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AN APPRAISAL OF THE ENVIRONMENTAL CHALLENGES ASSOCIATED WITH THE NATURAL GAS RESOURCE AND ITS UTILIZATION METHODS IN NIGERIA

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Abstract

Nigeria has recently seen an astronomical increase in gas utilization, particularly during the 'post-PIA' and 'Decade of Gas' era, aided by significantly favourable incentives. However, little or no attention is given to the consequences of natural gas and its utilization techniques, which include variety of technology for collecting, recycling, and using waste gas for reasons other than flaring. Some of these issues include water pollution and methane leakage, which is more severe than gas flaring. This paper argues that, although utilizing gas has various advantages, there is a critical need to strike a balance between enjoying the benefits of natural gas and safeguarding the environment. The objectives of this paper, using the doctrinal research methodology, are to examine the importance of incentives for gas utilization in Nigeria, explore the existing gas utilization projects both before and after the 'PIA and Decade of Gas' era, the environmental and health challenges associated with the natural gas resource and its utilization methods, and the inadequacy of the legal regime for gas utilization in Nigeria on environmental protection. This research concludes that Nigeria's present regulatory framework for gas utilization is more concerned with reducing gas flaring than with addressing the recognized environmental breaches caused by natural gas and its utilization techniques. As a result, it advises further reforms to fundamental laws on gas utilization, such as the Petroleum Industry Act of 2021, as well as the formulation and implementation of strict natural gas emissions rule.

Keywords: Natural gas, Utilization methods, Environmental problems, Nigeria

1. Introduction

Natural gas is a useful energy resource with several applications, including heating and power production, automobile fueling and cooking, amongst others. Natural gas has significant environmental ramifications, since it is critical energy resources with the ability to fuel economic growth, industrial development, and energy security, especially in resource-rich countries such as Nigeria. Natural gas is a fossil fuel energy source with many compounds, and one of its biggest components is methane, a notorious pollutant.[1] Thus, the mining, processing, and use of natural gas pose enormous environmental issues that endanger human health, ecosystems and the larger objective of sustainable development.

Nigeria has the continent's greatest natural gas reserves and ranks sixth in the world for LNG Exports.[2] Natural gas, with its clean and dependable features, is quickly becoming an essential component of Nigeria's search for energy security.[3] Its extraction and use are becoming more important in national development objectives. Natural gas is destined to become a bigger part of Nigeria's search for energy mix as the government attempts to ensure the sustainability of its energy supply, improve energy efficiency, and cut down on energy-related expenses.[4] This article therefore seeks to critically evaluate the environmental infractions associated with natural gas resource

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[1] Natural Gas Explained – US Energy Information, <https://www.eia.gov/energyexplained/natural-gas/> accessed 20 August 2025.

[2] BP June 2022 *Statistical Review of World Energy,*<https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html/> accessed 9 November 2023.

[3] ibid.

[4] C Nwaoha and David Wood, 'A Review of the Utilization and Monetization of Nigeria's Natural Gas Resources: Current Realities,' (2014), Vol. 18, *Journal of Natural Gas Science and Engineering* 412.

development and utilization techniques in Nigeria, as well as the regulatory loopholes that create an enabling ground for environmental degradation.

2. Incentives for Gas Utilization in Nigeria

The goal to reduce gas flaring and realize potentials from the enormous reserves and numerous applications of gas remain the key forces driving the incentivization of gas utilization in Nigeria.[5] Hence, incentivization is vigorously pursued to drive gas utilization with the aim of developing a strong distinct industry for gas and ameliorating the economic losses and environmental hazards from gas flaring.[6] This regime is adjudged to be good and a means of encouraging investors in the gas industry.[7]

As part of its efforts to support the gas industry, the Nigerian government recently unveiled a number of tax breaks designed to promote a business-friendly atmosphere, support innovation, and entice investment throughout the gas value chain. These incentives are primarily provided for by the Petroleum Industry Act[8] and the Companies Income Tax Act[9] (as amended by the Finance Act).[10] According to the PIA, all companies involved in domestic midstream petroleum operations, downstream gas operations, and large-scale gas utilization industries as defined by the Act are eligible for incentives under section 39 of the CITA (as amended), which is the main law governing corporate taxation in Nigeria. It further stipulates that when the tax- free term provided under section 39 of the CITA expires, investors in gas pipeline will be eligible for an additional five-year tax-free period. According to section 39(1) (a) of the CITA, a gas utilization company is eligible for a three-year tax vacation, which may be extended for an additional two years provided the company operates satisfactorily. A 35% Petroleum Capital Investment allowance on the value of any asset the company purchases for the business and a 15% capital investment allowance under 39 (1) (c) (ii) if the company took advantage of the tax holiday present alternatives to the tax holiday offered by section 39 (1) (b).

Furthermore, companies that utilize the window provided by the tax-free period will be eligible for an accelerated capital allowance regime following the tax-free period, which include a 90% annual allowance on any investment made and a 10% tax retention for investments in plants and machinery by virtue of section 39 (1) (c) (i).

Additionally, section 39 (1) (d) (i)-(ii) states that all dividends paid out during the tax holiday are exempt from taxes, provided that the downstream investment is made in foreign currency and amount to at least 30% of the company's equity share capital for the purchase of imported machinery and plant. Lastly, 39 (1) (e) allows interest on loans the business collects for development of gas utilization projects to be tax deductible, as long as the approval of the Minister of Petroleum Resources was first sought and obtained to carry on the said project.[11]

The PIA improves the potential for greater private investment in the gas pipeline industry by providing an extra five-year tax-free period for investors, totaling a ten (10) year tax holiday for gas

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[5] J Okoro, 'Nigeria: A Comparative Analysis between Pioneer Industry and Downstream Gas Utilization' (2021), <*https://www.mondaq.com/nigeria/oil-gas-electricity/1039598/a-comparative-analysis-between-pioneer-industry-and-downstream-gas-utilization*> accessed 11 November 2023.

[6] ibid.

[7] OH Onyi-Oghelle, 'The Legal Regime for Nigerian Gas,' (2017), Vol. 8, *Nnamdi Azikiwe University Journal of International Law and Jurisprudence*, 158.

[8] Petroleum Industry Act No. 6 of 2021. It shall hereinafter be referred to as the 'PIA.'

[9] Companies Income Tax Act, Cap. C21, Laws of the Federation of Nigeria, 2004 (No. 28 of 1979; No. 11 of 2007). It shall hereinafter be referred to as 'the CITA.'

[10] Finance Act No. 3 of 2021.

[11] See also Alliance Law Firm | 'Bridging the Infrastructure Gap: The Implementation and Impact of the Petroleum Industry Act (PIA) 2021,' <*https://www.lexicology.com/library/detail.aspx?g=f5944006-9323-400f-b6c6-6ae0494c045d*> accessed 24 March 2024.

pipeline projects.[12] The fiscal framework for the gas industry, which was established in the PIA, is also aimed at encouraging investment in the sector via tax breaks. Thus, section 260 (1)(b)(i)–(iii) of the PIA explicitly exempts the payment of hydrocarbon tax on related natural gas, non-associated gas, and any condensates or liquids produced from associated gas.

3. Gas Utilization Projects in Nigeria

Gas utilization is the major aim of Nigeria's petroleum and energy policy. The major motivations of gas utilization projects in Nigeria were the government's ambition to increase wealth and diversify the country's economy.[13] However, a mix of new government incentives and pressure from worldwide trends to end gas flaring, along with increased domestic industrial demand for gas, have pushed operators to invest in gas projects.[14] Thus, in recent years, and in light of the government's '2020-2030 Decade of Gas' initiative, natural gas is not only being used on a much larger scale, but is also being commercialized with the power sector, the LPG sector, the cement sector, and the fertilizer sector identified as the key drivers of gas demand growth in Nigeria. The gas utilization projects therefore enable captured gas to be harnessed for socioeconomic and environmental benefit, with a view to eliminating routine gas flaring and creating the much needed gas infrastructure for development.[15]

3.1 Existing Gas Utilization Projects in Nigeria in the Pre-PIA and Decade of Gas' Era'

Some of the critical gas projects behind utilization of natural gas in Nigeria before the launch of the 'Decade of Gas' project and enactment of the PIA in 2021 include the following:

3.1.1 The Nigeria Liquefied Natural Gas (NLNG) Project

Nigeria LNG Limited (NLNG) was incorporated to harness Nigeria's vast natural gas resources and produce Liquefied Natural Gas (LNG) and Natural Gas Liquids (NGLs) for export and national income.[16] It is owned by four shareholders, namely, the Federal Government of Nigeria, represented by Nigerian National Petroleum Company Limited (49%), Shell (25.6%), Total Energies Gaz and Electricite Holdings France (15%) and Eni (10.4%). The establishment of NLNG as a company is backed by the Nigeria LNG (Fiscal Incentives, Guarantees and Assurances) Act,[17] which amongst other things, provides for the guarantees and assurances by the Federal Government of Nigeria to the company and its shareholders.

Ten years after its incorporation in 1989, the first two LNG trains were completed, paving way for the export of the company's first LNG cargo on October 9, 1999 which signified the start of one of the most successful stories in the LNG industry worldwide.[18] It subsequently went from a two-train LNG plant in 1999 to a six-train plant within 9 years after start-up.[19] A seventh train is under construction to increase the facility's capacity by 8 million metric tons per year.[20] Regulatory and political issues however contributed to the delay in the project's start date.[21]

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[12] See s. 302 (6) PIA.
[13] Y Oke, *Nigerian Energy Resources: Oil and Gas Law* (Princeton & Associates Publishing Co. Ltd., 2019) 698.
[14] ibid.
[15] PH Agbonifo, 'Natural Gas Distribution Infrastructure and the Quest for Environmental Sustainability in the Niger Delta: The Prospect of Natural Gas Utilization in Nigeria,' (2016) Vol. 6 No. 3, *International Journal of Energy Economics and Policy* 442.
[16] The NLNG, <*https://www.nigerialng.com/the-company/Pages/Who-We-Are.aspx*> accessed 2 December.
[17] Cap. N87, Laws of the Federation of Nigeria, 2004.
[18] NLNG Train 7 – The Future is Gas, <*https://www.nigerialng.com/Train7-Project/Pages/Home.aspx*> accessed 5 December 2023.
[19] ibid.
[20] Oke, (*n*20).
[21] ibid.

3.1.2 The Escravos Gas Project

The Escravos Gas Project was established for the purpose of curbing gas flaring and subsequent waste of natural gas in Nigeria.[22] The Escravos project, executed by Chevron and the former NNPC, is expected to boost the domestic gas market with 400 million standard cubic feet per day gas supply, equivalent to 26 percent of the total domestic gas supply of the country.[23] The Escravos GTL project processes approximately 150 million cubic feet of gas each day and produces LPG for sale to international markets and pipeline quality gas for domestic use.[24] This project is important for Nigeria because it represents a tangible environmental benefit by reducing gas flaring, and also providing a major boost to GTL research and development.[25]

3.1.3 The West African Gas Pipeline (WAGP) Project

The West African Gas Pipeline Company limited (WAPCo) is a limited liability company that owns and operates the West African Gas Pipeline System (WAGP).[26] WAPCo is an international company transporting natural gas in Nigeria, Benin, Togo and Ghana in a safe, efficient, responsible, and reliable manner to create value for its diverse stakeholders.[27] It therefore promotes the WAGP system as a key natural gas transmission infrastructure for all natural gas sources including Liquefied Natural Gas (LNG).[28]

3.1.4 Nigeria-Morocco Regional Gas Pipeline Project

The pipeline, which was first envisaged in 2016, is one of the world's most ambitious energy projects, with plans to become the world's second-longest pipeline.[29] The NMGP would be 5,600 km long and would span 13 African nations, meeting the energy demands of an estimated 400 million people along the West African coast.[30] The project offers to boost Africa's socioeconomic growth, while the pipeline attempts to bring gas from Nigeria to Europe, while supplying nations along the route to aid fulfill their energy needs.[31] Proponents say this project will not only benefit the African continent, but will also provide fresh gas sources for Europe due to its dire need for an alternative gas source to cover gas shortages due to the Russia-Ukraine war.[32]

4. Gas Utilization in Nigeria in the 'Decade of Gas' and 'PIA' Era

Nigeria's energy future has been reevaluated in light of the radical developments in the gas industry after the 'Decade of Gas' launch in 2021 and the enactment of the PIA 2021.[33] The 'Decade of Gas' refers to the era of increased gas utilization as a tool for industrialization and economic advancement, while the PIA represents a watershed in the history of Nigeria's oil and gas industry,

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[22] ibid.

[23] Reps Committee Probes spending of $7.8bn additional cost on Escravos Gas Project, *TheCable*, 5 October, 2022, <*https://www.thecable.ng/reps-committee-probes-7-8-bn-cost-increase-spent-on-escravos-gas-project*> accessed 15 January 2024.

[24] Escravos Gas-to-Liguid-Project, <*https://www.hydrocarbons-technology.com/projects/escravos/* > accessed 14 January, 2024.

[25] Chevron's Escravos GTL Project finally sets off Ground, <*https://archive.businessday.ng/oilandgas/article/chevrons-escravos-gtl-project-finally-gets-off-ground/*> accessed 15 January 2024.

[26] About WAGPCO – Company Profile, <*https://www.wagpco.com/company-profile/*> accessed 15 January 2024. The West African Gas Pipeline Authority based in Abuja, Nigeria's Federal Capital Territory, is the regulatory body for WAPCo

[27] ibid.

[28] ibid.

[29] 'Construction of Nigeria-Morocco Gas Pipeline to start in 2024,' <https://www.moroccoworldnews.com/2023/11/359201/construction-of-nigeria-morocco-gas-pipeline-to-start-in-2024> accessed 16 January 2024. It shall hereinafter be referred to as the 'NMGP.'

[30] ibid.

[31] ibid.

[32] Gas Outlook | 'Nigeria – Morocco Pipeline Vulnerable: Experts' <*https://gasoutlook.com/analysis/nigeria-morocco-gas-pipeline-highly-vulnerable-experts/*> accessed 20 January 2024.

[33] Association of Distributors of Gas | 'Last Year in Nigeria's Gas Sector in 2021,' <https://ald.org.ng/last-year-in-nigerias-gas-sector-in-2021/> accessed 19 January 2024. The 'Decade of Gas' Initiative was launched in March 2021 by President Muhammad Buhari at the virtual Nigeria International Petroleum Summit (NIPS) Conference.

marking the beginning of improved fiscal and regulatory changes.[34] These government initiatives (the passage of the PIA and the "Decade of Gas" launch) have contributed to the unveiling of the opportunities available in Nigeria's domestic gas market. Today, new gas utilization schemes abound in the country, which include:[35]

1. Nigeria has made its incursion into the $20.6 billion worldwide methanol market. After the project is completed, it is expected to generate about 10,000 metric tonnes of methanol, which would put Nigeria in the top tier of methanol producers globally.
2. Industrial customers and manufacturing facilities in Lagos and Ogun state will have access to gas distribution services from Shell Nigeria Gas (SNG) and Nigerian Gas Marketing Company (NGMC) under a 20-year gas distribution deal.
3. Maiduguri and the surrounding regions will be supplied with electricity by a 50-megawatt gas-fired power plant being built by the Nigerian National Petroleum Corporation (NNPC). The gas will be sourced from Greenville LNG.
4. Construction of the NLNG Train7 project, which is worth $10 billion and would increase LNG production capacity by 35% and create 12,000 direct jobs, has commenced.
5. UTM Offshore Limited, a maritime and services firm in Nigeria, and Afrexim bank, the African Export-Import Bank, have signed an MoU to solicit $5 billion to fund the construction of the country's first floating liquefied natural gas (FLNG) project. Natural gas and condensate with a potential processing capacity of 176 MMscfd are anticipated by the project.
6. Nigerian Liquefied Natural Gas (NLNG) Limited has signed agreements with Asiko Power Limited, Bridport Energy Limited, and Gas Plus Synergy Limited to increase the domestic gas supply of over 1.1 million tonnes of LNG per annum to commercial and industrial users all over the country.

These are only a few of the latest efforts in Nigeria to use natural gas during the review period; more are expected soon, especially with the heightened energy transition.

5. Challenges Associated with Natural Gas and its Utilisation Methods in Nigeria

Natural gas utilisation techniques include the use of a variety of technology to collect, recycle, and utilise waste gases generated (on a big and small scale) during oil and gas production operations for uses other than flaring.[36] It has been observed that, in the rush to secure natural gas as an alternative source of clean energy and a viable source of revenue for the country, little or no attention is being paid to the environmental risks associated with the entire natural gas industry chain, from exploration and exploitation to utilisation. These issues include:

5.1 Environmental and Health Risks Associated with Hydraulic Fracturing

Nigeria has its fair share of commercial shale gas, which may have both socioeconomic and environmental repercussions for the Niger Delta and Nigeria as a whole. Shale formations are often found between 1,500 and 4,000 meters below the Earth's surface and may cover enormous regions.[37] The shale layers contain microscopic holes that retain oil or gas, while the surrounding rock is strongly compressed, preventing the pores from connecting in order to enable the trapped oil or gas to flow easily into a wellbore.[38] To release these trapped resources, the rock must be split using a method known as hydraulic fracturing, or "fracking," which allows oil or gas to be extracted from shale.[39] Hydraulic fracturing is the process of pumping specific fluids into a selected rock formation at pressures over the rock's breaking point, resulting in cracks that enable oil or gas to flow towards

[34] ibid.
[35] ibid.
[36] R Abu, K Patchigolla and N Siims, 'A Review on Qualitative Assessment of Natural Gas Utilization Options for Eliminating Routine Nigerian Gas Flaring, (2023) 3(1), *Gases* 2.
[37] G Zuckerman, *The Frackers: The Outrageous Inside Story of the New Energy Revolution,* (Penguin Books, 2013) 34.
[38] ibid.
[39] ibid.

the wellbore.[40] According to Omidire, the entire scope of the consequences of hydraulic fracturing is unknown, and any possible advantages may be outweighed by environmental and health problems.[41]

One major concern is the danger of water pollution, which might accelerate the development of waterborne illnesses.[42] Other potential impacts include methane-related air pollution, increased dust, and noise levels.[43] Furthermore, the enormous water use necessary for fracking may strain local water resources, possibly affecting food production and availability to clean water, outweighing any industrial or agricultural advantages.[44] There are rising worries that uncontrolled or poorly managed fracking operations may contribute to climate change, harm sustainable development, and violate human rights.[45] Other dangers include infrastructure damage, increased carbon emissions, the production of volatile organic compounds, and the unsustainable depletion of natural resources[46] and even the triggering of small earthquakes etc.[47] Moreover, large-scale industrial activity associated with fracking can alter the character and appearance of local communities - especially when close to residential areas,[48] raising the risk of harm to public health and well-being. In such circumstances, citizens may be forced to flee their homes, businesses, or towns, thereby infringing their right to a safe and healthy environment.[49]

5.2 Air Pollution

Air pollution often emits bad odours, airborne particles, and harmful gases into the surroundings.[50] The effect on human health varies depending on the kind and concentration of pollutants, with long-term exposure providing substantial concerns to those who live or work close.[51] Burning natural gas releases nitrogen oxides, which are major contributors to smog, as well as trace levels of sulphur, mercury, and fine particles.[52] Furthermore, unconventional gas production has the potential to impact air quality at both the local and regional levels. In certain drilling jurisdictions, there has been an observed increase in hazardous air pollutants; specifically, two of the six 'criteria pollutants'-particulate matter and ozone, including their respective precursors-thereby contravening regulations established by the Environmental Protection Agency (EPA) owing to their recognized and substantial risks to public health and environmental integrity.[53] High levels of these pollutants have been related to a variety of detrimental health impacts, including respiratory problems, heart disease, and cancer.[54] According to a research, those who live within half a mile of unconventional gas wells are more likely to suffer from air pollution-related health issues than those who live further

[40] K Omidire, 'Access to Courts by Vulnerable Persons in Relation to Hydraulic Fracturing in South Africa,' (2020), Vol. 46, *Commonwealth Law Bulletin* 664.
[41] ibid.
[42] ibid.
[43] K Suzuki, 'The Role of Nuisance in the Developing Common Law of Hydraulic Fracturing,' (2022), Vol. 41, *Boston College Environmental Affairs Law Review* 265.
[44] Omidire (*n*40) 665.
[45] ibid, (n40) 666.
[46] A Oladotun and M Sadhana, 'A Literature Survey on the Potential Impacts of Fracking on the Nigerian Economic, Social, Legal and Environmental Sustainability,' (2021), Vol. 21, No. 2, *Journal of African Sustainable Development,* 124-125.
[47] BBC News - "Fracking in Lancashier Suspended Following Earthquakes," 26 October, 2018, <*https://www.bbc.com/news/uk-england-lancashire-45976219*>accessed 12 November 2023.
[48] Omidire, (*n*40) 666.
[49] RA Kitze, 'Moving Past Pre-Emption: Enhancing the Power of Local Governments over Hydraulic Fracturing,' (2013), *Minnesota Law Review* 389.
[50] G Richard, SC Izah and M Ibrahim, 'Air Pollution in the Niger Delta Region of Nigeria; Sources, Health Effects and Strategies for Mitigation,' (2023), Vol. 29, No. 1, *Journal of Environmental Studies* 1.
[51] ibid.
[52] Union of Concerned Scientists, 'Environmental Impacts of Natural Gas,' <https://www.ucsusa.org/resources/environmental-impacts-of-natural-gas#reference> accessed 30 November 2023.
[53] California Environmental Protection Agency Air Resources Board, 2012, Health Effects of Air Pollution,' <https://www.ww2.arc.ca.gov/our-work/topics/health> accessed 20 December 2023.
[54] Union of Concerned Scientists, (*n*52).

away.[55] As a consequence, public health specialists urge governments not to drill near residential areas.[56]

5.3 Global Warming Emissions

Gas is a fossil fuel, mostly composed of methane, and a greenhouse gas. Methane, the second most significant greenhouse gas after carbon dioxide, is a fundamental driver of climate change.[57] Using gas for energy creates greenhouse gas pollution, thus driving climate change in three ways:[58]

1. Burning natural gas generates carbon dioxide-the most significant greenhouse gas contributing to climate change.
2. Even before burning, gas activities emit significant volumes of carbon dioxide and methane at all stages of production. Methane is particularly strong, with short-term warming impacts 86 times larger than carbon dioxide, therefore the full impact of petrol is often underestimated.
3. Exporting liquefied petrol requires a significant amount of energy, often from fossil fuels, which contributes to already high emissions levels.

Methane, the principal component of natural gas, leaks during drilling and extraction from wells, as well as transit in pipelines. According to studies, methane leakage occurs at a significant rate across the natural gas system.[59] As a result, natural gas continues to be a harmful, polluting fossil fuel that contributes to climate change.

5.4 Water Use and Pollution

Tripathy and Panda define water pollution as any physical or chemical alteration in water that might harm living creatures.[60] The quantity of water needed to hydraulically fracture a well varies depending on formation geology, well architecture, and the hydraulic fracturing procedure utilised.[61] Unlike other energy-related water withdrawals, which are often returned to rivers and lakes, the majority of water used in unconventional oil and gas extraction is not recoverable.[62] Unconventional gas production may potentially pose health concerns to local populations by contaminating drinking water sources with toxic chemicals used in wellbore drilling, hydraulic fracturing, oil or gas processing and refining, or wastewater disposal.[63]

6. Natural Gas Utilisation and Environmental Protection: The Shortcomings of the PIA and its Regulations

It is evident that natural gas, despite its benefits, has negative repercussions for the environment and for residents of areas where gas is explored, extracted, used, or commercialized. It would therefore be counterproductive to emphasize on the viability of natural gas as an alternative source of revenue generation, or as a cleaner source of energy while de-emphasizing the environmental problems linked to the various processes which natural gas is subjected to, and to the detriment of the host communities directly or indirectly affected by these projects.

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[55] ibid.
[56] Natural Gas 101 – An Overview of Gas, Pollution and Climate Change, <https://www.climatecouncil.org.au/resources/why-is-gas-bad-for-climate-change-and-energy-prices/> accessed 16 January 2024.
[57] ibid.
[58] ibid.
[59] Union of Concerned Scientists, (*n*52).
[60] SN Tripathy and S Panda, *Fundamentals of Environmental Studies* (Vrinda Publications (P) Ltd, 1999) 104-108
[61] LO Haluszczak, AW Rose and LR Kump, Geochemical Evaluation of Flowback Brinr from Marcellus Gas Wells in Pennsylvania, U.S.A., (2012) *Applied Geochemistry* 55-61.
[62] Ibid.
[63] T Colborn and others, 'Natural Gas Operations from a Public Health Perspective,' (2011) 17 (5), *Human and Ecological Risk Assessment: An International Journal,* <https://tandfondonline.com/doi/abs/10.1080/10807039.2011.605662> accessed 15 January 2024.

The legal framework, currently defined by the PIA[64] and its Regulations[65] has made robust provisions for natural gas operations in the country.[66] The novel features of the PIA and its Regulations are therefore aimed at guaranteeing dependable and inexpensive access to natural gas in Nigeria, stimulating competition in the subsector while prohibiting discrimination and monopoly, and thereby optimising the enormous gas sector resources.

Section 104 (1) of the PIA specifically prohibits gas flaring in Nigeria, except; in the case of an emergency; pursuant to an exemption granted by the commission; or as an acceptable safety practice under established regulations. Breach of this provision would lead to the payment of a fine, and this fine shall be for the purpose of environmental remediation and relief of the host communities of the settlors on which the penalties are levied.[67]

The PIA provides for an environmental management plan (EMP) which is an important component of a project's environmental sustainability strategy because it specifies the steps that will be taken to reduce the project's negative environmental consequences throughout the construction, operation, and decommissioning stages.[68] An EMP offers a framework for controlling and minimising a project's environmental consequences, ensuring that it is developed and managed in a manner that reduces environmental damage and supports sustainable development.[69] However, the success of EMPs might be hindered by problems such as inadequate planning, a failure to consult with local communities and stakeholders, and insufficient resources and budget allocation.[70]

Among other things, prior to the start of petroleum production, a licensee or lessee must install metering equipment that meets the specifications conferred on every facility from which gas flaring is permitted, as prescribed by the commission or authority, and failure to do so would constitute an offence.[71] A licensee or lessee producing natural gas is also required to submit a natural gas flare eradication and monetisation plan to the Commission within 12 months after the effective date, and this plan must comply with the rules established by the Commission under this Act.[72]
The Midstream Regulations which restrict venting and excessive flaring of flare gas under Regulation 8 (1) - (3) states:

> *that midstream petroleum operators must not exceed the Authority's limitations when venting flare gas ... Prior to the issuing of a license to operate, a licensee or permit holder must consult with the Authority to identify the maximum number of significant flaring occurrences and gas likely to be flared ... The amount of gas flared and the number of significant flaring occurrences specified in subsection (2) must include all scheduled maintenance, facility start-up or strategic operating reasons, including testing.*

[64] This is the major legal and regulatory for the oil and gas industry; it is also an economic law that has significant implications for the Nigerian economy.
[65] The Midstream Gas Flare Regulations, 2023 is aimed at promoting responsible gas utilization and environmental sustainability in the midstream and downstream sectors. It shall hereinafter be called the 'Midstream Regulations'; while the Gas Flaring, Venting and Methane Emissions (Prohibition of Waste and Pollution) Regulations 2023 provides a legal framework for the protection of the environment against the effect of gas flaring, prevent waste of gas and creation of social and economic benefit to Nigeria from gas flaring. It shall hereinafter be called the 'Upstream Regulations.'
[66] JK Pere-Owei, 'The Innovations of the Petroleum Industry Act with Respect to Gas in Nigeria'<https://loyalnigerianlawyer.com/the-innovations-of-the-petroleum-industry-act-with-respect-to-gas-in-nigeria/> accessed 26 September 2024.
[67] See s. 104 (4) PIA, 2021.
[68] See s. 102 (1) PIA, 2021. See also Terracon | 'The Role of Environmental Management Plan (EMP),' <https://www.terracoindia.com/2024/0/06/the-role-of-environmental-management-plan-emp/> accessed 18 September 2024.
[69] ibid.
[70] ibid.
[71] See s. 106 (1)-(2) PIA, 2021.
[72] See s. 108 PIA, 2021.

Under the Upstream Regulations, a licensee, lessee or producer of gas that flares, vents or wastes gas without the Commission's authorization shall pay a fine of US$3.5 (Three Dollars, Five Cents) per 28.317scm (1,000scf), an administrative fine of US$1,000 (One Thousand Dollars) for the contravention notification to be served by the Commission on erring licensee, lessee or producer of gas, and a fine of US$1,000 (One Hundred Dollars) for each day that the contravention continues after the notification.[73]

Furthermore, Section 52 (1) of the PIA established the Midstream and Downstream Gas Infrastructure Fund ("the Fund") subject to appropriation from the National Assembly. One of the sources of finance for the Fund is money received from gas flaring penalties by the Commission under section 104 (4) of the PIA, which shall be for the purpose of environmental remediation and relief of the host communities of the settler on which the penalties are levied.[74] By Section 52 (10) of the PIA, the Fund is basically aimed at increasing the consumption of natural gas and reducing or eliminating gas flare in Nigeria.[75] The proper use of funds in the Fund for essential infrastructure investment, as required by the Act, would result in enhanced development of important gas infrastructure, such as pipelines, processing plants, and storage facilities, as well as a decrease in gas flaring. This will also make it easier to deliver and distribute gas to previously underserved regions.

The current legal framework for natural gas utilisation in Nigeria does not adequately address the problems associated with natural gas resources and their utilisation methods. While it is laudable that there are provisions for environmental restoration and relief, the PIA and its Regulations place a strong emphasis on preventing gas flaring by explicitly prohibiting it and prescribing penalties for flaring. Furthermore, according to the requirements of section 110 (4), the funds acquired as fines will be utilised for environmental remediation and relief of host communities devastated by gas flaring.

Natural gas has several advantages that make it an efficient, generally clean-burning, and cost-effective energy source. It burns cleaner than coal and produces less air pollution. However, if produced irresponsibly, it creates serious environmental and health risks, and wastes a valuable energy resource because uncombusted natural gas is mostly methane, which is much more potent than carbon dioxide[76] which flaring releases into the environment. In this wise, flaring becomes safer than releasing natural gas into the air because carbon dioxide is not as strong a greenhouse gas as methane.[77]

It is concerning that the PIA does not particularly address the environmental concerns related with the use of natural gas and its utilisation techniques, nor does it impose sanctions for doing so. Thus, the PIA and its Regulations require strict adherence to a gas flaring elimination plan while clearing the way for intensive gas utilisation, not only to mitigate environmental difficulties caused by waste gas, but also to encourage significant expansion of the gas industry. They, however, failed to consider the observed environmental violations caused by natural gas resources and its utilisation techniques.

All environmental laws are based on the Constitution of the Federal Republic of Nigeria 1999, which serves as the foundation from which all other legislation and rules gain their legality.[78] The

[73] Regulation 21 of the Gas Flaring, Venting and Methane Emissions (Prevention of Waste and Pollution), 2023.
[74] See s. 52 (7) (c) PIA, 2021.
[75] See s. 52 (10) PIA, 2021.
[76] Environmental Defense Fund - 'Oil and Gas: How we are Reducing Harmful Impacts'<*https://www.edf.org>climate>oil-and-gas*> accessed 23 February 2023.
[77] Ibid.
[78] See s. 1(1), Constitution of the Federal Republic of Nigeria, 1999 (as amended), Cap. C38, Laws of the Federation of Nigeria, 2004. It shall hereinafter be referred to as the 'CFRN.'

Nigerian state is authorised to preserve and develop the environment, including water, air, land, forest, and wildlife.[79] The state is required to establish and implement policies that promote planned and balanced economic growth, keeping in mind that all economic activities occur on land, air, or water.[80] The state must therefore protect its citizens from the unsustainable use of natural resources, by intentionally enacting viable environmental and resource policies which encourage sustainable development.

7. Findings

This article explored the incentives that have provided a much-needed boost to gas utilisation in the nation, the environmental issues associated with natural gas and its utilisation techniques, and the key laws for gas utilisation in Nigeria, and discovered that:

1. While natural gas is a versatile and cleaner-burning fossil fuel, it does not come without risks for individuals and the environment. These include negative health conditions such as respiratory difficulties, cardiovascular disorders, and cancer, climate change, global warming, pollution (air, water and land) and methane leakage which is even worse than the gas flaring which utilization seeks to curb, thus impacting adversely on sustainable development and human rights.
3. The legal regime for gas utilisation in Nigeria, as primarily defined by the PIA and its Regulations, is more concerned with specifically reducing gas flaring, thereby failing to expressly address the identified environmental infractions caused by the use of natural gas and its utilisation methods.
3. The PIA requires licensees or minor entities involved in upstream and midstream petroleum activities to submit an EMP to the Commission or Authority for projects requiring environmental impact assessment. If not properly implemented, such EMP may face challenges such as poor planning, insufficient resources, and a failure to engage with local communities and stakeholders in accordance with the Environmental Impact Assessment Act,[81] which is already being referred to as a 'paper tiger' due to its ineffectiveness in preventing environmentally harmful developments from occurring.

8. Conclusion

The use of natural gas provides both advantages and problems for environmental conservation. While natural gas is a cleaner option to other fossil fuels, its extraction and use are nevertheless harmful to the environment. It is critical that the government, gas industry, and individuals prioritize the creation and implementation of laws, regulations, sustainable practices, and technology to reduce these effects and guarantee long-term sustainability of natural gas. By striking a balance between using natural gas for both energy and revenue generation on the one hand, and protecting the environment for future generations on the other, it is possible to reap the benefits of this cleaner fuel source while mitigating its negative environmental effects.

9. Recommendations

To guarantee that natural gas and its utilisation techniques remain sustainable and ecologically responsible, it is necessary to adopt steps to reduce environmental consequences, which are as follows:

1. The government must prioritize the right to life and a healthy environment above the economic advantages of natural gas. In this regard, it should encourage the responsible development of natural gas resources via best practices and legislation that safeguard vulnerable ecosystems and reduce air, land, and water pollution. The PIA and Regulations should undergo further reforms to ban environmental breaches and provide appropriate sanctions for violations

[79] See s. 20, CFRN 1999 (as amended).
[80] JE Chigonu, OK Mubochi and UA Uayamen, 'Environmental Regulation of Oil and Gas Operations in Nigeria: The Role of Legal and Regulatory Framework,' <https://www.researchgate.net/publication/369766279> accessed 05 October 2024.
[81] No. 86 of 1992.

occasioned by natural gas utilization. There should, therefore, be enactment and implementation of strict emission restrictions for natural gas production, transportation and utilisation to reduce environmental pollution.

2. To reduce greenhouse gas emissions, governments and industry stakeholders should invest heavily in systems that collect and use methane emissions from natural gas production and delivery. Relevant agencies, including the Nigerian Midstream and Downstream Petroleum Regulatory Authority and the Nigerian Upstream Petroleum Regulatory Commission, should monitor natural gas leaks and environmental impacts to address pollution sources in the industry chain. This responsibility should not be left to developers in order to curtail under-reporting of natural gas leaks or falsification of data on actual volume of gas flared.
3. A comprehensive EMP that includes environmental considerations for natural gas and its utilization methods in project planning and decision-making should be developed. Such EMP mandatorily should comply with requirements to engage with local communities and stakeholders to understand their concerns and needs, and allocate adequate resources to implement environmental management measures.