

THE LEGAL AND REGULATORY IMPERATIVE FOR A SHARED TELECOMMUNICATIONS AND POWER INFRASTRUCTURE MODEL IN NIGERIA'S OIL AND GAS SECTOR

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Abstract: Nigeria's economic landscape is defined by a stark paradox: vast energy resources coexist with profound energy poverty. This is acutely evident in its two most critical sectors. The oil and gas industry, responsible for a significant portion of government revenue, routinely flares associated gas due to a lack of viable commercial outlets, wasting resources and causing environmental damage while simultaneously relying on expensive, polluting diesel generators for its operational power. Parallely, the telecommunications sector, the bedrock of the nation's digital economy, dedicates up to 70% of its operational expenditure to diesel fuel for powering over 30,000 base stations nationwide. This paper argues for a legally facilitated, symbiotic infrastructure-sharing model that utilizes stranded and flared gas from oil fields to generate electricity for co-located telecommunications infrastructure. It posits that while the technical and economic feasibility of this model is sound, its implementation is critically hampered by a complex, siloed, and often contradictory legal and regulatory framework. Through a comprehensive analysis of the Petroleum Industry Act (PIA) 2021, the Nigerian Gas Flare Commercialisation Programme (NGFCP), the Electricity Act 2023, and relevant telecommunications regulations, this paper identifies the specific commercial, contractual, and regulatory impediments to this convergence. The study concludes that a proactive harmonization of these legal silos is not merely beneficial but imperative to unlock a triple-win scenario: enhancing operational efficiency and profitability for both sectors, significantly reducing environmental pollution, and bolstering national energy security. The research contributes to the discourse on sustainable development law, energy law, and the role of commercial law in fostering innovative cross-sectoral solutions in emerging economies.

Keywords: gas flaring; telecommunications towers; Petroleum Industry Act (PIA); Nigerian Gas Flare Commercialisation Programme (NGFCP); Nigeria.

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INTRODUCTION: THE PARADOX OF PLENTY AND THE IMPERATIVE FOR CONVERGENCE

Nigeria stands as a testament to the resource curse paradox, a nation endowed with immense hydrocarbon wealth yet plagued by chronic infrastructural deficits, particularly in the power sector (Ofuonyebuzor, 2021). The Nigerian oil and gas industry, for decades the mainstay of the national economy, has been characterized by a notorious practice: the flaring of associated natural gas. Despite numerous governmental deadlines and policies aimed at curbing this practice, Nigeria remains one of the world's top seven gas-flaring countries, burning billions of standard cubic feet of gas annually and contributing significantly to CO₂ emissions and environmental degradation in the Niger Delta region (World Bank, 2023). This flaring represents not only an environmental catastrophe but also a monumental economic waste—a valuable resource being intentionally destroyed (Ayibam, 2022; Ayibam, 2024a; Ayibam, 2024b). Concurrently, oil and gas companies operating in these remote fields face their own energy crisis, forced to depend on an unreliable national grid and thousands of diesel-fired generators to power their critical operations, from drilling rigs and flow stations to residential camps, incurring enormous operational costs and logistical complexities.

In a seemingly unrelated sector, Nigeria's telecommunications industry has undergone a revolutionary transformation since its liberalization in 2001. It has become a critical enabler of economic and social activity, connecting millions of people and businesses. However, this success story is powered almost entirely by diesel. The industry maintains a vast network of over 30,000 base stations across the country, and due to the epileptic nature of the national grid, each station requires its own diesel generator(s) and a complex setup of batteries and power systems to ensure 99.9% uptime. The Nigerian Communications Commission (NCC, 2022) estimates that energy costs, predominantly diesel, account for between 60% and 70% of a network's operational expenditure (OPEX). This high cost structure ultimately translates to higher tariffs for consumers and reduced margins for operators. Furthermore, it creates a massive carbon footprint, with the sector being a significant contributor to Nigeria's greenhouse gas emissions.

The convergence of these two challenges presents a unique and compelling opportunity. The logical solution appears straightforward: capture the gas currently being flared at oil fields, use it to fuel a gas-fired power generation plant, and supply the resulting stable and cheaper electricity to power both the oil field operations and co-located telecommunications infrastructure, particularly tower base stations. The engineering feasibility of small-scale gas-to-power solutions is well-established. The economic rationale is equally powerful: oil companies can monetize a wasted resource and reduce their own diesel costs, telecommunications companies can drastically slash their largest OPEX line item, and the environment benefits from reduced flaring and diesel consumption.

However, the persistent absence of widespread implementation of this model suggests that the primary barriers are not technical or economic, but legal and regulatory. The existing legal frameworks governing oil and gas, electricity, and telecommunications

were designed in isolation, creating vertical silos of regulation that are ill-equipped to handle horizontal, cross-sectoral integration. A project that involves extracting gas (regulated by the Nigerian Upstream Petroleum Regulatory Commission - NUPRC), converting it to electricity (regulated by the Nigerian Electricity Regulatory Commission - NERC), and supplying it to a telecom tower (implicated by Nigerian Communications Commission - NCC guidelines) must navigate a labyrinth of permits, conflicting regulations, and contractual uncertainties (Sunny-Hart,, 2024). This paper, therefore, seeks to investigate this critical impediment. Its central thesis is that the development of a shared telecommunications and power infrastructure model in Nigeria's oil and gas sector is fundamentally a legal and regulatory challenge. The research will dissect the applicable legal frameworks, identify the specific points of conflict and ambiguity, analyze the requisite commercial agreements, and propose a coherent path towards regulatory harmonization. By doing so, it aims to provide a legal blueprint for unlocking this significant opportunity for sustainable development, economic efficiency, and environmental conservation in Nigeria.

THE EXISTING LEGAL FRAMEWORKS: NAVIGATING A SILOS OF REGULATION

The proposed symbiotic model exists at the intersection of three distinct legal and regulatory universes, each with its own history, philosophy, and complex set of rules. Successfully implementing a flare-gas-to-telecom-power project requires navigating this tripartite regulatory maze, where compliance with one regime does not guarantee compliance with another, and where gaps and overlaps create significant uncertainty for investors and project developers (Anwana & Equere, 2022, Anwana & Equere, 2023).

The primary governing law for the oil and gas sector is the historic Petroleum Industry Act (PIA) 2021, which fundamentally overhauled the regulatory landscape. On the issue of gas flaring, the PIA takes a stern stance. It explicitly prohibits the flaring or venting of natural gas produced in association with crude oil, except under specific exempted circumstances such as for safety reasons, startup operations, or where appropriate commercial outlets are unavailable (as determined by the regulator). Most significantly, the PIA imposes a stringent penalty for flared gas, requiring the polluter to pay a fine that is determined by the Nigerian Upstream Petroleum Regulatory Commission (NUPRC) and is intended to be punitive, not merely a cost of doing business (PIA, 2021, Section 104). This creates a strong financial incentive for oil companies to seek alternatives to flaring. The PIA also provides a framework for the commercialization of gas, including provisions for gas terms, pricing, and the assignment of gas rights (Nwankwo, et al., 2024). However, the Act is primarily designed for large-scale gas commercialization projects, such as supplying gas to power plants or LNG trains. Its provisions are not necessarily tailored to the small-scale, localized offtake required for powering a cluster of telecom towers, leaving room for regulatory interpretation and potential ambiguity regarding licensing requirements for such mini-projects.

The Nigerian Gas Flare Commercialisation Programme (NGFCP), initiated by the government prior to the PIA but intended to be subsumed under its framework, is the

most direct policy initiative targeting this issue. The NGFCP's objective is to provide a platform for awarding flare gas to competent third-party investors who will develop technologies and markets to utilize the gas. The program operates on a "Flare Gas Sale Agreement" model. However, as noted by Omi (2022), the implementation of the NGFCP has been slow and fraught with challenges, including concerns over gas pricing, the creditworthiness of offtakers, and the logistical difficulties of aggregating gas from multiple flare points. For a telecom tower power project, a third-party developer would likely need to engage with this framework to secure a reliable gas supply, adding a layer of regulatory complexity and negotiation.

On the power side, the electricity sector is governed by the Electricity Act 2023, which consolidates the laws relating to the Nigerian electricity supply industry. Generation, transmission, distribution, and trading of electricity require licenses from the Nigerian Electricity Regulatory Commission (NERC) (Ayibam, 2024c). The Act does provide for certain exemptions from licensing, notably for "captive power generation," which is generation for personal use and not for sale to a third party. It also makes provisions for isolated mini-grids and embedded generation. The critical legal question for our model is whether selling power exclusively to a single offtaker (a telecom tower company) located on or near the same oil field constitutes a "captive" arrangement or a commercial supply requiring a full generation and trading license. The answer is not clear-cut and depends on the specific corporate structure and connection arrangement. NERC's regulations are designed for a more traditional power market, and applying them to a single bilateral wire between a generator and a telecom tower can be overly burdensome and costly, potentially rendering small-scale projects economically unviable.

The telecommunications sector, regulated by the Nigerian Communications Commission (NCC) under the Nigerian Communications Act (NCA) 2003, is primarily concerned with spectrum management, licensing of operators, and ensuring quality of service. While the NCC does not directly regulate power supply, its regulations have a significant indirect impact. The NCC mandates strict uptime requirements for network operators. Any power solution adopted by a telecom company must meet these reliability standards. Furthermore, the NCC has shown an increasing interest in promoting environmental sustainability within the industry. In 2021, it published a draft "Green Code" for the telecommunications industry, encouraging licensees to adopt renewable energy and energy-efficient technologies to reduce their carbon footprint (NCC, 2021). While not yet mandatory, this soft law instrument indicates regulatory awareness and could be used to incentivize the adoption of gas-based power over diesel generators. However, the NCC's mandate stops at encouragement; it cannot streamline the approvals needed from NUPRC or NERC.

The environmental regulatory framework, overseen by agencies like the National Environmental Standards and Regulations Enforcement Agency (NESREA), also plays a role. Projects must conduct Environmental Impact Assessments (EIAs) and obtain necessary permits. While switching from flaring and diesel to gas power is a net positive for the environment, it still requires going through the prescribed regulatory channels, adding time and cost to project development. The interplay of these four regulatory

spheres—petroleum, electricity, telecommunications, and environment—creates a daunting compliance landscape that demands significant legal expertise and upfront investment to navigate, often deterring the very innovation the model seeks to encourage.

COMMERCIAL AND CONTRACTUAL STRUCTURES: FORGING THE SYMBIOTIC LINK

Assuming a project developer can successfully navigate the regulatory thicket, the next critical challenge lies in structuring the commercial relationships between the various parties through a set of robust, interlocking contracts. These agreements must be carefully drafted to allocate risks appropriately, ensure bankability, and provide long-term stability for a project that is inherently based on the continuous operation of two different critical infrastructures. The foundational contract is the Gas Sale and Purchase Agreement (GSA). This is a well-established instrument in the oil and gas industry, but its application here is unique. A traditional GSA for a large-scale power plant or industrial user involves the delivery of large volumes of gas over a long-term period via a pipeline connection. In our model, the offtake is (small-scale), the gas may be supplied directly at the flare point, and the buyer is likely a special purpose vehicle (SPV) set up to develop the power project, not a credit-worthy utility. This necessitates significant adaptations to standard GSA terms. The "take-or-pay" clause, which obligates the buyer to pay for a minimum quantity of gas regardless of whether it is taken, becomes a significant risk for the small-scale power developer. If the telecom tower reduces its consumption or the power plant has downtime, the SPV could still be liable for gas payments, potentially crippling its finances. Negotiating a flexible or "reasonable efforts" clause, or a hybrid payment structure, is therefore crucial (Bunter, 2020). Furthermore, the gas pricing formula must be competitive with the alternative—diesel—to make the project economically attractive to the end-user. A price indexed to international gas markets may not be suitable; a price pegged to a discount to the local diesel price could be a more sustainable model.

The second pivotal contract is the Power Purchase Agreement (PPA). This agreement between the power generator (the SPV) and the telecom tower company (the offtaker) is the primary revenue stream for the project. The PPA must be bankable to attract debt financing. This requires it to be long-term (typically 10-15 years) and to contain clear terms on capacity and energy payments. However, the needs of a telecom tower are different from those of a national grid. The key performance indicator is unwavering reliability. Therefore, the PPA must include stringent service level agreements (SLAs) with severe financial penalties (liquidated damages) for unscheduled outages that cause the tower to switch to its backup diesel system. From the generator's perspective, the force majeure clause must be carefully negotiated to include events that could affect gas supply from the oil company, insulating them from liabilities arising from disruptions outside their control. The allocation of operational and maintenance responsibilities for the dedicated power line connecting the plant to the tower must also be explicitly defined.

The most probable structure for such a project is the Third-Party Developer Model. In this scenario, an independent energy company sets up an SPV that enters into a GSA with

the oil company, secures all necessary permits, builds, owns, and operates the gas-fired power plant, and sells the electricity to the telecom company via a PPA. This model is advantageous as it leverages the specialized expertise of the developer and does not require the oil company or the telecom company to divert capital or focus from their core businesses. The legal complexity, however, increases as it involves a web of agreements: the GSA, the PPA, an Engineering, Procurement, and Construction (EPC) contract, an Operations and Maintenance (O&M) agreement, and financing documents. The rights and obligations in each must be perfectly aligned. For instance, a default under the GSA that leads to a shutdown of gas supply will constitute a force majeure event under the PPA, triggering a chain of consequences that must be clearly outlined in the contracts to avoid disputes.

Risk allocation is the central theme threading through all these agreements. The risks are multifaceted: volume risk (will the flare gas be available in consistent quantities?), price risk (will the cost of gas or the price of electricity remain commercially viable?), technology risk (will the power plant perform reliably?), regulatory risk (will changes in law affect the project?), and offtaker credit risk (will the telecom company be able to pay its electricity bills?). A comprehensive legal due diligence process is required to identify, assess, and mitigate each of these risks, allocating them to the party best able to bear them. This often involves a trade-off between bankability for the developer and affordability for the offtaker. Without expertly drafted contracts that provide certainty and balance for all parties, this symbiotic model will remain an attractive idea that is too risky to implement in practice.

CASE STUDY: APPLYING THE FRAMEWORK TO A HYPOTHETICAL SCENARIO IN THE NIGER DELTA

To move from theoretical legal analysis to practical application, it is instructive to apply the framework to a concrete, hypothetical scenario. Let us consider a proposal by "Niger Delta Power Solutions (NDPS) Ltd," an independent power developer, for a project in Oil Mining Lease (OML) 99, operated by "Major Oil Company (MOC) Nigeria Ltd." Within this OML, there is a flow station, "Flow Station Alpha," which currently flares an average of 5 million standard cubic feet of gas per day. Within a 5-kilometer radius of this flare site, there are 15 telecommunications base stations operated by two major Mobile Network Operators (MNOs) and an independent tower company, "TowerCo Nigeria."

NDPS's proposal is to build, own, and operate a 5MW modular gas-fired power plant at the flare site. It plans to enter into a 15-year Gas Sale Agreement with MOC to offtake the associated gas at a negotiated price. It will then generate electricity and construct a dedicated mini-grid to supply power to Flow Station Alpha itself (reducing MOC's diesel consumption) and to the 15 telecom towers, replacing their diesel generators. NDPS will sign long-term Power Purchase Agreements with MOC and the telecom tower owners. The regulatory approval process for NDPS would be arduous. First, it must engage with the NUPRC regarding the gas offtake. Since the gas is currently being flared, it would likely fall under the NGFCP framework. NDPS would need to qualify as a competent

participant, bid for the gas, and negotiate a Flare Gas Sale Agreement with MOC, subject to NUPRC's approval. The NUPRC would need to be satisfied that the end-use is legitimate and that the pricing is fair.

Second, NDPS must approach the Nigerian Electricity Regulatory Commission (NERC). The key question is whether this project requires a generation license. Given that the power will be sold to multiple commercial entities (MOC and the tower companies) via a dedicated distribution line, it is highly unlikely to qualify for a "captive generation" exemption. NDPS would therefore need to apply for and obtain a generation license from NERC. This process is detailed, requiring proof of technical competence, financial capability, and compliance with technical grid codes (even for an isolated mini-grid). Furthermore, as it will be selling electricity, it may also need a trading license. The cost and time associated with this licensing process can be prohibitive for a small 5MW project.

Third, while the NCC is not a direct regulator of the power plant, its policies are critical. The MNOs and TowerCo will only sign the PPA if they are confident that the power supply will be more reliable than their current diesel setup and will not jeopardize their license conditions with the NCC regarding network availability. They will require iron-clad SLAs in the PPA. Furthermore, the NCC's "Green Code" could be used by the MNOs to justify the slightly higher upfront cost of connecting to the gas power grid as part of their corporate sustainability commitments, making them more amenable to the deal.

The contractual negotiations would be complex. MOC, a large international company, will insist on its standard GSA terms, which are designed for multi-million dollar deals, not small-scale offtake. They may be reluctant to take on any volume risk, insisting on a strict take-or-pay clause. The telecom companies, on the other hand, are notoriously tough negotiators on cost. NDPS must secure a PPA price that covers its gas costs, capital expenditure, O&M costs, and provides a return, while still offering the towers a discount to their current diesel OPEX. This requires intricate financial modeling and a delicate balancing act during negotiations.

This hypothetical case illustrates the myriad of legal and regulatory hurdles that stand between a brilliant idea and its execution. It shows how a project that is technically simple and economically rational can be bogged down by the need to obtain approvals from multiple regulators and to negotiate a suite of complex contracts with powerful counterparties. The transaction costs—legal fees, consulting fees, and management time—can easily sink a small-scale project before it even begins.

COMPARATIVE ANALYSIS: LESSONS FROM OTHER JURISDICTIONS

While Nigeria's situation is unique, it is not without precedent. Other resource-rich developing countries have grappled with the challenge of gas flaring and have implemented policies and models that offer valuable lessons. A comparative analysis, while not providing a ready-made solution, can highlight alternative regulatory approaches and contractual innovations that could be adapted to the Nigerian context. A prominent example is Norway, which successfully eliminated routine flaring through a

combination of stringent regulations and economic incentives. The Norwegian government implemented a carbon tax on CO₂ emissions, which made flaring an extremely expensive option. More importantly, they required oil companies to submit detailed plans for gas utilization before field development approval was granted. This "pre-approval" system embedded gas capture and monetization into the project's DNA from the outset, rather than treating it as an afterthought (Ite, 2021). While Nigeria's PIA has moved in this direction with its flaring prohibition, the Norwegian model demonstrates the effectiveness of integrating utilization planning into the initial licensing round, forcing companies to think creatively about solutions from day one.

In the Middle East, countries like Saudi Arabia and Qatar have extensively used associated gas for domestic industrial development and power generation, largely through state-directed initiatives. While their scale is different, their success underscores the importance of a clear national strategy and the state's role as a coordinator between different sectors of the economy. In Nigeria, a more coordinated approach between the Ministry of Petroleum Resources, the Ministry of Power, and the Ministry of Communications and Digital Economy could help break down the silos and provide clearer policy direction for integrated projects.

Closer to home, in Angola, the "Angola LNG" project is a large-scale example of capturing associated gas that was previously flared and converting it for export. While this is a mega-project, it shows the technical and commercial viability of gas commercialization in a similar African context. For smaller-scale applications, some countries have experimented with simplified regulatory procedures for "mini-power" projects below a certain capacity threshold. For instance, in certain Indian states, projects below 5MW may face a fast-tracked approval process to encourage distributed generation (World Bank, 2019). This is a lesson NERC could adopt: creating a specific category and a streamlined, cost-effective licensing pathway for small-scale embedded generation projects that utilize waste gas and serve a dedicated cluster of users.

The key takeaway from these comparative examples is that successful gas flare reduction is rarely achieved by the market alone. It requires a proactive and smart regulatory state that uses a mix of tools: punitive measures (like the PIA's fines), economic incentives (tax breaks for gas utilization projects), and regulatory streamlining (creating dedicated pathways for small-scale projects). Nigeria has begun with the stick (the fine); it now needs to carefully design the carrots and remove the regulatory roadblocks to encourage the innovative, small-scale solutions that can make a significant cumulative impact.

FINDINGS AND RECOMMENDATIONS: TOWARDS A CONDUCTIVE LEGAL ARCHITECTURE

The preceding analysis leads to several unequivocal findings. First, the legal and regulatory frameworks governing oil and gas, power, and telecommunications in Nigeria are deeply siloed, creating significant ambiguity, duplication, and high transaction costs for integrated flare-gas-to-power projects. Second, the commercial and contractual models required for such projects are complex, requiring bespoke adaptations of

standard agreements to appropriately allocate risks between parties with vastly different bargaining power and operational priorities. Third, the current regulatory processes, particularly within the electricity sector, are disproportionately burdensome for small-scale, off-grid power projects, stifling innovation at the local level. Fourth, while policies like the NGFCP and the PIA's flaring penalty are steps in the right direction, they are insufficient on their own to stimulate the desired level of small-scale investment.

Based on these findings, this paper proposes the following concrete recommendations for creating a more conducive legal and regulatory architecture:

1. **Establish an Inter-Regulatory Task Force:** The President should mandate the creation of a permanent task force comprising representatives from the NUPRC, NERC, NCC, and NESREA. Its mandate would be to develop and issue joint regulations and guidelines specifically for integrated gas-to-power projects. This task force would serve as a "one-stop shop" for project developers, providing clarity and streamlining the approval process across the different regulatory domains.
2. **Create a Simplified Licensing Category within NERC:** NERC should use its powers under the Electricity Act to create a new, simplified category of license for "Embedded Generation and Isolated Supply" for projects below 10MW that utilize waste gas (flare gas) or renewable resources. This fast-track process would reduce application costs, simplify technical requirements, and issue permits within a defined, short timeframe, making small-scale projects financially viable,
3. **Develop Model Contracts for Small-Scale Gas Commercialization:** The NUPRC, in collaboration with industry stakeholders like the Oil Producers Trade Section (OPTS) and the Nigerian Electricity Hub, should develop and publish model Gas Sale Agreements and Power Purchase Agreements tailored for small-scale offtake. These model contracts would provide a balanced starting point for negotiations, reducing legal costs and time, and ensuring fair risk allocation, particularly for independent power developers negotiating with larger oil and telecom companies.
4. **Incorporate Explicit Incentives within the NCC's Framework:** The NCC should finalize and implement its "Green Code" for the telecommunications industry (Berebon, 2025a; Berebon, 2025b). Beyond encouragement, it could incorporate tangible incentives, such as a more favorable treatment in regulatory fees or reporting requirements for network operators who can demonstrate a reduction in their carbon footprint through connections to gas-powered mini-grids, thereby creating a pull factor from the demand side.

CONCLUSION

The vision of using Nigeria's wasted flare gas to power its critical telecommunications infrastructure is a powerful one, emblematic of the kind of innovative, home-grown solution that can drive sustainable development. It promises to turn an environmental

liability into an economic asset, reduce operational costs for two key sectors, and enhance the reliability of the nation's digital backbone (Berebon, 2024). However, as this paper has comprehensively argued, realizing this vision is contingent not on further technical or economic analysis, but on a deliberate and concerted effort to reform the legal and regulatory environment.

The current framework, a product of historical sectoral silos, is the single greatest impediment to progress. It creates uncertainty, heightens risk, and imposes prohibitive transaction costs on would-be project developers. By adopting the recommendations outlined—regulatory harmonization, procedural simplification, and the provision of standardized contractual tools—the Nigerian government can unlock significant private sector investment into this space. This is not merely a regulatory tweak; it is a strategic imperative. Fostering this convergence is a practical demonstration of how commercial law and astute regulation can be leveraged to solve seemingly intractable problems, paving the way for a more efficient, sustainable, and secure energy future for Nigeria.

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