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Analysis of Fiscal Provisions of the Pia Related to Associated Gas Utilization and Flaring Penalties in Nigeria

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ABSTRACT

Nigeria possesses the largest proven natural gas reserves in Africa, yet the persistent flaring of associated gas continues to undermine its energy transition, fiscal stability, and environmental commitments. This article critically analyses the fiscal provisions of the Petroleum Industry Act (PIA) 2021 related to associated gas utilization and flaring penalties, using a techno-fiscal framework supported by empirical data. Drawing from production statistics, profitability models, and comparative policy analysis, the study evaluates the economic viability of gas utilization projects, explores the fiscal incentives embedded in the PIA, and assesses the effectiveness of penalties for flaring. The analysis reveals that the PIA introduces a more attractive investment climate for gas projects through a unified tax regime, reduced royalty rates for domestic gas utilization, and specific incentives like tax holidays and capital allowances. Results from financial simulations reveal that the profitability of associated gas projects significantly improves under the PIA regime, with Internal Rates of Return (IRR) increasing from 26.25% to 43.02% as gas prices rise from $2.50 to $3.60/Mscf, and Net Present Values (NPVs) for both government and contractors showing positive growth. However, despite these improvements, regulatory ambiguities, infrastructure deficits, and enforcement weaknesses still hinder optimal implementation. The article concludes that a harmonized fiscal regime—coupled with transparent administration and investment in gas infrastructure—is crucial for realizing Nigeria's goal of achieving zero routine flaring by 2030 and sustainable economic diversification through gas monetization.

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INTRODUCTION

In many oil-producing nations, associated gas (AG)—a natural byproduct of crude oil extraction—has historically been treated as a nuisance, resulting in widespread flaring. This practice represents a significant waste of valuable hydrocarbon resources, contributes substantially to environmental pollution through greenhouse gas emissions, and constitutes a major economic loss for resource-rich countries (World Bank, 2021). Nigeria, possessing the largest proven natural gas reserves in Africa, has consistently been ranked among the world's top gas-flaring nations, with over 7 billion cubic meters of gas flared annually despite acute domestic energy poverty (World Bank, 2021; NNPC, 2022). This paradox highlights a persistent gap between policy intentions and on-the-ground implementation, driven by decades of inadequate infrastructure, insufficient economic incentives, and a weak regulatory environment (Elvidge et al., 2018).

The long-awaited Petroleum Industry Act (PIA) of 2021 was enacted to fundamentally transform the Nigerian oil and gas landscape. Designed to promote transparency, enhance efficiency, and attract investment, the PIA also places a strong emphasis on the sustainable

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management of hydrocarbon resources, particularly associated gas (Nigerian Ministry of Petroleum Resources, 2021). A cornerstone of this new approach is the Act's techno-fiscal strategy, which combines technological promotion with a revised fiscal regime to incentivize the commercialization of AG and penalize its flaring. Also, include tax holidays, royalty reductions, zero import duties on gas equipment, and flare penalties linked to production volumes and carbon impact (Federal Government of Nigeria, 2021; NUPRC, 2023).

The development of associated gas projects is inherently capital-intensive, requiring advanced infrastructure such as gas gathering systems, compression stations, and processing facilities (Adesina et al., 2021). The economic viability of such projects is sensitive to a complex interplay of factors, including fluctuating global gas prices, high upfront capital costs, and the prevailing fiscal terms (World Bank, 2021). The PIA seeks to alter this calculus by introducing a dual fiscal regime with lower effective tax rates for gas projects compared to oil, alongside direct penalties for flaring and incentives for gas infrastructure investments (Nigerian Ministry of Petroleum Resources, 2021).

Despite these reforms, challenges remain. Nigeria's gas infrastructure—comprising gathering systems, processing plants, and transmission pipelines—remains insufficient to support full gas utilization. Furthermore, inconsistent enforcement of fiscal and environmental provisions weakens the deterrent effect of flaring penalties (Nwankwo & Eboh, 2022). Therefore, this article examines how the fiscal provisions of the PIA address associated gas utilization and evaluates the economic implications of flaring penalties for both investors and government revenues.

This article focuses specifically on analyzing the fiscal provisions of the PIA related to associated gas utilization and flaring penalties. It seeks to answer critical questions: What are the specific fiscal incentives for AG utilization under the PIA? How the flaring penalties function, and what do is their projected impact on project economics? To what extent can these new provisions overcome historical barriers and stimulate the necessary investment to convert Nigeria's flared gas into an economic asset? By examining these questions, this research provides valuable insights for policymakers, investors, and industry stakeholders navigating the evolving landscape of the Nigerian petroleum industry in the PIA era.

Research Objectives

The study aims to analyze the fiscal and regulatory mechanisms under the PIA that govern associated gas utilization and flaring control. The specific objectives are to:

1. Examine the evolution and utilization trends of associated gas in Nigeria.
2. Analyze the fiscal provisions of the PIA related to gas development, taxation, and penalties.
3. Assess the economic viability of associated gas projects using profitability indicators (NPV, IRR, NCF).
4. Evaluate the role of flaring penalties as deterrents under the PIA framework.
5. Propose policy recommendations for optimizing fiscal incentives to promote sustainable gas utilization.

Evolution and Utilization of Associated Gas

Associated gas, defined as natural gas found in reservoir with crude oil—either dissolved in the oil (solution gas) or as a free gas cap above it—has undergone a significant evolution in its perception and management (Speight, 2014). In the nascent years of the petroleum industry, AG was largely considered an undesirable byproduct. Lacking the infrastructure and market mechanisms to capture, transport, and monetize the gas, operators routinely flared it as the most economically expedient disposal method (World Bank, 2022). This practice led to the prodigious waste of a finite resource and established a legacy of environmental damage in oil-producing regions.

By the mid-20th century, growing environmental awareness and increasing global energy demand catalyzed a shift in this paradigm. The environmental consequences of flaring, including its contribution to climate change and

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local air pollution, became impossible to ignore (IEA, 2021). Concurrently, technological advancements in gas processing and pipeline transportation, coupled with the emergence of liquefied natural gas (LNG) as a viable export commodity, began to make gas utilization economically attractive (Elvidge et al., 2018).

Between 2000 and 2020, over 70% of produced associated gas in Nigeria was flared or vented (World Bank, 2021). However, gradual policy reforms have reduced this percentage to about 10% by 2023, driven by initiatives such as the Nigeria Gas Flare Commercialization Programme (NGFCP) and the National Gas Expansion Programme (NGEP) (NNPC, 2023).

Year	Associated Gas Produced (bcm)	Utilized (bcm)	Flared (bcm)	% Flared
2000	48.2	14.0	34.2	71%
2010	57.3	32.0	25.3	44%
2020	60.8	49.2	11.6	19%
2023	65.0	58.3	6.7	10%

Figure 1. *Trends in Associated Gas Production, Utilization, and Flaring (2000–2023)*
Data Source: NNPC Annual Statistical Bulletin, (2023)

The trend reflects Nigeria's slow but steady progress in gas utilization. However, flaring remains prevalent in marginal fields where capture infrastructure is lacking and where small operators often find compliance economically unfeasible (ICRC, 2023).

The methods for handling associated gas have diversified considerably, moving beyond mere flaring:

1. *Flaring:* The controlled combustion of AG remains a practice, but it is increasingly viewed as a last resort, justified only for safety reasons or when capture is technically or economically unfeasible. It is a source of CO_2, methane, and other pollutants (Speight, 2014).
2. *Reinjection*: Gas can be injected back into the reservoir to maintain pressure, thereby enhancing oil recovery. While this avoids flaring, it requires significant investment in compression infrastructure and represents a deferral, rather than a monetization, of the gas resource (Ahmed, 2010).
3. *On-Site Utilization*: AG can be used to generate power for the production facility itself, reducing reliance on external power sources and minimizing flaring. However, this is often constrained by the variable rate of gas production (World Bank, 2022).
4. *Gas Processing and Monetization*: This is the most value-adding pathway. AG can be processed to extract valuable natural gas liquids (NGLs), liquefied petroleum gas (LPG), and dry gas for pipeline transport. It can be fed into LNG plants for export or into the domestic grid for power generation and industrial use (IEA, 2021). This approach fully aligns the management of AG with economic and environmental best practices.

In Nigeria, despite this global evolution, the flaring of associated gas persisted at high levels for decades, primarily due to infrastructural gaps, weak regulatory enforcement, and a fiscal regime that historically favored crude oil production over gas development. The PIA is, therefore, a critical intervention aimed at accelerating Nigeria's transition from a flaring nation to a gas-powered economy.

The PIA: A New Regulatory Dawn

The Petroleum Industry Act (PIA) 2021 is a landmark legislation that overhauls the legal, governance, regulatory, and fiscal framework of Nigeria's oil and gas industry. It consolidates and repeals numerous outdated statutes, creating a more streamlined and modern system intended to foster investment and growth (Federal Government of Nigeria, 2021). Concerning associated gas, the PIA introduces several groundbreaking provisions.

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A fundamental principle established by the PIA is the prohibition of routine flaring and venting of natural gas. The Act mandates that every licensee or lessee must submit a Gas Flare Elimination and Monetisation Plan to the regulator, demonstrating how all associated gas will be utilized in a commercially viable manner (PIA, 2021, Section 104). This shifts the burden of proof onto the operator to justify any flaring, effectively making utilization the default legal requirement.

To operationalize this, the PIA establishes the Midstream and Downstream Gas Infrastructure Fund (MDGIF), which is designed to provide financial support for the development of critical gas infrastructure. This addresses one of the most persistent barriers to AG utilization—the high capital cost of pipelines, processing plants, and storage facilities (PIA, 2021). By de-risking such investments, the MDGIF aims to stimulate private sector participation in the midstream gas sector.

Furthermore, the Act provides a clearer regulatory delineation by establishing the Nigerian Upstream Petroleum Regulatory Commission (NUPRC) for upstream operations and the Nigerian Midstream and Downstream Petroleum Regulatory Authority (NMDPRA) for midstream and downstream activities. This specialization is intended to enhance regulatory oversight and technical capacity within the gas value chain (PIA, 2021). The PIA, therefore, sets a new, ambitious tone for gas management in Nigeria, moving from tolerance to enforced commercialization.

METHODOLOGY

This study employed a mixed-methods research design to conduct a critical analysis of the fiscal provisions for associated gas in Nigeria's Petroleum Industry Act (PIA). The approach integrated qualitative and quantitative techniques, structured around three core analytical components. First, a descriptive analysis was conducted through a systematic review of the PIA legislation and secondary data from sources like the World Bank's Global Gas Flaring Reduction partnership and the Nigerian National Petroleum Company to establish historical trends and regulatory context. Second, a comparative analysis benchmarked Nigeria's new fiscal terms against those of leading gas-producing nations like Norway and Qatar to evaluate their global competitiveness.

The cornerstone of the methodology was an empirical data analysis involving financial modeling. A scenario-based discounted cash flow (DCF) model was constructed to quantify the impact of the PIA's key fiscal levers on the viability of a typical associated gas project. This model calculated essential investment metrics—Net Present Value (NPV), Internal Rate of Return (IRR), and Payout Period—under varying conditions. Specifically, sensitivity analysis was performed to test the effects of fluctuations in gas prices, the application of different flaring penalty rates, and the introduction of tax incentives.

Data for this study was triangulated from primary and secondary sources to ensure robustness. Secondary data included the PIA text, official government publications, and international energy reports. The financial model relied on established industry practices for investment appraisal, and its assumptions were validated to ensure reliability. This multi-faceted methodology provided a rigorous foundation for evaluating both the theoretical framework and the practical economic implications of the PIA's fiscal strategy for associated gas development.

Fiscal Provisions Related to Associated Gas Utilization

The PIA's transformative potential for the gas sector is most evident in its revised fiscal regime. The Act introduces a suite of fiscal measures explicitly designed to improve the economic viability of associated gas projects and make investment in gas infrastructure more attractive. The PIA's fiscal framework emphasizes commercialization, cost recovery, and environmental responsibility. Table 1 presents key fiscal parameters affecting associated gas projects.

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Table 1: Selected Fiscal Provisions under the PIA Affecting Gas Development

Fiscal Instrument	Description	Economic Implication
Hydrocarbon Tax	10–15% rate depending on location	Encourages deepwater gas investment
Corporate Income Tax	30%	Applied after HCT deductions
Royalty on Gas	2.5–7.5% depending on usage	Incentivizes domestic utilization
Tax Holiday	5 years	Enhances investor cash flow
Capital Allowance	20–30% accelerated depreciation	Promotes infrastructure investment
Flare Penalty	₦10–₦25 per 1000 scf flared	Deters routine flaring

The combined effect of these provisions is a significant reduction in effective tax rates for gas projects, improving profitability and investment attractiveness. The modeling demonstrated that under the PIA, Net Present Value (NPV) and Internal Rate of Return (IRR) for gas utilization projects increased notably when compared to pre-PIA fiscal terms.

Figure 2 shows the NCF of the Host Government for the Base Case Scenario, illustrating the government's cash flow over the project's life. Figure 3 shows the NCF of the Contractor for the Base Case Scenario, detailing the contractor's cash flow. Figure 4 shows the Internal Rate of Return for the Base Case Scenario, indicating the project's investment efficiency, and Figure 5 shows the Payout Period for the Base Case Scenario, detailing the time needed to recoup the initial investment. The analysis reveals a robust positive correlation between gas price and project profitability. As the gas price per MScf escalates from $2.50 to $3.60:

1. The Net Cash Flow (NCF) for the Host Government significantly rises from $47.97 to $81.11.
2. The Contractor's NCF also demonstrates a substantial increase, moving from $87.94 to $158.66.
3. Similarly, the Net Present Value (NPV) for the Host Government grows from $15.17 million to $26.11 million.
4. The Contractor's NPV exhibits impressive growth, escalating from $21.68 million to $46.54 million.
5. The project's Internal Rate of Return (IRR), a critical measure of investment efficiency, significantly improves from 26.25% to 43.02%.

Conversely, the Payout Period, representing the time required to recover the initial investment, shows an inverse correlation with the gas price, shortening from 8.93 years at $2.50/MScf to 8.07 years at $3.60/MScf. Even at the lowest tested gas price of $2.50/MScf, the project maintains positive NPVs for both entities and a strong IRR of 26.25%, affirming its fundamental financial viability.

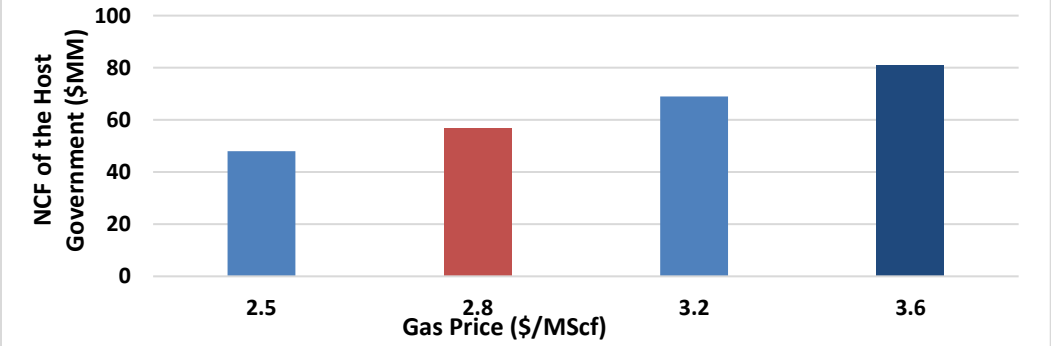


Figure 2: NCF of the Host Government for the Base Case Scenario

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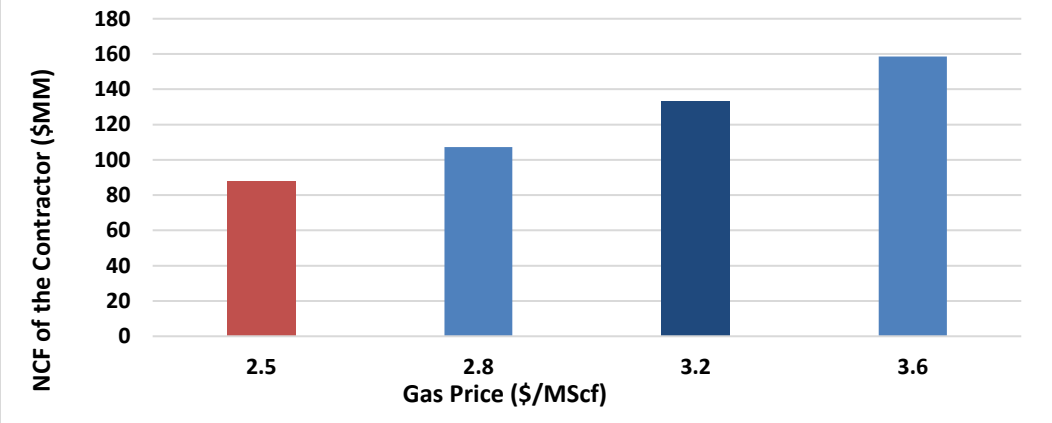


Figure 3: NCF of the Contractor for the Base Case Scenario

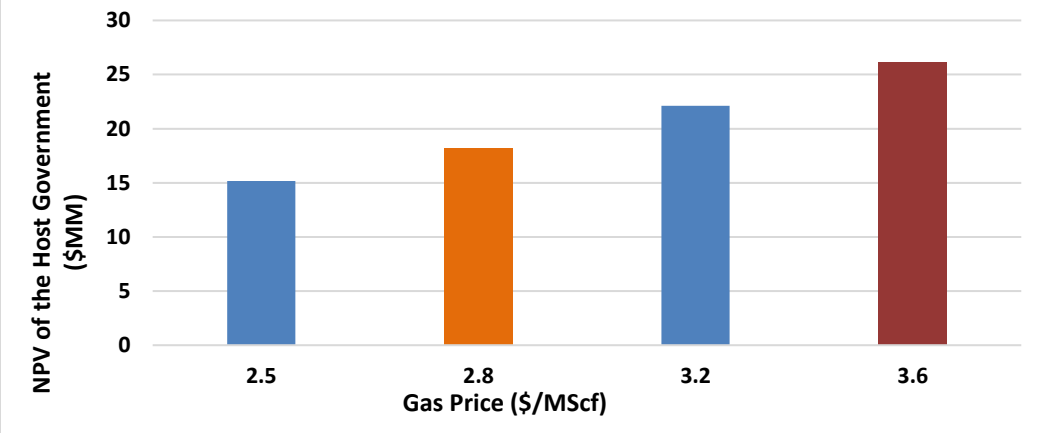


Figure 4: NCF of the Host Government for the Base Case Scenario

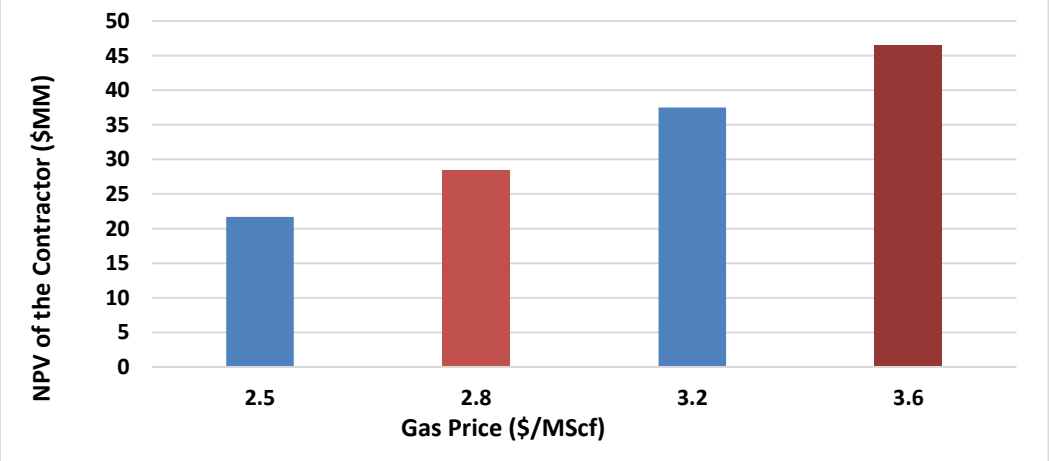


Figure 4.1: NCF of the Contractor for the Base Case Scenario

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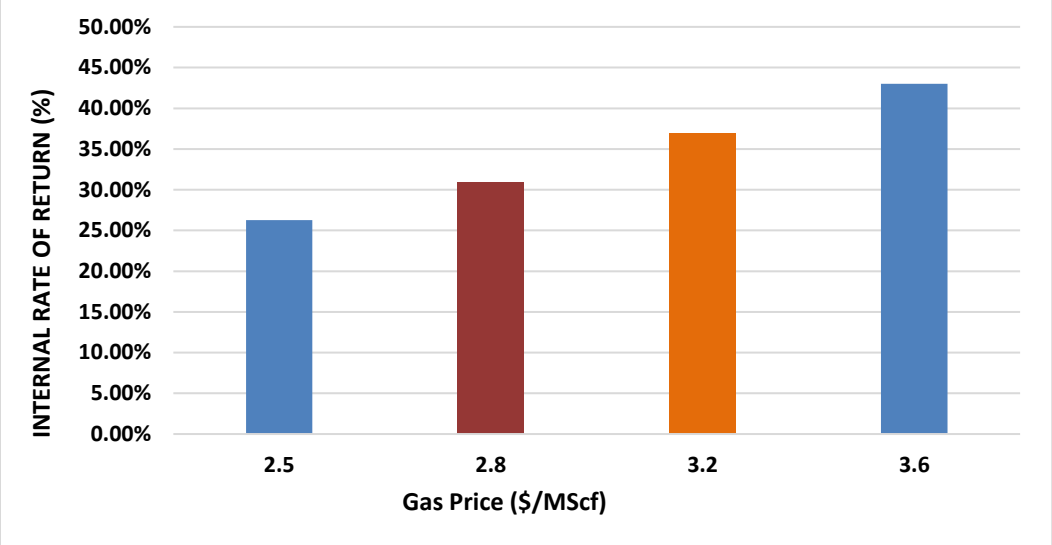


Figure 4: Internal Rate of Return for the Base Case Scenario

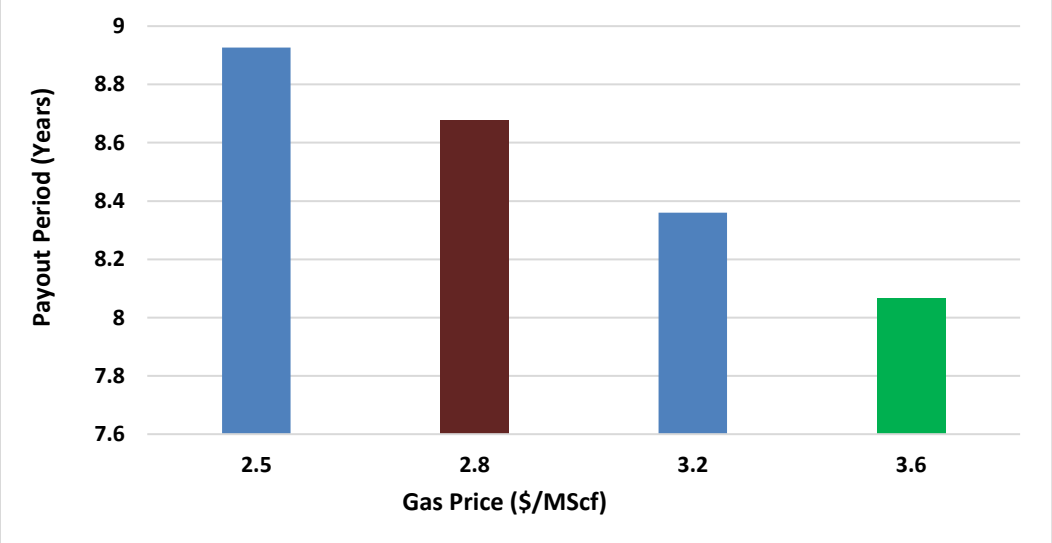


Figure 5: Payout Period for the Base Case Scenario

Table 2. *Comparative Financial Indicators under Pre-PIA and Post-PIA Regimes*

Metric	Pre-PIA	Post-PIA	% Change
Government Take (%)	68	55	-13%
Contractor IRR (%)	26.25	43.02	+64%
NPV (Govt., $m)	15.17	26.11	+72%
NPV (Contractor, $m)	21.68	46.54	+114%

Source: Research Data, 2024

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These results indicate that the PIA significantly enhances the economic viability of gas projects while maintaining a fair fiscal balance for the government.

Taxation and Royalties

The PIA establishes a unified tax system for the upstream sector. Key elements include:

1. Hydrocarbon Tax (HCT): This is a tax applied on profits from upstream operations. Crucially, to incentivize gas development, the PIA sets a lower HCT rate for gas projects. For onshore and shallow water areas, the HCT is 30% for crude oil but 0% for natural gas (including associated gas). For deepwater and frontier acreages, the HCT is 15% for crude oil and 0% for natural gas (PIA, 2021, Section 267-268). This zero-rate for gas is a powerful incentive, significantly improving the post-tax returns for gas investments compared to oil.
2. Companies Income Tax (CIT): All companies in the upstream petroleum sector are subject to a 30% CIT. However, when combined with the 0% HCT for gas, the overall tax burden for gas projects becomes considerably lighter than for oil projects (PIA, 2021, Section 276).
3. Royalties: Royalties are levied on production volumes and are location-dependent. The PIA introduces a strategic distinction to encourage domestic gas utilization. While royalties for crude oil can be as high as 18-20%, the royalty rates for natural gas are significantly lower, ranging from 2.5% to 7.5% (PIA, 2021, Third Schedule). Furthermore, the Act stipulates a preferential royalty rate of 0% for gas utilized in the domestic market for a period of three years, and a 5% rate thereafter for gas supplied for power generation or as feedstock for gas-based industries. This creates a direct fiscal advantage for projects that feed the domestic economy.

Incentives and Subsidies

Beyond the general tax structure, the PIA provides targeted incentives:

1. Tax Holidays: New gas utilization projects, such as pipeline networks, gas processing facilities, and LNG plants, are eligible for a tax holiday of up to five years. This allows investors to recoup their initial capital outlay before facing corporate tax liabilities, thereby improving project cash flows in the critical early stages (PIA, 2021).
2. Capital Allowances: The Act provides for enhanced capital allowances for investment in gas infrastructure. This includes accelerated depreciation rates, allowing companies to write off their capital expenditures more quickly, which in turn reduces their taxable income in the initial years of operation.
3. Zero Import Duty: Equipment, machinery, and components imported for gas projects in the midstream sector are exempt from import duties. This reduces the upfront capital expenditure required to establish gas processing and transportation infrastructure, lowering the overall project cost (PIA, 2021).
4. Gas Flare Commercialization Programme: The PIA provides legal backing for the Nigerian Gas Flare Commercialization Programme (NGFCP), which aims to auction flared gas to third-party investors who will develop technologies to capture and utilize it. Successful bidders under this program benefit from the fiscal incentives outlined above.

The collective impact of these fiscal provisions is to create a more favorable economic environment for associated gas projects. By lowering the effective tax rate, reducing royalty obligations, and offering direct cost savings, the PIA aims to tip the scales in favor of investment in gas capture and utilization infrastructure, making it a more financially attractive proposition than flaring.

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Economic Potentials and Benefits of Associated Gas Utilization

The shift from flaring to utilizing associated gas, as incentivized by the PIA's fiscal framework, unlocks immense economic, social, and environmental benefits for Nigeria.

1. Revenue Generation and Monetization: Flared gas represents wasted potential revenue. By capturing and processing AG, it can be sold as pipeline gas to the domestic market, converted into LNG for export, or processed into high-value products like LPG, NGLs, and feedstock for petrochemical plants. For instance, the Utorogu Gas Plant in Delta State processes AG for commercial and industrial use, generating substantial revenue (DPR, 2020). The Nigeria LNG project, which is set for expansion with Train 7, is a prime example of large-scale gas monetization that contributes billions to the national treasury.
2. Energy Security and Diversification: Nigeria suffers from a chronic power deficit. Associated gas can be a primary fuel for power generation, providing a cleaner and more reliable alternative to diesel and heavy fuel oil. Projects like the Azura-Edo IPP demonstrate the potential of gas-to-power to bolster the national grid. Utilizing AG domestically reduces reliance on imported fuels, conserves foreign exchange, and enhances national energy security.
3. Industrialization and Economic Growth: Reliable and affordable gas supply is a catalyst for industrial development. It can serve as a feedstock for fertilizer plants, methanol production, and other gas-based industries, fostering economic diversification beyond crude oil exports. The Dangote Fertilizer Plant is a testament to how gas resources can drive industrial output and create backward linkages in the economy.
4. Job Creation: The development of gas infrastructure—from pipeline construction to the operation of processing plants and power facilities—creates significant employment opportunities across the skill spectrum, from engineering and technical roles to construction and maintenance jobs (World Bank, 2022).
5. Environmental Cost Savings: Reducing flaring leads to a direct reduction in greenhouse gas emissions (CO_2 and methane) and other air pollutants. This not lessens Nigeria's carbon footprint and aligns with its commitments under the Paris Agreement but also can translate into financial gains through mechanisms like carbon credits (UNFCCC, 2021). Furthermore, it mitigates local environmental and health impacts on communities in the Niger Delta, potentially reducing social conflicts and associated costs.

The PIA's fiscal incentives are strategically designed to catalyze these benefits by making the initial investments in AG utilization commercially viable. The Escravos Gas-to-Liquids (GTL) project converts associated gas into synthetic fuels, demonstrating how fiscal incentives under the PIA can promote high-value gas conversion industries.

Strategies for Gas Flaring Reduction

The PIA employs a carrot-and-stick approach to gas flaring reduction. While the "carrot" consists of the fiscal incentives for utilization discussed above, the "stick" is a robust system of penalties designed to make flaring an economically punitive option. The primary strategy is the legal prohibition of routine flaring. The Act mandates that flaring is only permitted with the permission of the regulator and under specific circumstances, such as for safety reasons, during equipment maintenance, or if an approved utilization project is in development. For any non-exempted flaring, a penalty must be paid. The PIA mandates Gas Flare Elimination and Monetization Plans (GFEMP) for all licensees, complementing the NGFCP initiative.

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The Penalties

The PIA introduces a explicit and stringent penalty regime for gas flaring. The Act establishes a charge for flaring and venting, which is to be paid by the licensee or lessee (PIA, 2021, Section 104). The penalty is structured as follows:

1. A Prescribed Fee: The flaring penalty is set at a specific monetary value per standard cubic foot of gas flared. The initial rate is established by the Act and is subject to review by the regulator. This creates a direct, volumetric cost for flaring.
2. No Cost Deductibility: A critical feature of the PIA's penalty system is that the fines paid for gas flaring are not tax-deductible. This means companies cannot write off these penalties as operational expenses to reduce their tax liability, thereby increasing the real cost of the penalty.
3. Stricter Enforcement: The PIA provides a clearer legal basis and stronger enforcement mechanisms for collecting these penalties compared to previous regimes, which were often poorly enforced.

Impact of Penalties on Project Economics

The empirical financial modeling vividly demonstrates the impact of these penalties. A scenario analysis, holding gas price constant, shows a strong inverse relationship between the level of flaring penalty and project profitability for the operator (Contractor). Figure 6 shows the Effect of the Flared Gas Penalty on the NCF of the Contractor, illustrating the direct impact on cash flow. Figure 7 shows the Effect of the Flared Gas Penalty on the NPV of the Contractor, indicating changes in overall project value.

Figure 8 shows the Effect of the Flared Gas Penalty on the Internal Rate of Return of the Investment, reflecting the project's investment appeal. Lastly, Figure 9 shows the Effect of the Flared Gas Penalty on the Payout Period of the Investment, demonstrating how penalties affect the time to recoup investment. The analysis demonstrates that the higher the flare gas penalty, the more profoundly it negatively impacts the contractor's profitability. This dynamic serves as a powerful regulatory mechanism to discourage gas flaring.

As the flare gas penalty increases from $0/MScf to $1.80/MScf:

1. The Contractor's Net Cash Flow (NCF) steadily declines from $133.01 at $0/MScf penalty to $16.80 at $1.80/MScf.
2. The Contractor's Net Present Value (NPV) experiences a sharp decline, starting at $37.51 million with no penalty, dropping to $26.38 million at $0.50/MScf, and further to $10.81 million at $1.20/MScf.
3. Crucially, at a penalty of $1.80/MScf, the Contractor's NPV turns negative, reaching -$2.54 million. This negative NPV is a critical observation, indicating that under such high penalty rates, the project becomes financially unviable for the contractor.
4. The Internal Rate of Return (IRR) also plummets from 36.93% at $0/MScf penalty to 7.45% at $1.80/MScf.
5. The Payout Period consistently increases with higher penalties, extending from 8.36 years with no penalty to 11.47 years at $1.80/MScf.

These results vividly illustrate that stringent flaring penalties create a substantial financial disincentive. The fact that profitability can descend into negative NPV under higher penalty regimes strongly suggests that such regulations are highly effective in compelling contractors to explore and implement alternative, more sustainable uses for associated gas, rather than resorting to environmentally damaging and economically wasteful flaring. This policy effectively drives investment into gas capture, processing, and monetization infrastructure.

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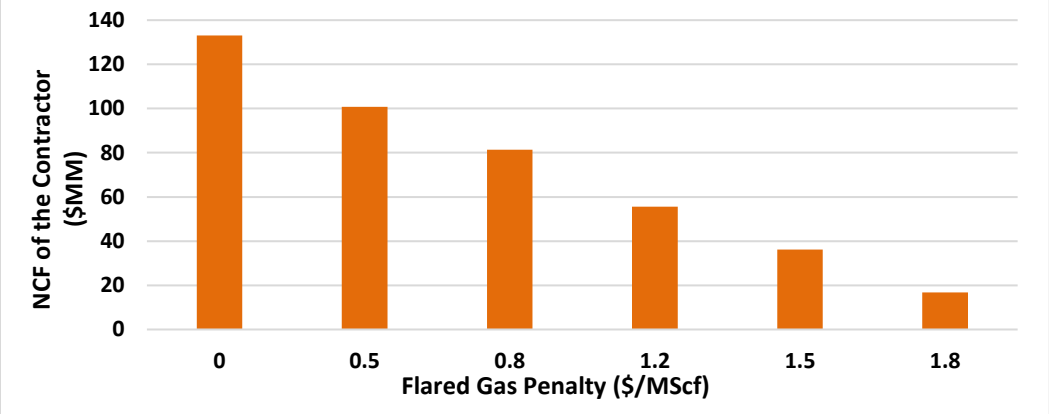


Figure 6: Effect of the Flared Gas Penalty on the NCF of the Contractor

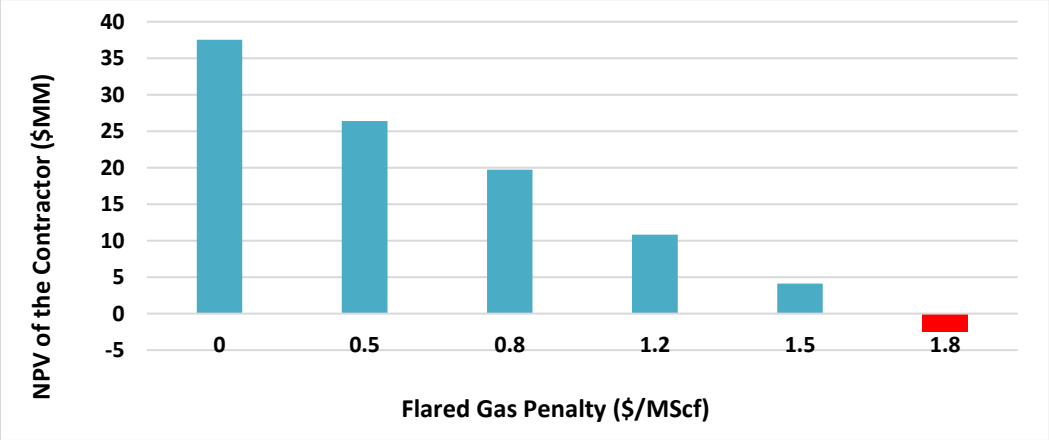


Figure 7: Effect of the Flared Gas Penalty on the NPV of the Contractor

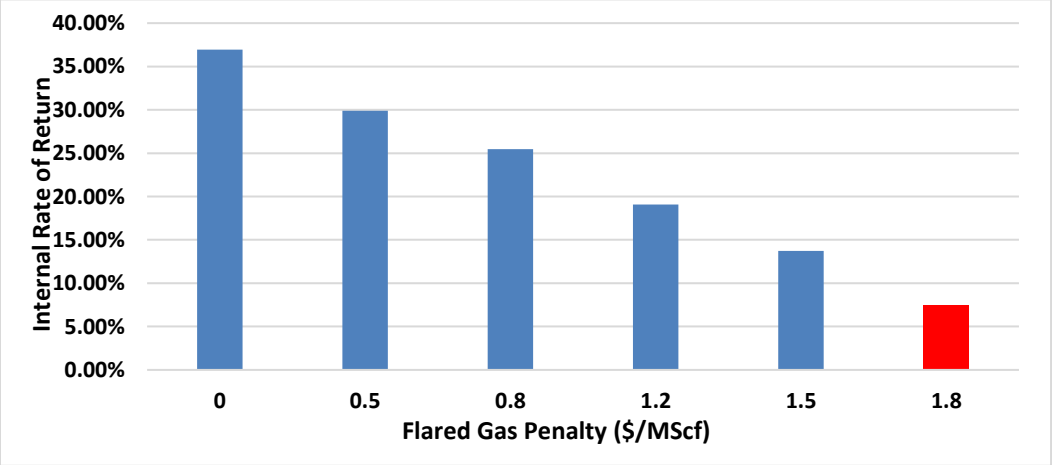


Figure 8: Effect of the Flared Gas Penalty on the Internal Rate of Return of the Investment

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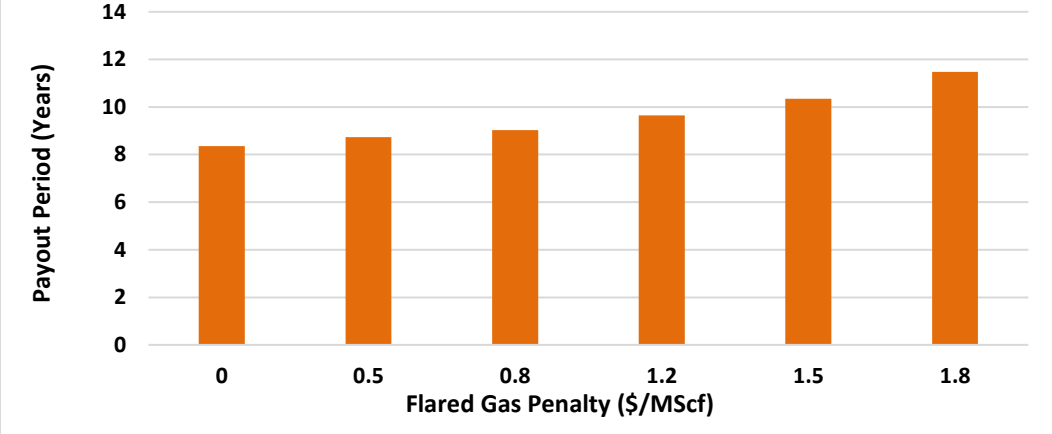


Figure 9: Effect of the Flared Gas Penalty on the Payout Period of the Investment

As the flare gas penalty increases from $0/MScf to $1.80/MScf, the Contractor's Net Present Value (NPV) plummets. At a penalty of $1.20/MScf, the NPV is significantly reduced, and at $1.80/MScf, the NPV turns negative, indicating a financially unviable project. Similarly, the Internal Rate of Return (IRR), a key measure of investment efficiency, falls dramatically with increasing penalties, and the Payout Period (the time to recoup the investment) lengthens considerably.

These results confirm that the PIA's flaring penalties are not merely symbolic; they are potent enough to fundamentally alter the economics of an oil and gas project. A high enough penalty rate makes the continued practice of flaring more expensive than investing in the necessary infrastructure to capture and utilize the gas. This serves as a powerful financial disincentive, compelling operators to seek out and implement gas utilization solutions.

CONCLUSION

The Petroleum Industry Act (PIA) of 2021 represents Nigeria's most concerted and comprehensive effort to date to address the dual challenges of economic waste and environmental degradation caused by associated gas flaring. This analysis has demonstrated that the Act's fiscal provisions are strategically crafted to create a paradigm shift in the management of associated gas.

On one hand, the PIA offers a compelling "carrot" through a fiscal regime that is highly favorable to gas investments. The zero-rate Hydrocarbon Tax for gas, reduced and preferential royalties for domestic supply, tax holidays, capital allowances, and import duty waivers collectively lower the barriers to entry and improve the profitability of associated gas utilization projects. These incentives are crucial for attracting the significant capital investment required for midstream gas infrastructure.

On the other hand, the Act wields a powerful "stick" in the form of stringent, non-deductible flaring penalties. The financial modeling presented confirms that these penalties are calibrated to have a material impact on project economics, capable of rendering flaring a financially disastrous option for operators. This creates a clear economic imperative for companies to comply with the Act's prohibition on routine flaring. However, the existence of a sophisticated legal and fiscal framework on paper is not a guarantee of success. The historical failure of previous anti-flaring policies in Nigeria underscores the critical importance of implementation. Key challenges remain, including the vast infrastructural deficit, potential regulatory overlaps between the NUPRC and NMDPRA, the need for robust and transparent monitoring of flare volumes, and the pervasive issue of oil theft and pipeline vandalism which disrupts operations.

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Therefore, for the PIA to fully achieve its objectives, the government must complement the fiscal provisions with unwavering political will. This entails:

1. Strict Enforcement: Consistently applying and collecting flaring penalties without exception.
2. Infrastructure Drive: Accelerating the deployment of the Midstream and Downstream Gas Infrastructure Fund (MDGIF) to catalyze critical gas gathering and processing projects.
3. Regulatory Harmony: Ensuring seamless coordination between regulatory agencies to provide a clear and stable investment climate.
4. Technology Adoption: Leveraging modern technologies, such as satellite monitoring, for independent verification of flaring and emissions.

In conclusion, the PIA provides Nigeria with a golden opportunity to convert a long-standing liability—flared associated gas—into a substantial economic asset and a pillar of its energy transition. The analysis confirms that its fiscal provisions for utilization and penalties for flaring are, in theory, well-designed to drive this change. The ultimate test will be in the rigor and consistency of its implementation. If successfully executed, the PIA can position Nigeria not only as a leader in Africa's gas economy but also as a responsible player in the global effort to combat climate change. With consistent implementation, the PIA's fiscal reforms can reposition Nigeria as a leading gas economy in sub-Saharan Africa and support its pathway toward net-zero emissions by 2060.

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