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Adverse impacts of natural gas exploitation and utilization in Nigeria: The Pia 2021 in perspective

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Abstract
Nigeria is currently witnessing an unprecedented rise in the utilization of gas especially with the passage of the PIA 2021, and the launch of the 'Decade of Gas 2030' initiative. However, there is minimal focus on the adverse effects of natural gas and its utilization methods which include the use of a combination of technologies to collect, recycle and use waste gas for purposes other than flaring. Some of these problems include water contamination and leakage of methane which is worse than gas flaring. This paper argued that while the utilization of gas has several benefits, there is need to create a balance between enjoying the advantages of natural gas and protecting the environment. The objectives of this paper, using the doctrinal research methodology, are to examine the importance of natural gas to Nigeria's energy mix, incentives for gas utilization in Nigeria, existing gas utilization projects both before and post '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 paper finds that the current legal regime for gas utilization in Nigeria is focused with curbing gas flaring without taking into contemplation the environmental infractions occasioned by natural gas and its utilization methods. It therefore recommends further reforms of the primary legislation on gas utilization and close monitoring of methane leaks and other environmental impacts associated with natural gas utilization by relevant agencies.

Keywords: Natural gas, utilization methods, adverse impacts, PIA, Nigeria

Introduction
Natural gas, a valuable energy resource, has a wide range of applications from heating and electricity generation to fuelling vehicles and cooking, amongst other uses. Natural gas has important implications for the environment, being a vital energy resource with the potential to drive economic growth, industrial development, and energy security, particularly in resource-rich nations like Nigeria. Its exploitation and utilization are therefore becoming increasingly central to national development strategies. However, the extraction, processing, and consumption of natural gas present significant environmental challenges which pose risks to public health, ecosystems, and the broader goal of sustainable development. This paper aims to critically appraise these environmental issues arising from natural gas resource development and its utilization methods in Nigeria, and the regulatory gaps that contribute to environmental degradation.

The Relevance of Natural Gas Utilization to Energy Security in Nigeria
Nigeria holds the largest natural gas reserves on the continent, ranking sixth globally among exporters of liquefied natural gas (LNG). [1] With its clean and reliable benefits, natural gas is fast morphing into a critical component of Nigeria's quest for energy security. [2] It provides a sustainable and environmentally friendly source of energy, thus contributing to the country's effort to diversify Nigeria's hitherto oil-dependent economy. [3] The country is expanding gas-based industries for liquefied natural gas (LNG) production and export, compressed natural gas (CNG) for transportation, and domestic gas distribution networks while developing necessary infrastructure such as pipelines, gas processing plants, and storage facilities among other benefits. [4] Natural gas utilization methods include the use of a combination of technologies to collect, recycle, and use the waste gases produced (both on a large and a small scale) during oil and gas production activities for purposes other than flaring. [5] The use of flare gas has provided opportunities for developed and developing nations endowed with abundant hydrocarbon fuels to achieve high sustainability development for future use. [6] Natural gas is therefore destined to become a larger part of Nigeria's energy mix as the country seeks to guarantee the sustainability of its energy supply, benefit from greater energy efficiency, and reduce energy-related costs. [7]

Incentives for Gas Utilization in the Nigerian Gas Sector
The desire to mitigate gas flaring and actualize potentials from the abundant reserve and multiple uses of gas remain the twin factors driving the incentivization of gas utilization in Nigeria. [8] 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. [9]
It is observed that the fiscal regime with respect to gas in Nigeria is markedly different from that pertaining to crude oil. [10] This regime is adjudged to be good and a means of encouraging investors in our gas industry. [11] In line with its commitment to bolster the gas sector, the Nigerian government recently introduced a series of tax incentives tailored to foster a business-friendly environment, encourage innovation, and stimulate investment across the gas value chain notably under the Petroleum Industry Act, 2021 [12] and recent amendments made to the Companies Income Tax Act, 1961 [13] by the Finance Act, 2021. [14]
The PIA provides that all companies engaged in domestic midstream petroleum operations, downstream gas

operations and large-scale gas utilization industries as defined in the Act, shall be entitled to benefit from the incentives provided under section 39 of the CITA (as amended) which is the principal law that regulates the taxation of companies in Nigeria. [15] It equally provides for investors in the gas pipeline to be granted an additional tax-free period of five years at the expiration of the tax-free period granted in section 39 of the CITA. [16]

By section 39 [1] of the CITA, a company involved in gas utilization is entitled to an initial three [3] years tax holiday, with an additional 2 years renewal if the company is able to satisfactorily perform its business. There is however, an alternative to the tax holiday provided for in section 39 [1] (b), CITA which is a 35% Petroleum Capital Investment allowance on the value of any asset purchased by the company for the business, and 15% capital investment allowance under 39 [1] (c)(ii), CITA if the company took advantage of the tax holiday. Further still, by virtue of 39 [1] (c)(i), CITA companies that take advantage of the window provided by the tax free period shall be allowed an accelerated capital allowance regime after the tax free period, comprising of 90% annual allowance on any investment made, with a 10% tax retention for investments made in plants and machinery.

Also, 39 [1] (d) (i)-(ii), CITA provides that all dividends distributed during the tax holiday are not taxable, on the condition that the downstream investment is made in foreign currency and the investment was for the acquisition of imported plant and machinery of not less than 30% of the company's equity share capital. Finally, by 39 [1] (e), CITA interest on loans collected by the company for developing gas utilization projects shall be tax deductible, provided the approval of the Minister of Petroleum Resources was first sought and obtained to carry on the said project. By virtue of section 39 [2], CITA the initial tax-free period of three years of a company under the CITA which is renewable by two more years upon satisfactory performance, starts on the day the company commences production as certified by the Ministry of Petroleum Resources. [17]

The PIA, by granting an additional tax-free period of five years for investors in gas pipelines, which sums up a ten [10] year tax holiday for gas pipeline investment, enhances the prospects of increased private investment within the sector. [18] Also geared towards promoting investment in the sector through tax incentives is the fiscal framework of the gas sector as introduced in the PIA. [19] Thus, section 260 [1] (b)(i)–(iii) of the PIA specifically exempts payment of hydrocarbon tax on associated natural gas, non-associated gas and any condensates or liquids produced from associated gas.

Gas Utilization Projects in Nigeria

Gas utilization is the primary goal of Nigerian petroleum and energy policies. [20] The main drivers of gas utilization projects in Nigeria had been the government's desire to create more wealth and diversify the economy of the country. [21] However, a combination of new government incentives and pressure owing to global trends to end gas flaring, coupled with rising domestic industrial demand for gas have now encouraged operators to go into gas projects. [22] Thus, in recent times, and in the light of government's '2020-2030 Decade of Gas' initiative, natural gas is not only being utilized on a much wider scale, but is also being commercialized with the power sector, the LPG sector, the cement sector and fertilizer sector being 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. [23]

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:

2. 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. [24] It is owned by four shareholders, namely, the Federal Government of Nigeria, represented by Nigerian National Petroleum Company Limited (49%), Shell (25.6%), TotalEnergies 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, [25] 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. [26] It subsequently went from a two-train LNG plant in 1999 to a six-train plant within 9 years after start-up. [27] A seventh train is under construction to increase the facility's capacity by 8 million metric tons per year. [28] Regulatory and political issues however contributed to the delay in the project's start date. [29]

3. The Escravos Gas Project

The Escravos Gas Project was established for the purpose of solving the incessant flares and waste of natural gas in Nigeria. [30] 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. [31] 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. [32] The implications of this project for Nigeria are that the GTL venture represents a tangible environmental benefit by eliminating gas flaring, and it will also provide a major boost to GTL research and development. [33]

4. 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). [34] 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. [35] It therefore promotes the WAGP system as a key natural gas transmission infrastructure for all natural gas sources including Liquefied Natural Gas (LNG). [36]

5. The Nigeria-Morocco Regional Gas Pipeline Project

First conceived in 2016, the pipeline is one of the most ambitious energy ventures globally expected to become the second-longest pipeline in the world. [37] The NMGP would be 5,600 kilometers long and is set to cross 13 African countries, covering the energy needs of a staggering 400 million people along the West African coast. [38] In Africa, the project promises to support the continent's socio-economic development while the pipeline aims to deliver gas from Nigeria to Europe, while supplying countries along the way to help fulfill their energy needs. [39] 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. [40] The pipeline project therefore aims to monetize Nigeria's substantial natural gas resources to increase the country's revenue, diversify Nigeria's gas export routes, and eliminate gas flaring. [41]

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

From 2021 which saw the launch of the 'Decade of Gas,' and the subsequent passage of
the PIA, a radical change has been brought to the gas sector, thus pushing it forward and forcing a reassessment of the future of Nigeria's energy landscape. [42] The 'Decade of Gas' represents the timeline for increasing gas utilization and leveraging gas as a tool for driving industrialization and economic growth, while the PIA is widely regarded as a landmark legislation that is expected to herald fiscal and regulatory reform in Nigeria's oil and gas sector. [43] The launch of the 'Decade of Gas' and the passage of the PIA represent major initiatives on the part of government which have helped to unveil the incredible potentials and opportunities offered by Nigeria's domestic gas market.

Today, there are new projects on the front burner of gas utilization in Nigeria, such as 'Nigeria's incursion into the $20.6billion global methanol market, signalling its intention to compete in the global methanol market with a major investment in its production; Shell Nigeria Gas (SNG) and the Nigerian Gas Marketing Company (NGMC) have sealed a 20-year gas distribution deal to ensure that gas is delivered to industrial customers and manufacturing plants in Lagos and Ogun state; the Federal Government, through the Nigerian National Petroleum Corporation (NNPC), has commenced the construction of a 50 megawatts gas-fired power plant for the supply of electricity to Maiduguri and environs, with gas to be supplied in form of LNG by Greenville LNG; and construction has commenced for the $10 billion NLNG Train7 project which is expected to increase LNG production capacity by 35% upon completion, and create 12000 direct jobs etc.' [44]

These are a few of the projects that are currently aimed at utilizing natural gas in Nigeria in the era under review, with more being expected in the nearest future especially with the intensifying energy transition.

Challenges Associated with Natural Gas and its Utilization Methods in Nigeria

According to Emam, [45] natural gas utilization methods include the use of a combination of technologies to collect, recycle, and use the waste gases produced (both on a large and a small scale) during oil and gas production activities for purposes other than flaring. It has been observed that amidst the scramble for natural gas as an alternative source of clean energy and as a viable source of revenue for the country, little or no attention is being paid to the environmental risks associated with the entire industry chain of natural gas: from its exploration and exploitation down to its utilization. [46] The major challenges identified include:

1. Environmental and Health Issues induced by Hydraulic Fracturing

Nigeria has its fair share of shale gas in commercial quantity which may not only have socio-economic benefits, but also environmental implications for the Niger Delta in particular and Nigeria as a whole. Shale formations are usually found between 1,500 and 4,000 meters beneath the Earth's surface and can extend over large areas. [47] Within the shale layers are tiny pores that hold oil or gas, with the surrounding rock tightly compressed, thus preventing the pores from connecting and allowing the oil or gas to flow freely into a wellbore. [48] To release these trapped resources, the rock must be fractured through a process called hydraulic fracturing or 'fracking,' which enables the extraction of oil or gas from the shale. [49] Hydraulic fracturing involves injecting special fluids into a targeted rock formation at pressures higher than the rock's breaking point, creating fractures that allow oil or gas to flow toward the wellbore.' [50]

To Omidire, the full extent of hydraulic fracturing effects remains uncertain and any potential benefits it offers may be overshadowed by environmental and health concerns. [51] One key issue is the risk of water contamination, which could worsen the spread of waterborne diseases. [52] Other possible consequences include air pollution from methane emissions, increased dust, and noise. [53] Additionally, the significant water usage required for fracking could strain local water supplies, potentially impacting food production and access to clean water, outweighing its industrial or agricultural benefits. [54] There are growing concerns that unregulated or poorly managed fracking operations could contribute to climate change, [55] undermine sustainable development, [56] and infringe on human rights. [57] Other risks include damage to infrastructure, greater carbon emissions, the release of volatile organic compounds, [58] excessive depletion of natural resources, [59] and even the triggering of small earthquakes etc. [60] Moreover, large-scale industrial activity associated with fracking can alter the character and appearance of local communities—especially when close to residential areas— [61] raising the risk of harm to public health and well-being. In such cases, residents might be compelled to abandon their homes, livelihoods, or communities, potentially violating their right to a safe and healthy environment. [62]

2. Air Pollution

Air pollution frequently introduces foul odours, airborne particles, and toxic gases into the environment. [63] The impact on human health can vary based on the type and concentration of pollutants, with prolonged exposure posing serious risks to individuals living or working nearby. [64] Burning natural gas emits nitrogen oxides—key contributors to smog—as well as small amounts of sulphur, mercury, and fine particulates. [65] In addition, unconventional gas extraction can degrade air quality both locally and regionally.

In some drilling regions, there has been a rise in hazardous air pollutants and two of the six major pollutants—

particulate matter and ozone (along with their precursors)—that are regulated by the EPA due to their known risks to health and the environment. [66] Breathing elevated levels of these pollutants has been linked to negative health effects such as respiratory issues, heart disease, and cancer. [67] One study revealed that people living within half a mile of unconventional gas wells face a higher risk of health problems related to air pollution compared to those living farther away. [68] As a result, public health experts advise prohibition of drilling near residential areas by governments. [69]

3. Water Use and Pollution

To Tripathy and Panda, water pollution is a physical or chemical change in water that can adversely affect living organisms. [70] The amount of water used for hydraulically fracturing a well can vary because of differences in formation geology, well construction, and the type of hydraulic fracturing process used. [71] Unlike other energy-related water withdrawals, which are commonly returned to rivers and lakes, most of the water used for unconventional oil and gas development is not recoverable. [72] Unconventional gas development may therefore pose health risks to nearby communities through contamination of drinking water sources with hazardous chemicals used in drilling the wellbore, hydraulically fracturing the well, processing and refining the oil or gas, or disposing of wastewater. [73]

4. Global Warming Emissions

Gas is a fossil fuel, mostly made up of methane, and a greenhouse gas. [74] Methane is the second-most important greenhouse gas after carbon dioxide and a key driver of climate change. [75] Using gas for energy creates greenhouse gas pollution, thus driving climate change in three ways: [76]

1. Burning natural gas generates carbon dioxide—the most significant greenhouse gas contributing to climate change.
2. Even before combustion, gas operations leak large amounts of carbon dioxide and methane at every stage of production. Methane is especially potent, with short-term warming effects 86 times greater than carbon dioxide, meaning the true impact of gas is often downplayed.
3. Liquefying gas for export consumes enormous energy—usually from fossil fuels—adding even more emissions to an already polluting process.

The drilling and extraction of gas from wells and its transportation in pipelines results in the leakage of methane, the primary component of natural gas. [77] Studies have shown that high rates of methane leakage can be found throughout the natural gas system. [78] Gas therefore remains a fossil fuel which is dangerous, polluting and driving climate change. [79]

Inadequacies of the PIA and its Regulations on Natural Gas Utilization

Natural gas, despite its advantages, has negative implications for the environment and for inhabitants of communities wherein gas projects are sited. 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 to which natural gas is subjected.

The legal framework currently defined by the PIA [80] and its Regulations, [81] have made robust provisions for natural gas operations in the country. The objective of the Act is to pull together the gas resource of the country to animate the domestic market, regional development, and the export market. [82]

On environmental management, the PIA requires a licensee or lessee who engages in upstream and midstream petroleum operations to, within one year of the effective date or six months after the grant of the applicable lease, submit for approval an environmental management plan in respect of projects which require environmental impact assessment to the Commission or Authority, as the case may be. [83] An environmental management plan (EMP) is a critical component of a project's environmental sustainability strategy which outlines the measures to be taken to mitigate the adverse environmental impacts of a project during its construction, operation, and decommissioning phases. [84] An EMP provides a framework for managing and minimizing the environmental effects of a project, ensuring that it is designed and implemented in a way that minimizes harm to the environment and promotes sustainable development. [85] However, EMPs often face challenges that can hinder their effectiveness such as poor planning, failure to engage with local communities and stakeholders, and inadequate resources and budget allocation. [86]

Further still, Section 104 [1] of the PIA specifically makes gas flaring an offence 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. [87] Among other things, a licensee or lessee prior to the commencement of petroleum production, shall install metering equipment conforming to the specifications conferred on every facility from which gas flaring is permitted as the commission or authority may prescribe, and failure to install such metering equipment would constitute an offence. [88]

The PIA also mandates a licensee or lessee producing natural gas to submit a natural gas flare elimination and monetization plan to the commission, within 12 months of the effective date, and this plan should be in accordance with the regulations set out by the Commission under this Act. [89]

The Midstream Regulations which specifically prohibit venting and excessive flaring of flare gas, further provide under Regulation 8 (1) - (3) that:

1. A person engaged in midstream petroleum operations shall not flare or vent flare gas beyond limits set by the Authority.
2. A licensee or permit holder shall, prior to the issuance of a license to operate, engage with the Authority to determine the maximum number of major flaring events and quantity of gas flared.
3. The quantity of gas flared and number of major flaring events in sub regulation [2] shall include all planned maintenance, facility start-up or strategic operational reasons including testing.

By Regulation 8 [4], a licensee or permit holder who vents flare gas during a declared national emergency, may be exempted from the payment of penalties by the Authority.

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) as well as 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 upon such notification, the licensee, lessee or producer of gas will be liable to a fine of US$1,000 (One Hundred Dollars) for each day that the contravention continues after the notification. [90]

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. [91] 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. [92] Proper utilization of monies in the Fund for investment in critical infrastructure as prescribed by the Act, will lead to increased development of critical gas infrastructure, including pipelines, processing plants, and storage facilities, and the reduction of gas flaring. [93] This will also facilitate the transportation and distribution of gas to previously underserved areas. [94]

The legal framework for natural gas utilization as presently constituted has not paid adequate attention to the challenges associated with natural gas resource and its utilization methods in Nigeria. While it is commendable that there are provisions for environmental remediation and relief, the PIA and its Regulations however lay heavy emphasis on curbing gas flaring by expressly mentioning gas flaring as an offence, and prescribing the penalties for flaring. Further still, from the provisions of section 110 [4], the monies received as penalties will be used for environmental remediation and relief of the host communities affected by gas flaring. Also, gas flare fines will be paid into the Midstream and Downstream Gas Infrastructure Fund which will be utilized for midstream and downstream gas infrastructure investment within the Host Community of a designated facility. [95]

Natural gas has many qualities that make it an efficient, relatively clean burning, and economical energy source. It is not in dispute that natural gas burns cleaner than coal, producing 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 [96] 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. [97] It is indeed worrisome that the PIA does not categorically address the environmental challenges associated with use of natural gas and its utilization methods neither are there penalties for same. Thus, the PIA and its Regulations demand strict adherence to a gas flaring plan while paving way for intensive gas utilization [98] not just as a means of curbing environmental challenges occasioned by waste gas, but also encouraging massive development of the gas sector. They, however, neglected to take into account the identified environmental infractions caused by natural gas resource and its utilization methods.

The Constitution of the Federal Republic of Nigeria 1999 as the grund norm from which every other legislation and rule derive their validity, by itself, is the basis of all environmental laws. [99] The Nigerian state is empowered to protect and improve the environment and safeguard the water, air, land, forest and wild life. [100] To this end, the state is expected to formulate and direct policies which engender the promotion of a planned and balanced economic development bearing in mind that all economic activities take place on land, air or water. [101] Thus, any purported development that breeds suffering among the people or a cross-section of it is no development. [102] The state must avoid inflicting damage on its citizens by polluting activities or unsustainable utilization of the ecosystems [103] or its natural resources. Therefore, exploring the relationship between natural gas resource, environmental policy and green economic growth will help developing countries like Nigeria enact practical environmental and resources policy. [104]

Findings

This paper explored the various incentives which have given the much needed boost to gas utilization in the country, the environmental problems that come with natural gas and its utilization methods, and the primary legislation for gas utilization in Nigeria and finds that:

1. Natural gas, although available, versatile and a cleaner burning fossil fuel, is not entirely risk free in terms of the adverse implications of the use of natural gas and its utilization methods for humans and the environment. These include adverse health issues such as respiratory symptoms, cardiovascular diseases and cancer, climate change, global warming, air, water and land pollution, methane leakage which is even worse than the gas flaring which utilization seeks to curb, thus impacting adversely on sustainable development and human rights.
2. The legal regime for gas utilization in Nigeria, as primarily defined by the PIA and its Regulations, is more preoccupied encouraging natural gas utilization as a means of curbing gas flaring, thus failing to expressly take cognizance of the identified environmental infractions occasioned by the use of natural gas and its utilization methods.
3. The PIA mandates a licensee or lesser who engages in upstream and midstream petroleum operations to submit an EMP in respect of projects which require environmental impact assessment to the Commission or Authority, as the case may be. If not properly implemented, such EMP may face obstacles such as poor planning, inadequate resources and failure to engage with local communities and stakeholders in compliance with the EIA which has already been described as a 'paper tiger' due to its ineffectiveness in preventing developments that are detrimental to the environment from taking place.

Recommendations

In order to ensure that the natural gas and its utilization methods remain sustainable and environmentally

responsible, it is important to implement measures to minimize environmental impacts, which are as recommended below:

1. The PIA and its Regulations should be amended to make provisions prohibiting these environmental infractions, and prescribe adequate penalties for a breach of the said provisions, thus making companies liable for these infractions in tandem with 'the polluter pays principle.'
2. Strict emissions regulations for natural gas production, transportation and utilization to limit environmental pollution should be enacted and implemented.
3. The government and relevant companies should invest massively in technologies that capture and utilize methane emissions from natural gas production and distribution, reducing the release of potent greenhouse gas.
4. Methane leaks and other environmental impacts associated with natural gas utilization should be monitored by relevant agencies such as the Nigerian Midstream and Downstream Petroleum Regulatory Authority and the Nigerian Upstream Petroleum Regulatory Commission in order to identify and address sources of pollution in the industry chain.
5. An EMP with a comprehensive approach that integrates environmental considerations with regards to natural gas and its utilization methods into project planning and decision-making should be developed by engaging with local communities and stakeholders to understand their concerns and needs, as well as allocating sufficient resources to implement environmental management measures.

Conclusion

In conclusion, the utilization of natural gas presents both benefits and challenges for environmental protection. While natural gas is a cleaner alternative to other fossil fuels, its extraction and utilization still have negative impacts on the environment. It is crucial for government, gas industries and individuals to prioritize the development and implementation of laws, policies, sustainable practices and technologies to mitigate these impacts and ensure the long-term sustainability of natural gas. Government should exhibit political will by resisting the temptation to 'sacrifice its citizens' right to life and healthy environment' on the altar of economic benefits which the natural gas sector has to offer. In this wise, it should promote the responsible development of natural gas resources through best practices and regulations that protect sensitive ecosystems and minimize air, land and water impacts. By striking a balance between utilizing natural gas for both energy and revenue generation on the one part, and protecting the environment for the future generation on the other part, it is possible to harness the advantages of this cleaner fuel source while mitigating its negative impacts on the environment.

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