing, digital devices, medical equipment, detergents, tires and many others. They are also found in many parts of the modern energy system, including solar panels, wind turbine blades, batteries, thermal insulation for buildings, and electric vehicle parts. Petrochemical feedstock accounts for 12% of global oil demand, a share that is expected to increase driven by increasing demand for plastics, fertilizers and other products. IEA, 2018 report also stated that demand for plastics – the most familiar group of petrochemical products – has outpaced that of all other bulk materials (such as steel, aluminium or cement), and has nearly doubled since 2000, and that advanced economies, such as the United States and Europe, currently use up to 20 times as much plastic and up to 10 times as much fertiliser as developing economies such as India and Indonesia, on a per capita basis. All these underscores huge potential for growth worldwide. IEA further projected that this growth in demand for petrochemical products means that petrochemicals are set to account for over a third of the growth in oil demand to 2030, and nearly half to 2050, ahead of trucks, aviation and shipping. Petrochemicals are also poised to consume an additional 56 billion cubic meters of natural gas by 2030. (IEA, 2018).

6.2.3 Blue Hydrogen outlets for natural gas

Besides the petrochemicals and refinery plants, and the traditional natural gas commercialization pathways such as LNG, CNG, LPG, and lean gas for power, Nigeria can also pursue the commercialization of its vast natural gas resources through blue hydrogen fuel. Hydrogen is the simplest element, and the most abundant substance in the universe. When hydrogen burns, it generates energy in the form of heat, with water as a by-product. That means energy created from hydrogen generates no atmosphere-warming carbon dioxide, making it one of many potential energy sources that could help reduce carbon emissions and slow global warming. Production of blue hydrogen from natural gas leverages on carbon capture and storage technologies (CCS) technologies to limit the carbon intensity of hydrogen production from natural gas. At present, over 95% of hydrogen fuel is produced through the steam methane reforming (SMR) of natural gas, which is a carbon-intensive process that requires the

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application of CCS technologies to limit CO2 emissions. (Shell Catalysts & Technologies, 2020). Figure 6 shows the chart of global hydrogen forecast by Prededence Research, 2024. The global hydrogen market size is calculated at USD 262.13 billion in 2024, grew to USD 282.63 billion in 2025 and is projected to reach around USD 556.56 billion by 2034. The market is expanding at a CAGR of 7.82% between 2024 and 2034. The Asia Pacific hydrogen market size is calculated at USD 94.37 billion in 2024 and is expected to grow at a CAGR of 7.95% during the forecast year.

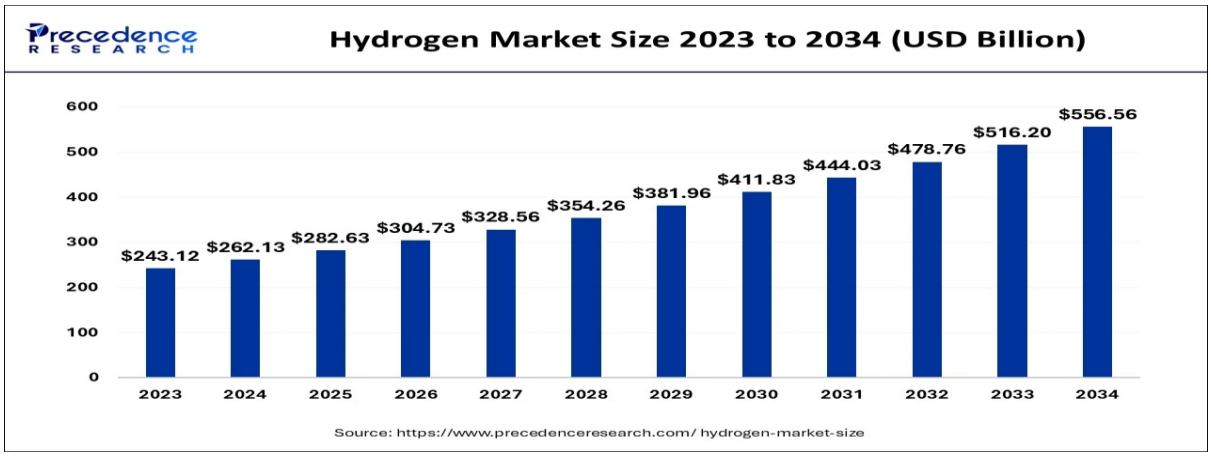

Figure 6: Global Hydrogen Market Size Projection: Source: Precedence Research, 2024.

According to the IEA, green hydrogen from renewables will reach 322.6 million metric tons by 2050 while Blue hydrogen from natural gas with CCSU is expected to reach some 203.8 million metric tons by 20250.

7.0 CHALLENGES IN FOSSIL FUEL FINANCING IN ENERGY TRANSITION

The net zero pathways of the advanced economies are all geared towards shifting investments from fossil fuel to renewables to achieve global emission targets by 2050, and this has resulted into pressures from both government and corporate organizations to implement and enforce policies that will shift finance away from fossil fuel investment, particularly those investments in the most "carbon-intensive" industries. As part of its obligations towards the net zero targets, the World Bank stopped the financing of upstream oil and gas projects from 2019, which has served as catalysts for the financial services industry which includes multilateral, and commercial lenders, such as the European Investment Bank, the UK Export Finance (UKEF), several export credit agencies, many investment funds and most international commercial banks, to pledge to curb their investments in fossil fuels. All these are points to the fact that the traditional source of financing for oil and gas projects is narrowing by the day. (Sweny et al, 2021). The United Nations Secretary General, Guterres, has also repeatedly pressed for commitments from member countries to pursue carbon neutrality by 2050. His target is for all nations, cities, financial institutions, and corporate organizations to work towards a net-zero plan that can reduce global emissions by 45 percent by 2030 compared with 2010 levels. He also demanded that global finance aligns with the Paris Agreement and the Sustainable Development Goals. The alignment should also create a carbon tax, which is a shift from income tax from taxpayers to polluters. As one of the enforcement strategies, Guterres also

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requested that companies be mandated to disclose climate-related financial risk, plus inclusion of carbon neutrality targets in their economic and fiscal decision-making, and that banks and other financial institutions pay attention to net zero obligations in their lending, with a provision that that asset owners and managers provide details on how they would decarbonize their portfolios.

7.1 Institutional funds shift away from fossil fuel

Already, a group of 27 banks out the big 60 global banks had reduced their funding of fossil fuel projects with European banks in the forefront as shown in figure 7, which is in line with the UN expectations

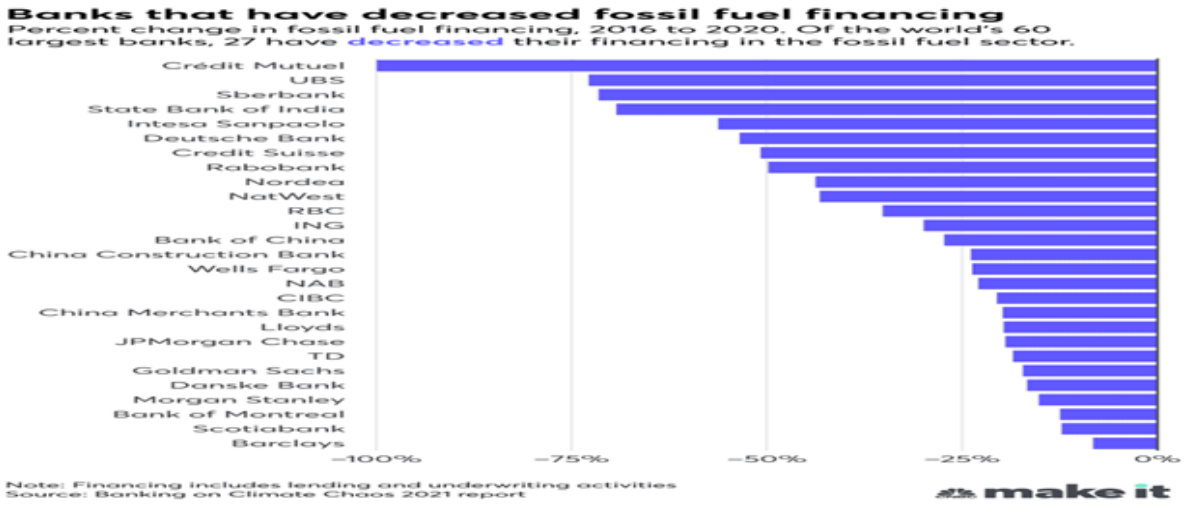

Figure 7: Banks that have decreased fossil fuel financing. Source: Clifford, 2021

Environmental, social and governance (ESG) principles, the non-financial factors that investors look at when identifying risk and growth opportunities constitute the fastest-growing asset class in the world. Deloitte expects some 50 percent, or $34.5 trillion, of all professionally managed money in the US will flow into ESG-compatible investments by 2025. Also, Aviva Investors and Fidelity International, alongside another 113 investors overseeing assets worth $4.2 trillion, urged 63 of the world's global banks to up their game on climate change, including the publication of short-term climate targets compliant with the International Energy Agency (IEA)'s net-zero scenario before annual shareholder meetings. (Meyer, 2021). Another set of about 1,500 investment institutions overseeing a combined $39.2 trillion of assets have also in October 2021, committed to divesting from fossil fuels. This came on the heels of the $16 billion Ford Foundation, that also announced that it has ceased to invest in fossil fuels, and Harvard University also pledged to fund fossil fuel from its giant $42 billion endowment. Other groups like the New York City's pension funds is also divesting about $4 billion worth of fossil fuel-related investments and Canada's second-largest pension manager, Caisse de Depot et Placement du Quebec, have announced that they will sell billions of dollars' worth of oil assets, including large equity stakes in Canada's top crude producers, as part of a new strategy that aims to dramatically cut the emissions from its investments. (Marsh, 2021).

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Also, Europe's biggest pension fund, ABP of the Netherlands, has joined the divestment train as it plans to blacklist fossil fuels due to pressure from activists and customers alarmed at the prospect of a climate catastrophe caused by carbon emissions. The Group, also in October 2021, announce that it will divest 15 billion euros (US$17.4 billion) worth of fossil fuel assets by early 2023, as part of its plan for a more ambitious CO2 reduction goal next year (Marsh, 2021). The Commonwealth Bank, Australia's largest lender, has broken ranks with rivals and will stop financing fossil fuel companies that aren't compliant with the Paris climate goals by the end of 2024. According to the bank, its clients that fail to meet an emissions pathway consistent with keeping global temperature increases to the "well below 2C goal of the Paris agreement" would not receive "new corporate or trade finance, or bond facilitation with a maturity beyond 31 December 2024". The bank set "core criteria" including having a medium-term emissions reduction plan to 2035 and a net-zero ambition covering at least 95% of the carbon pollution from extraction and processing, (Hannam, 2024). Another major Bank, Barclays bank has also announced that it will restrict lending to energy businesses that plan to expand their fossil fuel production, as it comes under severe pressure. Barclays was the biggest funder of the fossil fuel sector in Europe between 2016 and 2021 according to an environmental report. The bank has what it called a Climate Change Statement, announced that it would no longer provide direct funding for projects designed to expand oil and gas production, or infrastructure related to such projects. It said it would also end direct funding for any oil and gas projects in the Amazon or in the Arctic Circle, or which were aimed at extracting, processing or transporting oil from oil sands. (Leggett, 2024).

7.1.1 Additional limiting criteria by financial institutions

Besides the obvious shifts away from fossil fuels, financial institutions, especially, commercial banks have also incorporated in their investment policies environmental and social sustainability objectives, which tend to set out general criteria, including enhanced reporting obligations and in many cases restrict or prohibit investments in certain sectors. Many banks have thus introduced enhanced monitoring and reporting of, rather than an outright curb on, such investments, with a focus instead on increasing investment in more renewable energy to achieve a more sustainable energy investment portfolio. The Capital markets are not left out in this as there is already a growing shift in the attitudes of institutional investors away from fossil fuels as pressure from asset managers and shareholder votes lead to pledges to reduce production of, and operations using, fossil fuels. (Sweny et al, 2021). According to IEA, 2021, an increasing number of banks, pension funds, insurance companies, and institutional and private investors are limiting their exposure to certain types of fossil fuel projects: the primary focus has been on coal, but restrictions are increasingly seen on some oil and gas projects as well. Also, there are stern oppositions to new infrastructure projects arising from a combination of local environment issues with a push to keep fossil fuels in the ground. The result has been lengthy permitting procedures and litigation leading to project delays and cost overruns. In other cases, projects have been indefinitely postponed or cancelled, and such Infrastructure bottlenecks can create price discounts in local markets and serve as a major disincentive to new upstream investment. (IEA, 2021).

7.2 Institutional investors that support fossil fuel energy

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However, while the United Nations and the Heads of Governments are pushing for reduction in the funding of fossil fuel, financial reports on this haven't been very encouraging, as shown in figure 8 as reported by Urgewald, an oil and gas research group of a German environmental and human rights NGO. (Young, 2024). The NGO further noted that an estimated 96% of oil and gas companies are exploring and developing new reserves across 129 countries, would unlock the equivalent of 230 billion barrels of untapped oil and gas, the production and burning of which would, they calculated, release 30 times as much as the EU's annual greenhouse gas emissions. Some of these activities, according to the NGO is coming "frontier countries" such as South Africa, Namibia, Mozambique and Papua New Guinea that have little or no existing oil or gas production, which risks locking them into a fossil fuel future.

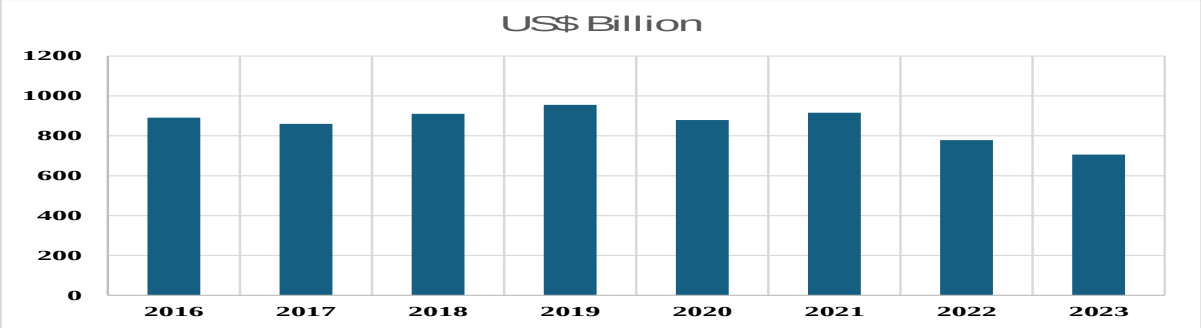

Figure 8: Banks funding of fossil fuel: Source: Young (2024)

The NGO also reported that only five countries the United States, Canada, Australia, Norway and the United Kingdom are responsible for over half of new oil and gas extraction planned by 2050, with the US alone accounting for a third (Young, 2024). The NGO added that while more than half of the banks have reduced fossil fuel funding in recent years, a handful in Europe investors have increased their financial commitment. Such entities as pension funds, hedge funds, sovereign wealth funds and insurance companies hold some $5.1 trillion in bonds and shares in fossil fuel companies, of which the vast majority are in companies actively developing new fossil fuel assets. The NGO further noted that institutional investors in the US, the world's biggest oil and gas producer, account for over 60% of all global investments. (Young, 2024). Some of these institutional investors that continue to provide financing for oil and gas projects do so under very stringent conditions that monitor and mitigate the environmental and social impact of such projects. These banks are often influenced by the Equator Principles, which were established in 2003 in response to the increasing pressure faced by the commercial banking market to ensure that the projects they financed observed the highest environmental and social standards. The Equator Principles are a risk-management tool and have been subscribed to by signatory financial institutions known as Equator Principle Financial Institutions (EPFIs) which currently comprise more than 100 financial institutions across 38 countries. There have been multiple iterations of the Equator Principles, the latest of which is known as "EP4" and was adopted in 2020 (affecting transactions entered into on or after 1 October 2020). The Equator Principles apply to, among other things, project finance and advisory services to project-related corporate loans and bridge loans. While the Equator Principles are primarily a set of voluntary principles to be followed by lenders, compliance with the Equator Principles is not possible unless the borrower carries out certain steps in assessing and managing risk. EP4 is more stringent than previous iterations of the Equator

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Principles and will have a significant impact on the development and financing of oil and gas projects regardless of the jurisdiction. (Sweny et al, 2021).

8.0 FINANCING NIGERIA'S OIL AND GAS INDUSTRY IN THE ENERGY TRANSITION

The world arguably is on the pathway to eliminating GHG emissions by 2050, with strong emphasis on reduction of fossil fuel production and consumption, at a time when the African continent shows very promising hydrocarbon discoveries. For African to develop these resources, it must evolve its funding strategy as international finance institutions and organizations shift their finances from fossil fuel development to renewables. It is, however, ironic that these industrialized countries built their economies on fossil fuel are the champions that are pushing for the developing economies to abandon their hydrocarbon resources for renewables. It's no secret that Africa contributed marginally (less than 4%) of the global emissions as shown in figure 10, while the same advanced economies also continue to heavily subsize fossil fuel consumption as shown in figure 9

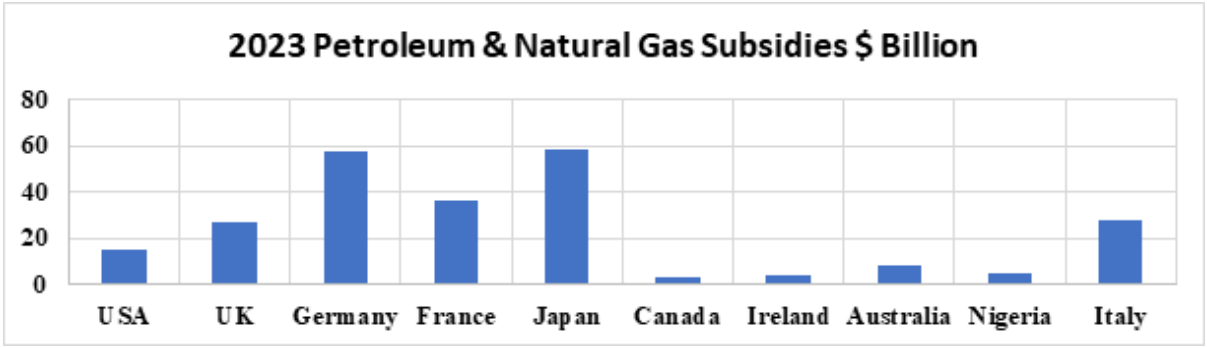

Figure 9: 2023 Petroleum and Natural Gas Subsidies of selected countries: Source Fossil fuel subsidy tracker

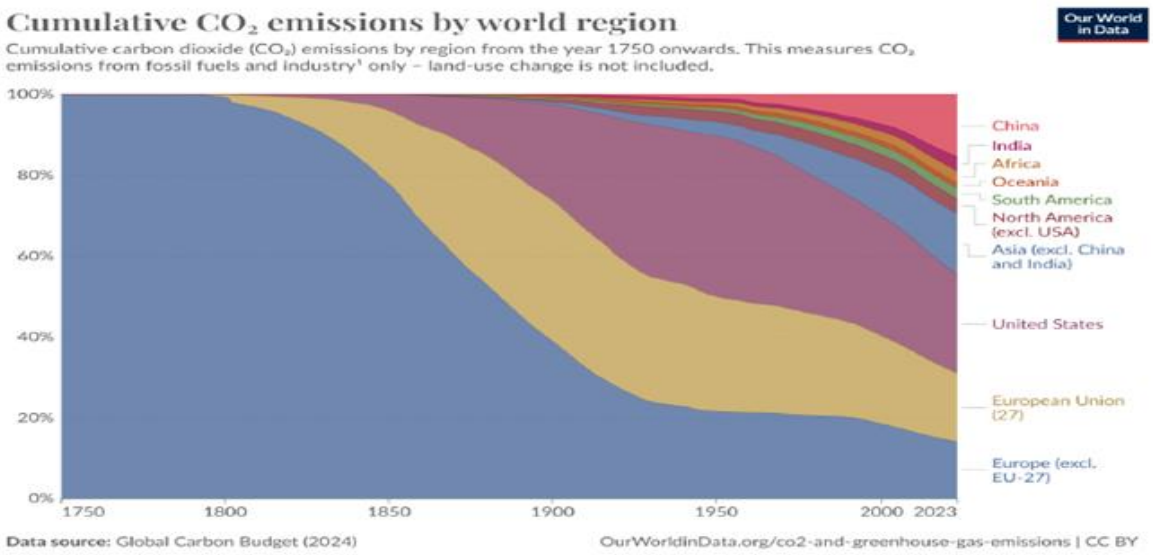

Figure 10: CO2 emissions by World regions – 1750 to 2023: Source: Our World in Data, 2024

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Africa must take its resource destiny in its hand if it must harness the full potential of its vast hydrocarbon resources and plough back the proceeds into sustainable development and poverty alleviation of the continent. Like the developed economies, Africa also requires energy intensive fossil fuel power as it cannot rely on unreliable renewable sources for its sustainable growth. (RegenPower, 2021). The continent must therefore press to utilize its fossil fuel energy sources to generate the required quantities of energy required for industrial factories and business sectors to create millions of jobs and drive economic diversification. (Ramachandran, 2021). It urgently requires large scale energy systems to power modernization of its agriculture, industry and infrastructure development. For instance, providing food security on the continent would require access to synthetic fertilizers, a product of natural gas, to raise its agricultural yields. The continent also requires large-scale energy intensive water control projects that rely on fossil fuel to provide irrigation for its crops, as small-scale solar powered irrigation systems can only work for small farmers. (APO Group, 2021). The developed economies must therefore see it as an imperative to provide a transition pathway for Africa and other developing economies to meet their development needs alongside zero net emission requirements.

As part of the continent's effort at attracting investment, the continent is also creating enabling environments for investment by promoting friendly policies, and regulatory and fiscal frameworks in their jurisdictions. For instance, Nigeria signed the Petroleum Industry Act (PIA) in August 2021, while other countries such as the Republic of Congo, Angola, and Senegal, through transformative regulatory changes, have focused on attracting foreign investment. (APO Group, 2021). These investment friendly policies according to the former Secretary-General of the Organization of the Petroleum Exporting Countries, OPEC, Mohammad Barkindo, are needed for Africa to be able to attract portions of the $12.6 trillion investment needed to meet world oil demand till 2045. This is as renewables growth will not be sufficient to provide the growing global energy requirement. The cumulative investment of $12.6 trillion in the upstream, midstream, and downstream is therefore crucial through to 2045. (Esiedesa, 2021). According to Oladipo, 2021, Nigeria, prior to the PIA have only captured a tiny fraction, about $3 billion, or 4 percent, out of the $70 billion committed on new projects in Africa between 2015 and 2019. Figure 11 shows the historical foreign direct investment, FDI flow into Nigeria.

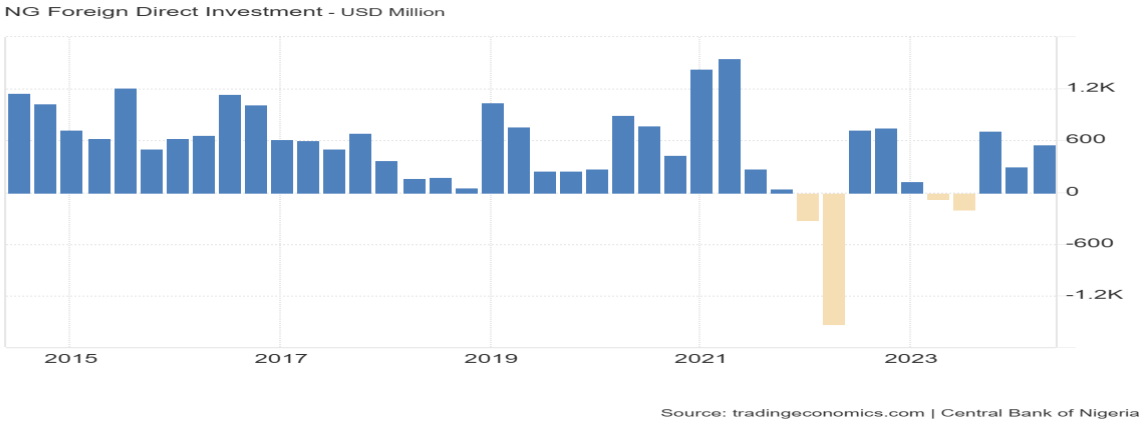

Figure 11: FDI flow into Nigeria from 2014-2024: Sources: trading economics

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Though Nigeria received about $ 2.6 billion of foreign investment inflows in 2nd quarter 2024, which is more than doubled its receipt of $1.0 billion in 2nd quarter 2023, it was about $800 million less than what it received in 1st quarter in 2024. 2024Q2, However, of this amount about 54 percent are foreign portfolio investment (FPI). According to the NBS report all the components of foreign investments declined in the 2nd quarter, with Foreign Direct Investment (FDI) recording the most significant drop, thus exposing the country to an influx of hot money capable of igniting instability in the foreign exchange (FX) market. Of the $1.17 billion FDI inflow, the oil and gas sector only attracted a meagre US$5 million (representing 0.2 percent of the total inflows) in 2nd quarter 2024 and no foreign investments in 1st quarter 2024 suggesting that Nigeria's upstream assets are becoming less competitive globally. (NESG, 2024).

8.1 Competitiveness in the African oil and gas investment terrain

It is no secret that Nigerian oil and gas sector currently faces increasing competition for funds on the continent, as more countries open up their oil and gas frontiers, such as the $20bn-plus Mozambique LNG project, led by France's Total, of which they have successfully secured up to $16bn of financing from a plethora of lending institutions. There is also the new entrant into the continent's upstream segment, Senegal, where Woodside Energy successfully brought in the $5.2 billion for the Sangomar oil project to first oil in June 2024. Another strategic player, BP is also bringing its first gas from its Greater Tortue/Ahmeyim floating LNG export project, on the Senegal-Mauritania maritime early 2025, while another gas project, Yakaar-Teranga, currently owned solely by Senegal, is expected to reach a final investment decision also in 2025. (Kennedy, 2024). Bp and Kosmos Energy are expected to make another FID for Phase 2 of the Greater Tortue Ahmeyim (GTA) LNG project estimated to cost $2.5 billion for the Construction of ultra-deepwater project in 2025 with commercial operations expected by 2027. The project's phase two will double output from 2.3 million tons of LNG per annum (mtpa) to 5.2 mtpa. (Nhede, 2024). There is also the Uganda and Tanzania $3.5bn oil pipeline deal that advances Kampala's long-delayed plans to develop its Lake Albert oil industry.(Africa Business, 2020). Another strategic project approaching FID is the Azule Energy, the PAJ Complex in Block 31 in Angola worth $3.6 billion ultra-deepwater project that will involve drilling 10 wells, with an FPSO, expected to be active by 2026. The continent is also expecting another FID from Tullow Kenya BV for its Phase 1 of the South Lokichar, estimated to cost $3.4 billion. The phase one of the onshore project includes the development of 321 wells, and the buildup of an 852 km pipeline, transporting 120,000 barrels of oil per day from the fields to Lamu Port for export to regional and international markets, with first production is expected in 2026. Namibia is also expecting FID on the Venus-1X and Graff-1X deepwater discoveries – made in 2022 by multinational energy companies TotalEnergies and Shell. The project is estimated to hold up to 11 billion barrels of crude oil, the discoveries serve as the country's first major deepwater oil finds, with first oil production targeted for 2029. (Nhede, 2024). Italy's Eni and its joint-venture partners are also planning to put together an investment around $7 billion in Angola in exploration and production, refining, and solar energy over the next 4 years. Also, besides its investment in Nigeria LNG, Shell is also actively involved in Egypt re-emergence as a regional LNG supplier in the eastern Mediterranean. (Szymczak, 2021). Nigeria is not left out in the FID race, as Shell plc's SHEL subsidiary, Shell Nigeria Exploration and Production Company (SNEPCo), announced a significant final investment decision (FID) in Bonga North, a deep-water project off the coast of Nigeria in December 2024. The project is a

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subsea tie-back to an existing Bonga Floating Production Storage and Offloading (FPSO) facility, which is operated by SHEL. (Shell, 2024)

8.2 Challenges and disincentives to oil and gas financing and investment in Nigeria

Given the current competitiveness on the continent, Nigeria must work harder to attract strategic investors into its oil and gas sector to boost not only its revenue, but to also provide the funds needed for the implementation of its unconditional 20% NDC commitments. Nigeria has a reported c.69% decline in petroleum industry investments between 2017 to 2022 (compared to an average global decline of 28% in the same period), due to multiple factors ranging from heightened operational costs and recurring delays in project completion are among such identified challenges. (Elias-Adebowale etal 2024). The country also lags global contractual cycles for the oil and gas sector by a magnitude of 4 to 6 times, and this has caused severe delays in project development in the sector. (KPMG 2024). Therefore, the passage of PIA in Augst 2021, with its incentives notwithstanding, Nigeria must also work to resolve a lot of other disincentives in the oil and gas sectors, such as its relatively high cost of production compared to other jurisdictions as shown in figure 12.

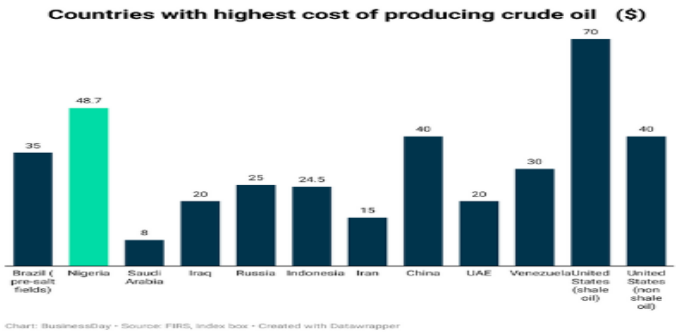

Figure 12: Cost of crude oil production by country. Source: Oladipo, 2024

The chart showed Nigeria as the second most expensive production cost per barrel globally only behind USA Shale Oil, which further adds to investors headaches. The country's operating costs therefore lack competitiveness, as shown in figure 11. This high cost of production is due to operators spending almost 50 per cent of their oil revenue in defraying the cost of production, a huge part of this cost goes into security of their oil assets. (Thisday, 2024). While there are on going efforts at curbing the menace of crude theft and pipeline vandalization, the figures are staggering- according to the Nigeria Extractive Industries Transparency Initiative (NEITI), the country lost $41.9 billion dollars to stolen and refined crude oil products in ten years between 2009 and 2018. (Vanguard,2019). Recent estimation of losses to oil theft and pipeline vandalism in the first five months of 2024 showed that the country may have lost as much as $3.57 billion to the menace during the period. Further reports in 2024 from the Nigerian National Petroleum Company Limited (NNPC) showed a staggering 400 incidents of crude oil theft, with the bulk of them occurring in the Western region of Rivers and Bayelsa states. In the meantime, the Nigerian Senate revealed that the country lost N2.3 trillion to crude oil theft in 2023 as of October 2023, and this was coming after the NNPCL spent N136 billion on security, repairs, and maintenance of vandalised infrastructure in the same 2023. In 2022, the NNPC stated that it lost $700 million every month to oil theft Besides the crude theft, the

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industry also suffers from crude oil deferment arising from the incessant pipeline and facilities vandalization. The NNPC reported recently in 2024 a staggering 400 incidents, most of the incidents had to do with unauthorised pipeline connections, vandalism, oil spills, and unlicensed storage sites. Some of the worst-hit oil companies have recently begun the transportation of their crude through significant arteries like the Nembe Creek Trunk Line (NCTL). But the disruptions not only lead to production downtime and loss of crude oil, but result in additional expenses in facility repairs.

According to a report by former Minister of State for Petroleum Resources, Mr. Timipre Sylva, the industry suffered about 38 million barrels of crude oil deferment annually since 2014 due to incessant pipeline vandalism, while in alone, 2020 about $1.538 billion in revenue was deferred due to 94 incidents. (Ajimotokun, 2021). Another disincentive to investors is the militancy and community disturbances and kidnapping and ransom taking within the Niger Delta Oil and Gas operating region. So even with the PIA in place, unless these problems are confronted and resolved, there is a possibility that proven oil and gas reserves will become stranded. (FSDH Research, 2021). The energy transition effect notwithstanding, Nigeria's investment climate in the oil and gas sector is becoming unsustainable, as we see the IOCs like Shell, Exxon Mobil and NAOC that have operated in the country for over five decades now divesting their assets in the onshore and swamp area and are either leaving or moving their operations into the deep offshore. This move is meant to avoid the headache of dealing with illegal oil bunkering and incessant destruction of pipelines as well as other assets. Shell has announced plans to sell its Nigerian onshore subsidiary, Shell Petroleum Development Company of Nigeria (SPDC) to Renaissance Consortium; Equinor has exited; Italian energy giant, Eni has sold its Nigerian subsidiary, Nigerian Agip Oil Company, to Oando and ExxonMobiI is selling to Seplat Energies ((Thisday, 2024).

8.4 Incentivizing and attracting oil and gas investment in Nigeria

8.4.1 The Passage of the Petroleum Industry Act, PIA

The passage of the PIA is welcome development in this regard, so long as it is implemented in time and in line with its provisions. The PIA provided several investment incentives such as the reduction of royalty and taxes, a move that dovetails neatly with the age-long aspiration of the International Oil Companies (IOCs). It also excluded offshore deepwater assets from hydrocarbon. In the case of gas investment, the PIA incentivizes gas monetization in Nigeria, by reducing gas royalties from 7% to 5.0%, and can be as low as 2.5% for natural gas production targeted at domestic market, which is really a huge incentive for massive investment in gas business especially for power generation. (FSDH Research, 2021). The abundant gas resources is more than enough to cover current demand levels, and to also provide feedstock for nine new gas-fired power plants with a combined generating capacity of nearly 6,000 MW by 2037. (African Energy Chamber, 2021). Additional incentives enshrined in the 2021 PIA include the replacement of the investment tax allowances, and investment tax credits (which encourage gold plating) with production allowances that reward incremental production by oil operatives. (Jeremiah 2021).

8.4.2 The 2024 Presidential Executive Orders for the Oil and Gas Industry

There is also the 2024 President Tinubu's three Executive's Order for the Oil and Gas industry which became effective on February 28, 2024, namely: Presidential Directive on Local Content

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Compliance Requirements, 2024 (the LCC Directive); Presidential Directive on Reduction of Petroleum Sector Contracting Costs and Timelines, 2024 (RPSCC Directive) and the Presidential Directive on the Oil and Gas Companies (Tax Incentives, Exemptions, Remission, Etc.) all of which are to provide additional incentives to attract investors into this jurisdiction. (Elias-Adebowale etal 2024). In their simple application, the Tax Incentives, etc Order provides for a gas tax credit at the rate of US$1.00 per thousand cubic feet ("MCF") or 30% of the fiscal gas price for Non Associated Gas projects have a first commercial production date that occurred on or before January 1, 2029, where the hydrocarbon liquids ("HCL") content, does not exceed 30 barrels per million standard cubic feet ("MMSCF"). For those that exceed 30 barrels per MMSCF, but is lower than 100 barrels per MMSCF, the project will enjoy a gas tax credit at a rate of US$0.50 per thousand cubic feet, or 30% of the fiscal gas price, whichever is lower. Also, any Greenfield NAG project with first commercial production after 1st of January, 2029 shall be eligible for gas tax allowance, at a rate of US $0.50 per MCF or 30% of the fiscal gas price, whichever is lower, provided the HCL does not exceed 100 barrels per MMSCF. (Duru & Oyebode, 2024). The Tax Incentive, etc order also Part II of the Order introduces the gas utilization investment allowance (GUIA or "the Allowance") on qualifying expenditure on plant and equipment for any new and ongoing projects in the midstream oil and gas industry, to be granted 25% investment allowance on actual qualifying expenditure on plant and equipment incurred on any new and ongoing project. This order also introduced fiscal incentives for deep water oil and gas projects to achieve a competitive internal rate of return and foster investment in that area. (KPMG, 2024). On the case of the Local Content Directive, the President has directed the Nigerian Content Monitoring and Development Board (NCDMB or "the Board"), in its implementation of the NOGICDA, to consider the practical challenges of insufficient in-country capacity for certain services in the sector, and act in a manner that does not hinder investments or cost competitiveness of oil and gas projects. Thus, the NCDMB shall not approve a Nigerian Content Plan (NCP) that contains intermediary entities that do not have the essential in-country capacity to perform the services. While this directive may suggest a sort of liberalizing the Local Content Market for all players – local and foreign, it is the expectation of the NDCMB to issue necessary guidelines for assessing and evaluating Nigerian companies seeking for oil and gas industry contracts, and whether foreign companies will now be considered for this preserved segment, where there is no local capacity to fill the void. (KPMG, 2024). Finally, the Presidential Directive on Reduction of Petroleum Sector Contracting Costs and Timelines, 2024 seeks to Shorten the procedure for obtaining approvals for contracts involving private companies and companies controlled by the FGN in the petroleum sector, by simplifying the contracting cycle to a period of not more than six months, increase the contract approval threshold and raise the duration of third-party contracts from three to five years, with a renewal option of an additional two years.(KPMG, 2024)

8.4.3 War on Crude theft, pipeline vandalization and insecurity in Niger Delta Operating Region

There are a renewed and even collaborative efforts amongst the various stakeholders in the oil and gas region to curb the menace of crude theft and pipeline vandalization that pushed the one-time African Oil giant to the 4th place in 2022 behind Angola, Algeria, and Libya, but for the collective and focused war, the country has bounced back as the top producer and exporter in 2024. (Mbah, 2024). As part of this effort, the Rivers State Government, a major stakeholder in the region and in the industry, donated six military-grade gunboats to help crack down on criminality and oil theft. The gun boats will enhance waterway patrols and response times,

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especially near submerged oil export pipelines that are prone to attack (Mbah 2024). This is besides the regular Joint Military taskforce that patrols within the Niger Delta, and the Nigeria's Navy recruitment of about 1,486 personnel to boost internal security operations in the country's crude production heartland (Kaledzi, & Salmanu,(2024). To guarantee prompt response, the war against crude theft, pipeline vandalization and insecurity in the Niger Delta oil and gas region, must involve all the stakeholders - the host communities, the local governments, the state governments, the federal government, and the oil and gas producing and servicing companies in the region. They must all come under a common umbrella with provisions for regular meetings, accountability of the entire process. The funding for such omnibus group can be sourced from the Host Community Trust Funds, Ecological Funds, NDDC, NCDMB, contributions by the local governments, Oil and Gas producing and servicing companies, state and federal governments, and their agencies. The government should also set up a special court system involving the judiciary and the military that will expeditiously and transparently try and prosecute every culprit brought before the court, rather than to depend on the regular court system.

8.4.4 Making financing accessible to Nigerian Oil and Gas Industry

There are several financial options available for the oil and gas sectors such as the capital market, pre-export/off takers, institutional investors, banks, private equities, inventory financing, oil and gas asset securitizations, prepayments, bonds, sustainability linked loans, venture capitalists, vendor and contractor financing, risked and pure service contracts, crowd funding, and family offices. One of the major challenges confronting the Nigerian oil and gas company is poor corporate governance structure as most of these financial sources require well structured companies, with audited financial books, which unfortunately is another major problem with some of the companies in Nigeria. To therefore attract investors and financiers into this critical energy transition period, it is important that Nigerian companies to be well structured in terms of corporate governance with audited financial statements. They must also work harder and set their systems functionally to comply with ESG requirements to be able to attract funds that are already moving to renewables.

A major milestone achievement in this direction was the floating of the $5 billion Africa Energy Bank that was inaugurated in June 2024 with a mission to fund oil, gas and energy projects across the continent. Membership of the bank includes African Petroleum Producers Organization (APPO) countries which include Algeria, Angola, Benin, Cameroon, Chad, the Republic of Congo, the Democratic Republic of the Congo, Ivory Coast, Egypt, Ghana, Equatorial Guinea, Gabon, Libya, Namibia, Niger, Nigeria, Senegal and South Africa. With headquarters in Abuja, Nigeria, the bank is scheduled to take off in Abuja on January 28 2025, with Afreximbank, another institutional investor, pledging to inject in another $1.7 billion of the $5 billion, (Ademola, 2024). In reaction to Nigeria's update on preparations for the Bank's operationalization, the Secretary General of APPO, Dr. Omar Farouk Ibrahim, said 50 per cent of the funds needed for the AEB take-off was available. (Anyanwu 2024). The idea of the Africa Energy Bank was initially muted by the former Nigerian Minister of State for Petroleum Resources, Timipre Sylva, as western nations scale down funding for hydrocarbon exploration across the world due to the race for renewable energies, and therefore setting up an African Energy Bank would be the only alternative available to African countries to continue to explore the vast hydrocarbon resources in the continent. According to the Minister, if Africa, and by extension, Nigeria must continue with the exploration and production of the vast oil and gas

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reserves when the world is cutting down on investments in the sector, Africa must set a financial institution, an African Energy Bank, to develop the oil and gas sector. The Minister added that Africa cannot leave its oil and gas underground just because other countries are racing for renewable energy. To him the combination of the African Energy Bank and African Development Bank should provide all the funds needed to develop Africa's vast hydrocarbon resources. (Orjiude, 2021).

While the setting up of the African Energy Bank is a timely and a welcome effort for the continent, as a major oil and gas and energy producing and exporting country, Nigeria must also support their top tier banks to scale up their capitalization to not only increase their investment capital for the oil and gas sector, but also play significant role in the African banking space. In terms of the 2024 continental ranking, done by Africa Business, South African Standard Bank tops the tier-1 banks on the continent with $13 billion capital, while Bank of Africa, Morocco came 10th with $3 billion capital. Nigerian FBN Holding topped the Nigerian list but was ranked 15th on the continent with only $1.9 billion capital. (Agbetiloye, 2024). In terms of asset base, South African Standard Bank records $167 billion, while the top four banks in Nigeria – FBN Holding, Access, Zenith, and UBA collectively hold $95 billion, which is 57% of the total asset base of Standard Bank. (Minney, T (2024). The current directives by the Central Bank of Nigeria, CBN to increase bank capital base of the tier 1 banks to N500 billion, while tier-2 banks are to raise N200 billion, is therefore a welcome development. Nigeria should also consider recapitalizing the Bank of the Industry, BOI to scale up its oil and gas funding to include upstream exploration and production projects. Besides managing the $300 million the Nigerian Content Intervention Fund, NCIF, with a $10 million single obligor limit, it also disbursed some N36.9 billion in 2021 to fund 24 oil and gas projects. (BOI, 2024). It may also be necessary to designate some of the tier-1 banks -Zenith, Guaranty, Access, Firstbank United Bank for Africa to focus on financing the deep pocket oil and gas and energy investments in the country. The alternative will be for the Nigerian Stock Exchange to partner with the Oil and Gas Industry operatives to raise the required funding for the deep capital requirements. In the meantime, members of the Petroleum Technology Association of Nigeria, PETAN can scale up its current efforts by actively participating under risked service contracts to develop oil and gas upstream assets.

9.0 CONCLUSIONS AND RECOMMENDATIONS

As the country strives to diversify its economy from oil and gas, it will require the same industry to fund the infrastructures and structures that will sustain the diversification process. The oil and gas industry is therefore the hope for Nigeria's industrialization that will move it speedily into a developed economy in the next decade. Nigeria must therefore be intentional in its pursuit to fund this industry, especially now that global finance is moving away from oil and gas to renewables. The time is also now, as major emerging and developed economies shift to renewables and low carbon sources to power their economies. This shift towards renewables spells doom for its oil and gas export markets, unless the country takes advantage of the current situation to consolidate itself as the African downstream petroleum hubs for refinery and petrochemical products. Nigeria must also recognize the new oil and gas entrants on the continent with more friendly fiscal regimes that is also making the competition stiff for Nigeria. The country must therefore scale up the current war on crude theft and pipeline vandalization and insecurity in the Niger Delta Region, while also constantly reviewing its fiscal regimes and investment climates to incentivize investors and finance into its maturing industry. While it is

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promoting the setting up of the African Energy Bank, Nigeria must also work closely with its top tier banks to grow the institutions to be able to fund the huge oil and gas investments – by designating some of the tier-1 banks to focus on the sector. The Nigerian Stock Exchange should also intensify efforts to bring in the oil and gas sector fully into the capital market, while the industry must also work on its corporate governance structure and ESG compliance requirements to be able to secure funding in the energy transition period.

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