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NATURAL GAS UTILIZATION IN NIGERIA AND IMPEDIMENTS TO SUSTAINABLE DEVELOPMENT IN THE GAS SECTOR: A JURISDICTIONAL APPROACH

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Abstract
It has become critical for Nigeria to decide how to best use its natural gas reserves while simultaneously protecting the environment and ensuring the sustainable development of its gas industry. The potential for gas sector development in Nigeria is enormous. Nevertheless, this paper contended that factors such as violations of the Environmental Impact Assessment Act, gaps in the Petroleum Industry Act, and a lack of gas infrastructure could impede the sustainable development of the gas sector. The objectives of this paper, which adopted the doctrinal research methodology, include examining the role of gas utilization companies in encouraging sustainable growth of the gas sector, the obstacles thereto, while focusing on Norway and Algeria as subjects of a jurisdictional study. The paper finds that these countries' sustainable growth in the natural gas industry was the result of a mix of stringent regulation, efficient enforcement, and a well-planned infrastructural basis. In contrast to Algeria, where compliance with environmental impact assessment is mandatory, the process remains weak and ineffective in Nigeria; the PIA's exemption practice represents a weak link in the Act which operators may take advantage of; and gas infrastructure remains inadequate. It recommends that the appropriate agencies should prevent licensees and operators from taking advantage of gaps in the EIA and the PIA, and that the government and other interested parties embark on deliberate funding of gas infrastructure to ensure that Nigeria's natural gas is used utilized maximally while reducing emissions, in order to guarantee sustainability in the gas industry.

Keywords: Gas utilization, impediments, jurisdictional approach, sustainable development, Nigeria

1. Introduction

This paper, examines the Nigerian gas sector through the lens of sustainable development and, by extension, environmental protection. It also investigates jurisdictional approaches capable of providing insights to, and recommendations for, the effective stewardship of Nigeria's gas sector thus making it more environmentally responsible. It also explores the vital role of gas companies in environmental preservation.

2. Environmental Sustainability of the Nigerian Gas Sector and the Role of Gas Utilization Companies

Among Nigeria's abundant natural resources, natural gas is particularly promising, with the ability to revolutionise several industries and drive economic progress.[1] Nigeria may show its dedication to environmental sustainability by making gas its primary energy source.[2] This would attract investors who are concerned about the environment and help Nigeria gain a favourable reputation internationally.[3] To aid developing nations in implementing realistic resource and environmental policies, it is necessary to investigate the connection between green economic development, environmental policy, and the use of natural gas resources.[4] It is impossible to overstate the significance of the gas industry's role in

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[1] O Isesele '5 Things Gas can do for Nigeria's Economy,' June 22, 2023, https://www.linkedin.com/pulse/5-things-gas-can-do-nigerias-economy-osaze-isesele accessed 27 April 2024.
[2] Ibid.
[3] Ibid.
[4] Y Kuang and B Lin, 'Natural Gas Resource Utilization, Environmental Policy and Green Economic Development: Empirical Evidence from China,' (2022) Vol. 79, *Resources Policy 102992.*

sustainability for humanity's future.[5] There needs to be a shift to more inclusive and long-term methods since the progress made in this regard has not been hitch-free.[6]

Within the Nigerian gas industry, gas utilisation firms are crucial in achieving environmental sustainability. The processing, distribution, and utilisation of natural gas are the main operations of these firms, and their actions may have a substantial influence on environmental results. Gas utilization companies help Nigeria's environment in diverse ways such as adherence to environmental regulations both at home and abroad:[7] these include conducting frequent environmental impact assessments and audits to find ways to lessen the negative effects of their operations, and implementing best practices to reduce environmental degradation.

As the critical need for sustainable strategies and practices becomes more widely recognised, it is critical that the industry shifts to a greener model that puts sustainability first, aims to reduce environmental damage, and works to restore and improve the natural world. When it comes to protecting the environment, gas utilisation firms are expected to use techniques and technologies that reduce the negative effects of processing, distributing, and using natural gas. Natural gas distribution infrastructure is one example of a technology that is essential to Nigeria's economic growth and ecological preservation.[8]

3. Obstacles to Sustainability in the Nigerian Gas Sector

Extracting and using gas resources is crucial to Nigeria's economy since it diversifies the country's revenue streams and provides electricity for homes, businesses, and industries. It is crucial to prioritise sustainable development in the gas sector. This refers to a way of planning that aims to balance the economic and social needs of current and future generations with the need to preserve or avoid excessive harm to the natural environment. Despite the many advantages of gas use, the problems that prevent the gas industry from achieving sustainable growth must be considered. These problems, which stem from a lack of clear regulations as well as complicated operations, threaten the fragile ecological balance and impede sustainable development projects that are vital to Nigeria's economic growth in the future. Therefore, in order to promote a healthy coexistence between economic growth and environmental preservation in Nigeria, it is necessary to understand and address these difficulties, which include:

3.1 The Environmental Impact Assessment Act[9]

Environmental impact assessment is a systematic approach to forecasting the ecological effects of a proposed development project, with the goal of identifying and mitigating any issues that may arise during the planning and design phases.[10] In other words, it is a method for determining how a development or project could affect the natural world. Since EIA is an inevitable by-product of the precautionary principle, it is critical to comprehend a project's environmental implications at the earliest opportunity to forestall environmental danger.[11] Unlike other types of evaluations, environmental impact assessments demand that decision-makers take environmental values into consideration and provide justifications for their choices based on extensive research into the project's environmental effects and public feedback on those effects.[12] An EIA is more than just a series of meetings that culminate in a report detailing the project's impacts and the steps taken to lessen those impacts.[13] The monitoring of

[5] 'Sustainability in the Oil and Gas Industry,' | Petrowiki, <https://petrowiki.spe.org_sustainability_in_the_oil_and... > accessed 27 April 2024.
[6] Ibid.
[7] Ibid.
[8] PE Agbonifo, 'Natural Gas Distribution and the Quest for Environmental Sustainability in the Niger Delta: The Prospect of Natural gas Utilization in Nigeria,' (2016) 6 (3), *International Journal of Energy, Economy and Policy* 442-448.
[9] Environmental Impact Assessment Act, 1992, No. 86. It shall hereinafter be referred to as the 'EIA Act.'
[10] O Nnubia, 'The Effectiveness of the Environmental Impact Assessment as an Instrument of Environmental Protection in Nigeria's Oil and Gas Industry' (2021), <https://www.researchgate.net/publication/360711323_THE-EFFECTIVENESS_OF_THE_ENVIRONMENTAL_IMPACT_ASSESSMENT...> accessed 30 April 2024.
[11] Ibid.
[12] Ibid.
[13] N Chioma, 'Prospects and Challenges of Alternative Disputes Arising from Non-compliance with Environmental Impact Assessment Laws and Regulations, [2019] (10), *The Journal of Property Laws and Contemporary Issues,* 41.

the operating and construction stages and the actions taken on the basis of such monitoring, until the ultimate abandonment or closure, are also part of this process.[14] An essential aspect of impact evaluations is the post-closure phase as well.[15]

Gas utilization companies in Nigeria have come under fire for allegedly not following the EIA Act to the letter, particularly when it comes to public involvement or participation. Before making a decision on an activity for which an environmental assessment has been prepared, the agency is required by Section 7 of the EIA Act to provide opportunity for specific groups to voice out their opinions on the activity's environmental impact assessment. These groups include government agencies, members of the public, experts in relevant disciplines, and interested groups. When members of the public are actively involved in making decisions and their opinions are thoroughly considered, we say that there is public participation.[16] In order to keep the public informed and to get their feedback, sponsor agencies engage in public engagement throughout the duration of a project.[17] Public participation is therefore not a one-time process, but rather an ongoing activity.[18] Decisions that impact people's lives may be shaped via public involvement, which gives affected stakeholders a voice.[19]

The following goals may be attained with public involvement in EIA:[20]

i. Ensuring that people have a say in how environmental policy goals are defined and finalised.
ii. Increasing public faith in environmental administration because it shows the government is serious about making sure government agencies, corporations, and elite groups all practise good environmental stewardship; and
iii. Providing easy access to environmental data and information, which improves environmental management and compliance.

As an appropriate example to be considered here is the Nigeria–Morocco gas pipeline, which is an extension of the larger West African Gas Pipeline project. The advocates of these two projects have taken a lot of heat for breach of the provisions of the EIA. Sustainability experts have stressed the need of consulting with local communities whose livelihoods are dependent on the coastal regions where the gas pipeline would run, and of investigating the extent to which the project complies with environmental impact assessment standards in relation to the Nigeria–Morocco gas pipeline.[21] Documentation of the consultation sessions with adjacent communities and other stakeholders conducted in a public forum, for inclusion in the EIA report's appendix, is one of the conditions for public involvement under the EIA.[22] In addition, the EIA specifies in Section 37 that review panels are responsible for gathering and making public all relevant information in order to conduct their assessments. Projects run by multinational oil corporations are subject to additional criteria laid forth by the World Bank in three areas: approach, execution, and feedback.[23] For instance, it is the proponent's responsibility to make sure that all individuals, especially those interested in participating, are allowed to attend.[24] Here, the criticism against the WAGP project-which includes the Nigeria–Morocco gas pipeline-is predicated on the fact that it did not following the EIA guidelines, particularly when it comes to public involvement.

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[14] Ibid.

[15] TA Yusuf, 'The Environmental Impact Assessment Practice in Nigeria; The Journey So far,' <https://www.inigerian.com> accessed 28 April 2024.

[16] Public Participation Guide: Introduction to Public Participation,' <https://www.epa.gov/international-cooperation/public-participation-guide-introduction-public-participation> accessed 24 April 2024.

[17] Ibid.

[18] Ibid.

[19] Ibid.

[20] H Ijaiya, 'Public Participation in Environmental Impact Assessment in Nigeria: Problems and Prospects,' (2016) 13, *Nigerian Juridical Review*, 83.

[21] 'Nigeria-Morocco Gas Pipeline highly Vulnerable: Experts,' <https://www.gasoutlook.com>analysis>nigeria-morocco-ga...> accessed 16 May 2024.

[22] TheiGuides | EIA Procedural Guideline, <https://admin.theiguides.org>media>documents> accessed 12 May 2024. See also AM Lawal, S Bouzarovski and J Clark, 'Public Participation in the EIA,'< <https://www.tandfonline.com/doi/full/10.1080/14615517.2013.8024191> accessed May 2024.

[23] Ijaiya, (n20).

[24] JC Nwafor, '*Environmental Impact Assessment for Sustainable Development: The Nigeria Perspective*,' (EL DEMARK Publications 2006) 191.

Offshore and onshore environments are also addressed by the WAGP initiative. The pipeline starts in Itoki, Nigeria, connects to the natural gas system at the Alagbado plant in Nigeria, and travels down the coast of Nigeria before eventually running offshore to a distribution terminal close to Takoradi in Ghana and places beyond.[25] The WAGP project did not meet the World Bank's and the EIA's requirements for increased involvement.[26] Local communities and NGOs in Nigeria took to the streets to protest the WAGP EIA Report's inaccessibility, a result of the country's public involvement failings in this area.[27] The outcome is that the Report is now available online at the World Bank Inspection Site.[28] Some individuals think that the WAGP Report wouldn't be available today if the locals and NGOs hadn't worked so hard to make it happen.[29] Protests demonstrate that not everyone had a chance to take part, which goes against both the EIA's and the World Bank's standards for public involvement.[30]

3.2 Lacunae in the PIA

Nigeria has its Petroleum Industry Act,[31] which includes important measures meant to guarantee, *inter alia*, the long-term growth of the gas industry. A licensee or lessee involved in upstream or midstream petroleum operations is required under the Act to submit an environmental management plan that addresses projects that need an environmental impact assessment to the Commission or Authority for approval.[32] This is valid for a full calendar year from the date of implementation or for a partial year after the issuance of the relevant license or lease.[33] Rehabilitating and managing negative effects on the environment is a significant per-condition for the Commission or Authority to approve the environmental management plan.[34] In addition, prior to the approval of the environmental management plan by the Commission or Authority, the licensee or lessee must make payment of a financial contribution to an environmental remediation fund which will be used for the rehabilitation or management of negative environmental impacts.[35] Huge financial investment is required to clean up a contaminated environment; thus it would be expedient for the Commission or Authority to comply the counsel of experts in the sector in this regard.[36] A potential consequence of underestimating an operator at this point is that the negative effect might be worsened, since the operator may delay in making further payments when the Commission or Authority eventually evaluates the real harm done.[37]

Flaring or venting natural gas is punishable by fines for licensees, lessees, or marginal field operators unless doing so is exempted by the Commission, is an acceptable safety practice, or occurs in an emergency.[38] It is equally important for the licensee to install the prescribed specification of metering equipment on the facility where natural gas may be flared or vented before petroleum production begins, and in accordance with the regulations set by the Commission or the Authority.[39] Thus, a licencee commits an infraction if he or she violates this condition, which is punishable by fine.[40] This procedure raises concerns about the preparedness of the Commission or Authority to fully control gas flares as it means that when the atmosphere is heavily polluted, the government will be unable to identify its source or even most of it, thus indicating the onset of failure control.[41] It would be ideal if the government,

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[25] AM Lawal, S Bouzarovski, and JRA Clark, 'Public Participation in EIA: The case of the West African Pipeline and Tank Farm Projects in Nigeria,' <https://www.researchgate.net/publication/263681879_Public_Participation_in_EIA_The_Case_of_West_African_Gas_Pipe> accessed 12 May 2024.
[26] Ibid.
[27] Ibid.
[28] According to Lawa, Bouzarovski and Clark it would have been preferable if the WAGP project's proponent had conceded this idea without the protests and campaigns.
[29] Ibid.
[30] Ibid.
[31] No. 6, 2021.
[32] Section 102 (1), PIA 2021.
[33] Section 102 (1) (a)-(b), ibid.
[34] Section 102 (3) (b), ibid.
[35] Section 103 (1), ibid.
[36] II Evans, 'End in Sight for Gas Flaring in Nigeria,' (2023) Vol. 8, Issue 2, *Advanced Journal of Current Research*, 13-49.
[37] *Ibid.*
[38] Section 104 (1) (a)-(c), PIA 2021.
[39] Section 106 (1), PIA 2021.
[40] Section 106 (2), PIA 2021.
[41] Evans, (*n*36).

which is responsible for regulating resource use and ensuring a sustainable environment, oversees these activities.[42] This involves the purchase of conventional metering equipment for the purpose of monitoring, and tracking the amounts and sources of natural gas flare.[43] Considering that these operations often occur in outlying areas, the government has a further responsibility to make sure that its designated agencies carry out this task thoroughly, without entrusting the licensees with any responsibility, in order to achieve the desired outcome.[44] Evans argues that the government's gas flare eradication efforts would be severely hindered if operators are allowed to install their own technology to quantify the amount of natural gas flared from their facilities.[45] This, in turn, will have a detrimental influence on the sustainable growth of the gas industry.[46] Allowing companies to install, operate, and interprete flare measuring and reading equipment makes government reliant on them for flare measurement and reading without an independent method of log verification.[47] Further still, no assurance can be given that the equipment will be in ideal working order or that the results will be accurate.[48]

The Commission or the Authority has the discretion to grant a gas flare permit to a licensee or lessee for a definite period to enable facility start-up or for strategic operational reasons, such as testing, as provided in Section 107 (a)-(b) regarding gas flare permits.[49] This provision goes against the spirit of the Act, especially considering the measures put in place to ensure operators are well prepared for pre-approval,[50] which is especially with regards to the gas sector. Almost every nation is actively working to halt environmental abuse which has become a worldwide issue. Hence, it is counter-productive in this age to build new pollution-increasing levers on the faulty premise that operators would give up their profits for the greater good of society.[51] In order to ensure that licensees are adequately prepared to avoid flaring gas both during facility start-up and for strategic operational reasons, the requirements for approving the technical and commercial terms of a prospecting licensee's field development plan also include the plan for elimination of routine flaring.[52] However, these conditions do not provide sufficient exceptional justification to get a pollution permit. Although it was meant to be a fair compromise for new licensees, it would have been more practical to expressly state a specific deadline rather than leaving it to the Commission or the Authority's discretion.[53] The risk here is that operators may get complacent after they become used to the exemption practice.[54] Most of the prior laws aimed at eliminating gas flaring were unsuccessful, as pointed out by researchers, due to the practice of prolonging exemption periods.[55]

3.3 The Infrastructure Gap in Gas Gathering and Distribution.

Because of its large natural gas reserves, Nigeria is an important participant in the international gas market. The country's inadequate infrastructure has, however, prevented the successful use and distribution of its gas resources, on a wider scale.[56] Despite having the largest gas reserves in Africa, only about 25% of Nigeria's reserves are actually used for production.[57] While Nigeria has the ninth-

[42] *Ibid.*
[43] *Ibid.*
[44] *Ibid.*
[45] *Ibid.*
[46] *Ibid.*
[47] Ibid.
[48] Ibid.
[49] Section 107 (a)-(b).
[50] Evans, (*n*36).
[51] Ibid.
[52] Ibid.
[53] Ibid.
[54] Ibid.
[55] Y Omorogbe, 'Regulation of Oil Industry Pollution,' in E Azinge and Others (eds), *New Frontiers in Law* (Oliz Publishers 1993) 147-163; E Ukala, 'Gas Flaring in Niger Delta: Failed Promises and Reviving Community Voices,' (2011), 2(1) *Washington and Lee Journal of Energy, Climate and the Environment* 97-126.
[56] UC Obi, NC Ole and S Uzoigwe, Alliance Law Firm | 'Bridging the Infrastructure Gap: Impact of the Petroleum Industry Act (2021),' <https://www.lexology.com/library/detail.aspx?g=f5944006-9323-400f-b6c6-6ae0494c045d> accessed 15 May 2024.
[57] *Ibid.*.

largest gas reserves in the world—at 209.5 trillion cubic feet—the country only uses around 8 billion standard cubic feet per day (bscf), according to the Nigerian Midstream and Downstream Petroleum Regulatory Authority (NMDPRA).[58] To address the gas infrastructure deficit in Nigeria during the next decade, the federal government revealed in August 2022 that an annual expenditure of almost $20 billion is necessary.[59] Even though there are a lot of gas reserves, they haven't been optimally harnessed in production and development.[60] The problem of inadequate gas infrastructure is partly caused by the capital-intensive nature of gas extraction[61] and the constant vandalism of gas pipelines. This has led to insufficient gas infrastructure to process and deliver enough gas for domestic use. The nation's capacity to generate electricity, expand economically, and fulfil export and domestic obligations have all been impacted by this infrastructural deficit. Building a reliable network to distribute natural gas is essential to Nigeria's economic growth, social progress, and ecological preservation. Natural gas extraction and utilisation is the Niger Delta region's last chance for long-term environmental protection and sustainable development planning and implementation. Without a doubt, gas development initiatives on a national, regional, and worldwide scale encourage gas use and export, effective energy management, and the sustainable use of non-renewable resources.[62] Inadequate use of natural gas and development of domestic and regional networks to collect, transfer, and distribute the gas has, nevertheless, encouraged environmental damage.[63] This in effect defeats the essence of gas development as a panacea to environmental degradation in Nigeria.

3.4 High Conversion Cost and Limited Refuelling Stations

Companies in Nigeria are already capitalising on the trend towards using compressed natural gas (CNG) as a fuel for heavy equipment such as truck fleets, since it is less expensive than petrol.[64] Despite the many obstacles, compressed natural gas (CNG) has the ability to transform the transportation sector due to its reduced emissions and affordability.[65] Major obstacles preventing more gas-powered vehicles from taking to Nigerian roads include the prohibitive expense of upgrading diesel and gasoline vehicles to Compressed Natural Gas (CNG) engines and the scarcity of refilling facilities.[66] Consumers typically end up bearing the cost of the high and capital-intensive expense of converting petrol vehicles to operate on compressed natural gas (CNG).[67] Further restricting its acceptance is the low number of CNG cars on Nigerian roads, which is a result of the costly conversion cost.[68]

The high expense of constructing additional filling stations is another factor that hinders the expansion of CNG infrastructure,[69] thus resulting in few CNG outlets in contrast to the extensive network for petrol.[70] Drivers are finding it challenging to switch to compressed natural gas (CNG),[71] so they keep using petrol, a dirtier fossil fuel. In addition, many customers are discouraged from making the change since the government is not offering any incentives to do so. In recent times however, the Nigerian government has resorted to distribution of free CNG kits to commercial operators to encourage a kick

[58] *Ibid.*
[59] *Ibid.*
[60] Current Gas Policies, Challenges and Protests | AO2LAW | 20 June, 2024, <https://ao2law.com>blog> accessed 1 August 2024.
[61] *Ibid.*
[62] PE Agbonifo, 'Natural Gas Distribution and the Quest for Environmental Sustainability in the Niger Delta: The Prospect of Natural Gas Utilization in Nigeria,' (2016), 6(3), *International Journal of Energy Economics and Politics* 442-448.
[63] *Ibid.*
[64] S Onyekwelu, 'High Cost of Conversion Slows Increased Adoption of CNG,' <https://businessday.ng/energy/article/how-cos-tcos-of-conversion-slows-increased-adoption-of-cng-vehicles/> accessed 6 August 2024.
[65] 'Navigating the Compressed Natural Gas Debate,' <https://leadership.ng/navigating-the-compressed-natural-gas-debate/> accessed 26 August 2024.
[66] Conversion leads to 40 per cent savings in energy costs for car owners. It however costs between N100,000 and N300,000 to purchase the kit needed for converting a car from petrol or diesel engine to a CNG engine, thus making it unaffordable for average Nigerians.
[67] Navigating the Compressed Natural Gas Debate, *(n65).*
[68] Ibid.
[69] Ibid.
[70] Ibid.
[71] Ibid.

start of the conversion process.[72] The federal government has also directed marketers to install CNG dispensing pumps to achieve a spiral growth pattern for the programme.[73] Despite the fact that indigenous gas stakeholders have backed this directive, which some see as having the potential to transform transportation, boost economic growth, and improve environmental sustainability, others have taken a more critical view and have pointed out the aforementioned challenges as potential roadblocks.[74] The government and relevant stakeholders in Nigeria have launched gas development programs to make the most of the country's abundant gas resource and avoid the environmental damage that comes with using dirtier fossil fuels. However, unless properly addressed, these identified downsides will undoubtedly have an adverse effect on the environment.

3.5 Economics of Natural Gas Price Control

Gas producers often argue that the current price levels are too low to justify investing in gas development and production or maintaining operating equipment,[75] especially since the Federal Government controls the price of natural gas sold in the domestic market, and which is seen as a subsidy to consumers.[76] Accordingly, a new Domestic Base Price (DBP) for natural gas, established at $2.42 per Million Metric British Thermal Units (MMBTU), was officially announced on April 1, 2024, by the Nigerian Midstream and Downstream Petroleum Regulatory Authority (NMDPRA).[77] Thus, following Sections 167 (1), 168 (1) and (4), and the Third and Fourth Schedules of the PIA, the Authority has set the Domestic Base Price for 2024 at USD2.42 per Million Metric British Thermal Units (MMBTU) for gas-based industries, an increase from its previous 2.18 MMBTU.[78] This new domestic base price of gas represents over 11 per cent increase from the previous gas price to the present one.[79] Although Nigeria possesses proven gas reserves of over 206 trillion cubic feet and over 600 trillion cubic feet of potential, it has struggled to harness them due to a lack of investment in the sector.[80] Arguably, many experts believe that the issue of appropriate gas pricing constitutes the major hindrance to the development of the gas sector.[81] This issue is particularly relevant in light of the fact that the main driver for domestic gas sales is the power sector which utilizes over 70% of the gas produced in Nigeria.[82]

The new pricing structure is a crucial aspect of the PIA's regulatory framework, aimed at establishing a standardized price for natural gas consumption across Nigeria.[83] The new gas prices therefore aim to keep Nigeria competitive compared to other gas-producing nations.[84] However, if the exchange rate between the naira and the dollar remains unstable, it could negatively affect pricing,[85] thus snowballing into low level of investment necessary for gas utilization. Determining an appropriate pricing mechanism for natural gas therefore remains an issue, as uncertainty around gas pricing can deter potential investors and consumers.

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[72] 'Easing Cost of Transportation: FG Distributes Free CNG Kits to Commercial Operators,' AIT 8pm NewsHour, August 1, 2024. This move is in response to agitations of citizens over high cost of transportation which has impacted negatively especially on the economic lives of Nigerians.
[73] Ibid.
[74] Ibid.
[75] Current Gas Policies, (n60*)*.
[76] See sections 167 PIA, 2021 and Regulation 8(2) of the Gas Pricing and Domestic Regulations 2023 by virtue of which the Authority is empowered to determine the Domestic Base Price for the strategic sectors.
[77] Ralph – Malix Legal Consult | 'Impact of the New Pricing of Natural Gas for the Nigerian Domestic Market,' <https://www.linkedin.com/pulse/impact-new-pricing-natural-gas-nigerian-domestic-rjb2c> accessed 10 August 2024. This announcement aligns with the directives outlined in the Petroleum Industry Act which mandates the regulator to declare a DBP annually.
[78] See sections 167(1), 168 (1) and (4), and the Third and Fourth Schedules of the PIA 2021.
[79] Ralph – Malix, *(*n80).
[80] Ibid.
[81] Current gas policies, (n60).
[82] Ibid.
[83] Ralph – Malix, (n80).
[84] Ibid.
[85] Ibid.

3.6 Security Concerns in the Niger Delta Region

Nigeria is the fourth-largest producer of liquefied natural gas (LNG) in the world. Most of its LNG sources are offshore and in the Niger River Delta.[86] On the other hand, Nigeria's energy industries are often hampered by the country's unrest of various dimensions.[87] Militants and pipelines vandals have been attacking Nigeria's pipeline network all over the country. Pipeline vandalism is a huge security problem for the gas industry when it comes to developing natural gas. Pipeline vandalism occurs as a result of wilful damage of pipelines with the goal of stealing crude oil and other fuel products.[88] Unrest has been going on for over forty years in the Niger Delta which has been the site of many conflicts even before it was colonised.[89] Initially, these conflicts were caused by protests against unfair treatment and, more recently, by the desire to control resources.[90] Vandalism has permanently changed the oil and gas industry, polluting the environment and costing the government, global oil companies,[91] and host communities a lot of money. We can't say enough about how important the gas is, for at the heart of this industry is the need to find, develop, produce, and move discovered gas and other resources from the Niger Delta Region in Nigeria, which is where most of the country's oil and gas reserves are located, through pipes built in creeks and across rivers.[92] This means that in Nigeria, oil and other related goods are moved through a large network of pipes that go from remote to populated areas.[93] For example, the NNPCL has a network of over 8000 km of pipelines that move oil and natural gas to different depots.[94] When compared to rail, barges, or trucks, pipelines lower the risks of transportation because they are buried deep into the ground and, where visible, there are placed far away from communities to protect the environment.[95] However, these pipes are not well protected.[96] So, when militancy started and people began to fight for better living conditions and better management of resources, among other things, pipelines became targets for different groups especially in the Niger Delta, to make their case to the Nigerian government.[97] Nigeria has suffered economic loss because of this, and water bodies, farmlands, and the general environment have all been affected by the activities of pipeline vandals.[98] Vandalism of pipelines has also been linked to fires that generally have caused human casualties, shortfall in petroleum products and a decline in power supply, all of which cause social and economic problems.[99]

There are security risks to gas facilities, output, and operations because of the situation, especially in the Niger Delta area, which lowers both the stability of supply and investor assurance.[100] The government has taken a number of actions, including passing the Miscellaneous Offences Act[101] and the Petroleum Production and Distribution (Anti-Sabotage) Act.[102] These laws make it illegal to tamper with or damage pipelines used for oil production or distribution, and punish those who do so with death penalty or life in prison. But these laws haven't had the desired effect because vandalism is still a problem in the sector.

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[86] Strauss Center for International Security and Law | 'Energy and Security: Developments in the Energy Filed and Questions of International Security,' <https://www.strausscenter.org/energy-and-security-project/nigeria/> accessed 3 August 2024.
[87] Ibid.
[88] J Ogbonna and OO Udofia, 'Pipeline Vandalism in Nigeria: Recommended Best Practice of Checking the Menace,' <https://www.researchgate.net/publication/261383622_Pipeline_Vandalism_in_Nigeria_Recommended_Best_Practice_of_Check> accessed 21 August 2024.
[89] A Ajodo-Adebanjoko, 'Towards Ending Conflict and Insecurity in the Niger Delta Region,' <https://reliefweb.int/report/nigeria/towards-ending-conflict-and-insecurity-niger-delta-region> accessed 3 August 2024.
[90] Ibid.
[91] EO Okumagba, 'Oil and Gas Pipeline 'Vandalism' in Nigeria: Analysing Alternative Options beyond the Traditional Legal Approach,' (2019) 37(7), *International Energy Law Review* 181 – 189.
[92] Ibid.
[93] Ogbonna and Udofia (n88).
[94] SE Sunday, 'Nigeria: Depot, Pipelines Gulped N167Billion in 13 Months,' The Daily Newspaper Nigeria, 16 April 2018 <https://allafrica.com/stories/201804160210> accessed 21 August 2024.
[95] E Onwuka and ON Dike, 'Effects of Surveillance on Oil Pipeline Vandalism in the Downstream Sector, Nigeria,' (2015) 4, *European Journal of Business and Social Sciences,* 127-135. See also J Rodriguez, C Comtois and B Black, *The Geography of Transport Systems* (Routledge) 2013, 255-256.
[96] Ogbonna and Udofia, (n88).
[97] PE Igbinovia, Oil Theft and Pipeline Vandalization in Nigeria (Safari Books) 2014, 32-33.
[98] Okumagba, (n91).
[99] Ogbonna and Udofia (n88)
[100] Strauss Center for International Security and Law, (n86).
[101] See section 1 (1)-(2) of the Petroleum Production and Distribution (Anti-Sabotage) Act of 1975 No. 35.
[102] See section 7 of the Miscellaneous Offences Act, 1984 No. 20.

4. Jurisdictional Approaches to Sustainable Gas Utilization in Nigeria

This section undertakes a study of countries such as Norway and Algeria with vast gas deposits. The choice of the selected case study countries was based on the transparent and proper management of their gas resources, which have either minimized or eliminated waste gas and its attendant effect on the environment. Nigeria can use the lessons learnt to strengthen its regulatory framework by replicating the strategies or legal templates of the selected case study countries' efforts towards ensuring sustainable development in the gas sector.

4.1 Norway

The country is a global positive example of where direct state regulations and strict environmental mechanisms resulted in an extraordinary accomplishment.[103] The country instituted regulatory measures that have significantly reduced gas flaring while increasing oil production.[104] A Carbon Tax introduced in 1991 proved to be a successful incentive in establishing zero routine gas flare environment in the oil and gas industry,[105] routine burning having been banned since 1971,[106] thus paving way for extensive utilization of gas from the earliest possible time in its history of exploration and exploitation of petroleum resources.

The economic and social conditions in Norway at the early stages of oil discovery made it possible to establish fairly strict regulations for the new petroleum industry.[107] Norway was characterised by fairly high GNP and employment, self-sufficiency in energy, high level of technical education, and tradition for hands on involvement in important sectors by the government.[108] This favourable economic and social condition placed the Norwegian government in a strong position against the MNOCs.[109] The concern was to hedge the negotiating position by means of insight and competence to control the industry.[110] This objective led the government to impose obligations other than just taxation on the oil companies.[111] Therefore, the government of Norway could afford to grant licences to these MOCs on its own terms.[112] This is contrary to what obtains in developing countries that are dependent on the MOCs for fund and technology.[113] There is often reluctance in developing countries to strictly enforce oil exploration regulations for fear of losing the funds and technology of the MOCs.[114] Unfortunately, Nigeria falls within this category. The Norwegian regulatory system for petroleum exploration and production is administrative law, concession, permit and approval based.[115] As part of its regulatory measures, Norway was the first oil-producing country to announce its support for the World Bank's initiative to end routine gas flaring by 2030.[116] Under the adopted measures, oil and gas developers are required to come to terms with gas utilization plans prior to carrying out any field development operations, and the responsibility of establishing an internal control system that ensures compliance, reporting and monitoring rests on their shoulders.[117] In addition to these measures, fiscal incentives such as the CO2 tax introduced in 1991and greenhouse trading scheme has added further direct costs that strongly advise against developers from engaging in flaring.[118]

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[103] Egypt Oil and gas Group | 'Norwegian Lesson in Gas Flare Elimination,' <https://egyptoil-gas.com/features/norwegian-lesson-in-gas-flare-eliminataion/> accessed 15 October 2024.
[104] Ibid.
[105] IEA | 'CO2 Tax on Offshore Oil and Gas,' <https://www.iea.org/policies/11695-co2-tax-offshore-oil-and-gas> accessed 15 October 2024.
[106] Egypt Oil, (*n*103).
[107] OK Mrabure and BO Ohimor, 'Unabated Gas Flaring Menace in Nigeria: The Need for Proper Gas Utilization and Strict Enforcement of Applicable Laws.' (2022) Vol. 46 No. 4, *Commonwealth Law Bulletin* 753-779.
[108] Ibid.
[109] DO Oghenejabor, 'Evaluating Gas Flaring Trends and Policies in Nigeria: A Feasibility Study on Possible Solutions with Emphasis on Norway,' (Msc. Thesis, Coventry University, 2024)217.
[110] Ibid.
[111] Ibid.
[112] Ibid.
[113] Ibid.
[114] Ibid.
[115] 'Oil and Gas Regulation in Norway – Lexology' <https://www.google.com/search?/=noway's+legal+and+regulatory+framework+for+the+gas+sector&client=firebox-b-> accessed 12 November 2024.
[116] Egypt Oil, (*n*103).
[117] Ibid.
[118] Ibid.

Norway's Petroleum Act of 1996,[119] provides the general legal basis for sound resource management, including the licensing system that gives companies rights to engage in petroleum operations. With regards to health, safety and prevention of pollution, the legislation sets strict requirements as regards the responsibilities of individual enterprises for risk identification, risk reduction, preparedness and response.[120] Management of major accident risk is required to be an integral part of petroleum activities.[121] For instance, licensees are strictly liable for pollution damage, regardless of fault.[122] All petroleum activities are subject to prior authorisation by the relevant regulatory authorities.[123] In all cases, operators have to submit an APG utilization scheme prior to the approval of their plan for development and operation of oil fields.[124] In fact, major new developments were only approved after significant investments were made to avoid routine gas flaring and gas venting."[125] For instance, at the Heidrun field, the development could have only proceeded in parallel with the construction of a methanol plant and connecting gas pipeline.[126] Also, in the Gullfaksoil field, the state company Statoil, following the 1991 CO2 tax introduction, developed a system to end continuous routine flaring by recycling APG. Instead of being flared, the gas is routed to an existing gas export system through a pipeline network.[127] In addition, the country also employs the Far North Liquids and Associated Gas System (FLAGS), a 450 km natural gas pipeline running associated gas and liquids from multiple platforms, including the four Brent platforms, in the North Sea to the St. Fergus Gas Terminal in the United Kingdom.[128] Since its commission in 1982, the use of the line has incrementally increased due to the incorporation of additional gas sources into the offshore network, increased production from existing fields and completion of onshore gas treatment facilities.[129] The supervisory and control role of the state institutions proved inevitable for the success of gas flaring reduction.[130] Similarly, strict observation of the regulatory requirements and processes by operators and the development of the gas transportation infrastructure contributed greatly to the achievements.[131] As a result, most of Norway's recovered gas is exported, while the remnant of APG is re-injected.[132]

The actors in the Norwegian petroleum industry are highly professional and take a very cautious approach, and there is broad-based tripartite cooperation between employers, trade unions and the state.[133] The Government's ambition is for Norway's petroleum industry to be a world leader in health, safety and environment work.[134] In line with the Norwegian Energy Policy, the country has been able to merge its role as a large energy producer with a pioneering position in environmental issues in Europe and worldwide.[135]

4.2 Algeria

Deposits of natural gas were first discovered in Algeria in 1956, and since then discoveries have also been made at several other fields.[136] Algeria ranks among the top countries in the world in terms of total

[119] The Petroleum Act 29 November 1996 No. 72. The Act, which is the primary regulatory framework for petroleum activities in the Norwegian Continental Shelf, establishes a basic principle that the Norwegian state has the proprietary right to subsea petroleum deposits on the Norwegian continental shelf, including gas.
[120] 'The Petroleum Act and the Licensing System,' <https://www.norskpetroleum.no/en/framework/the-petroleum-act-and-thelicensing-system/> accessed 20 October 2024.
[121] Ibid.
[122] See Chapter 7 of the Norwegian Petroleum Act of 1996.
[123] Ibid.
[124] The Petroleum Act and Licensing System, (*n*120).
[125] Ibid.
[126] Ibid.
[127] Ibid.
[128] Global Energy Monitor Wiki | 'Far North Liquids and Associated Gas System (FLAGS) Pipeline.' <https://www.gem.wiki/Far_North_Liqguids_And_Associated_Gas_System_(Flags)_Pipeline#BackgroundI> accessed 20 October 2024.
[129] Ibid.
[130] *Egypt Oil, (*n103).
[131] Ibid.
[132] Ibid.
[133] The Petroleum Act and the Licensing System, (n120).
[134] Ibid.
[135] Egypt Oil, (*n*103).
[136] Economy of Algeria, <https://www.britannica.com/place/Algeria/Economy> accessed 28 October 2024.

gas reserves and gas exports.[137] In 2022, Algeria represented the largest producer of natural gas in Africa, with output measured at a record 3.6 trillion cubic feet (tcf).[138] Exported both by pipeline and as liquefied natural gas, output has been largely driven by several major producing fields and is set to increase following a string of recent hydrocarbon discoveries in the country.[139] These include, among others:[140] (i) the Hassi R'Mel field which produced approximately 3.02 billion cubic feet per day (cf/d) in 2022, with production expected to continue until 2046; (ii) the Rhourde Nouss field which produced approximately 1.08 billion cf/d in 2022, (iii) the Alrar gas field which produced approximately 724 million cf/d in 2022, (iv) the Tinrhert Project which produced approximately 685 million cf/d in 2022, all fields owned and operated by Sonatrach, Algeria's national oil and gas company. While these fields contribute significantly to Algeria's overall output, major discoveries continue to be made and are likely to bring a number of highly prospective fields online.[141] Sonatrach has stated that it believes over two-thirds of the country's acreage remains unexplored, while over 100 discoveries remain undeveloped, presenting lucrative opportunities for investors and project developers.[142] Algeria is committed to reducing its greenhouse gas emissions and other environmental impacts of the gas sector,[143] hence its prohibition of gas flaring in 1966. Since then, Algeria, through Sonatrach, has invested heavily in more than 30 projects that have allowed the monetization of the recovered gas and valuable LPGs, thus substantially reducing associated gas flaring.[144] It has also embarked on a project to recover 532,000 SCM per day of flared (associated) gas from two crude (petroleum) production fields namely the field of "Tiguentourine" with a capacity of 450 000 SCM per Day and the field of "La Reculée" for a capacity of 70 000 SCM per day in the area of In Amenas.[145] The global context of the project not only meets Algeria's commitments in terms of environmental protection and the promotion of environmental goods and services, but also aligns with the UNFCCC and the Paris Climate Agreement.

Algeria's Hydrocarbon Law No. 19-13, 2019 which covers all matters pertaining to oil and gas activities within Algeria, including abandonment, flaring, and environmental issues, states that the exercise of hydrocarbon activities must respect obligations relating to: the safety and health of persons; environmental protection; the rational use of natural resources and energy,[146] among others. Moreover, the regulation has stipulations with regards to requirements for the use of best practices to prevent any risk or damage to people, to property, facilities and the environment.[147]

The law maintains the requirement of conducting an environmental impact assessment in order to request an operation license for oil and gas developments, which is subject to the approval of the competent authority.[148] Algeria serves as a blueprint for how other gas-rich countries in Africa can leverage their resources to stimulate development across various sectors of the economy.[149] The country has positioned its gas sector as a key driver of economic diversification, using revenue generated from Liquefied Natural Gas (LNG) exports to advance industrialization and electrification while correspondingly bolstering sustainability and climate resilience.[150]

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[137] Ibid.
[138] Largest Gas Fields in Algeria by Production, <https://energycapitalpower.com/largest -gas-fields-in-algeria-by-production> accessed 28 October 2024.
[139] Ibid.
[140] Ibid. In 2023, Sonatrach announced a newly-discovered gas condensate reservoir at the field likely to contain up to 12 tcf of reserves. The find will increase production by a further 130 billion cubic feet per year after being fast-tracked to development.
[141] Ibid.
[142] Ibid.
[143] I Boukhatem and PY Oei, 'Fossil Gas Lock-In-Risks: Analysis of Algeria's Electricity Sector and Implications for a Renewable Energy Transition,' (2023) 31, *Springer nature Link* 25-40.
[144] Ibid.
[145] Ibid.
[146] Law 19-13 of Algeria's Hydrocarbon Law, 2019. See also IEA – International Energy Agency, Law No. 19-13 – Law Governing Hydrocarbon Activities, <https://www.iea.org>policies>11809-law-no-19-13-la...> accessed 15 November 2024. This Law maintains the regulatory roles of the National Agency for the Valorisation of Hydrocarbon Resources (ALNAFT), the Hydrocarbon Regulatory Authority and Sonatrach (the National Oil Company).
[147] Ibid.
[148] Ibid.
[149] Energy Capital & Power | 'Natural gas Drives Algerian Economic Diversification,' <https://energycapitalpower.com/gas-sustainability-the-case-of-algeria> accessed 12 November 2024.
[150] Ibid.

5. Findings

Having undertaken a study of the role of gas utilization companies in particular, and the government in general, in encouraging sustainable development in the gas sector, the factors impeding sustainable development, and the efforts put in by selected countries in encouraging sustainable development in their gas industries, this paper finds as follows:

1. Compliance with the EIA Act remains weak in Nigeria. While Algeria has made the conduct of environmental impact assessment a mandatory requirement before approval can be given for oil and gas development, Nigeria still finds herself grappling with MNOCs who, just to fulfill all righteousness, only carry out EIAs after the projects must have commenced, and usually without public participation which is one of the major demands of the EIA Act.
2. Nigeria has gas gathering infrastructure deficit, despite the fact that it is reported to have the highest gas reserves in Africa. The nation has about 8,800 kilometres of pipelines for transportation of oil and gas, while a country like Norway boasts of an intricate network of pipelines of over 8000km dedicated solely to transportation of gas. Nigeria's infrastructure gap may significantly affect environmental sustainability in Nigeria, as the inefficient capture of gas will ultimately impact negatively on the country's plan to implement environmental preservation and sustainability.
3. The high cost of conversion of petrol and diesel cars into CNG engines, and lack of government incentives for it, may limit the adoption of CNG as alternative fuel for Nigerians. This factor is a drawback for the country's agenda to optimally maximize its abundant gas resource in order to prevent further degradation of the environment.
4. The Nigerian government's control of the price of natural gas, by virtue of s. 167 of the PIA and Regulation 8(2) of the Gas Pricing and Domestic Demand Regulations 2023 has remained a major hindrance to the development and growth of gas sector. This is because of the ever-present air of uncertainty around gas pricing which has deterred potential investors, thus snowballing into low-level of investment for the gas sector.
5. Industry players in Nigeria prefer sharp industry practices over legislative directions.[151] This has largely hampered the effectiveness of enforcement of legislations aimed at encouraging environmental protection and sustainable development of the natural gas industry. In this wise, the loopholes identified in the PIA are capable of being exploited by licencees and operators, especially with regards to the exemption practice. Norway's 'zero-flare' policy compelled gas companies to make prior gas utilization plans before carrying out field developments. Its strict legal regime, coupled with a strong and competent regulation of its gas sector therefore helped the country to successfully prioritize health, safety and environmental issues in the gas sector.

6. Conclusion

Sustainable growth in Nigeria is being propelled in large part by the country's gas industry, which has enormous potential and extensive reserves. Nevertheless, there are still major obstacles that prevent the industry from reaching its full potential and making a positive impact on the energy landscape of the country. Inadequate infrastructure, gaps in the legal and administrative framework, worries about security, and environmental deterioration are only a few of the major obstacles highlighted in this research. This study's findings highlight the need of investing in sufficient infrastructure and conducting a thorough review of the gas sector's present regulatory and governance framework in Nigeria. The implementation of stricter rules and regulations, more transparency and responsibility, and a stronger policy framework should be the top priorities of this reform. Companies in Nigeria that ustilize gas are crucial to the country's green sustainability initiatives. Addressing these obstacles and realising the gas sector's full potential requires close cooperation between the Nigerian government, industry players, and foreign partners. To achieve this, we must work together to tackle the sector's fundamental problems and institute changes that lead to more equitable and sustainable development, making the sector more conducive to long-term growth.

[151] D Ogbuishi, 'A Deconstruction of the Petroleum Industry Act 2021: Prospects and Consequences for the Nigerian Oil and Gas Sector,' *Researchgate* (2024), <https://www.A-Deconstruction-of-the-Petroleum –Industry-Act-PIA-2021-Prospects-and-Consequences-for-the-Nigerian-Oil-and-Gas-Sector.pdf-AdobeReader> accessed 16 December 2024.

7. Recommendations

Consideration of the following steps is necessary for the nation to attain sustainable growth in its gas sector:

1. The Commission and the Authority should be responsibility for strict institutional supervision and control. The PIA's provisions should not be left open for licensees and operators to take advantage of. Similarly, the authorised authorities need closely monitor licenses and operators to make ensure they comply with all regulations. The government is likely to rely on corporations for flare measures and readings, which might or could not be correct; thus corporations should not be allowed to install standard metering equipment. Government should assume this responsibility in order to limit all of forms of fraudulent practices in the sector.
2. Environmental impact assessment is an ongoing process that requires constant monitoring and action based on the findings. This monitoring occurs across the entire project lifecycle, from construction and operations to ultimate abandonment or closure and even beyond closure. It would be wise to follow Norway's lead and implement a "zero-flare" policy, which involves mandatorily conducting environmental impact assessments and giving top priority to public participation. Before approval for gas projects, there has to be substantial investment in the APG utilisation system and full conformity with the EIA Act.
3. In order to fulfil its climate obligations, Nigeria needs a well-organised gas infrastructure. This is because natural gas may reduce emissions of greenhouse gases by acting as a bridge fuel. Underdeveloped domestic and regional networks for gathering, transmitting, and distributing the related gas generated, as well as insufficient utilisation of natural gas, have contributed significantly to environmental deterioration. Consequently, Nigeria should follow the lead of Algeria and Norway and invest substantially on essential gas infrastructure to transport and process the commodity. The natural gas industry's push for sustainable development may benefit from this, and efficiency gains are possible as a result.
4. To encourage the citizens to embrace the conversion process, incentives for compressed natural gas (CNG) should be offered. Furthermore, essential infrastructure like refuelling stations must be put in place, and the cost of conversion must be kept moderate for the ordinary Nigerian.
5. The question of fair gas pricing is very important since it may help or hurt the gas sector's growth. The new pricing regime is an effort to keep Nigeria competitive, but before the country can attract investors in its natural gas sector, it must establish a clear pricing mechanism for natural gas to account for the volatility of the naira-dollar exchange rate.