APRI
AFRICA POLICY RESEARCH INSTITUTE

FEDERAL MINISTRY OF ENVIRONMENT
DEPARTMENT OF CLIMATE CHANGE

This project is funded in part by the Government of Canada

Ce projet est financé en partie par le gouvernement du Canada

Canada

POLICY BRIEF | MAR 2026

From waste to wealth: A national strategy for methane mitigation and commodification in Nigeria

POLICY BRIEF | MAR 2026

From waste to wealth: A national strategy for methane mitigation and commodification in Nigeria

By Dr Mahmoud Ibrahim Mahmoud

APRI
AFRICA POLICY RESEARCH INSTITUTE

Acknowledgements and Citation

This policy brief, *From waste to wealth: A national strategy for methane mitigation and commodification in Nigeria*, is an excerpt of the Methane Mitigation and Reduction Project's (MMRP) report *Clearing the air: Methane mitigation and reduction strategies in Nigeria's oil and gas sector*, launched on 12 August 2025. The report was produced by APRI – Africa Policy Research Institute, an independent African think tank with offices in Berlin, Germany and Abuja, Nigeria. APRI conducts strategic, systematic and policy-oriented research on key issues shaping the African continent.

Dr Mahmoud Ibrahim Mahmoud, the author of this policy brief, extends his heartfelt gratitude to Dr Mohammed Dahiru Aminu (APRI Non-Resident Fellow) for peer-reviewing the brief and offering valuable improvements to the document. He would also like to extend his sincere gratitude to Dr Iniobong Abiola-Awe (Director, Department of Climate Change, Federal Ministry of Environment, Nigeria) for her partnership and support in this project. Special thanks go to the participants who joined the 'Clearing the air: Advancing methane mitigation and reduction in Nigeria's oil and gas sector' event, whose input helped guide this policy brief. A big thank you to the field work data collection participants in the Rivers, Bayelsa and Cross River states. In addition, a special thank you to all those who supported the final launch of the MMRP report for Nigeria's oil and gas sector.

The author would also like to acknowledge and thank Dr Olumide Abimbola (Executive Director, APRI), Dr Grace Mbungu (APRI alumnus, who was Senior Fellow and Head, Climate Change Programme, APRI), Isabella Roberts (Programme Manager and Innovation Incubator, APRI) and Olumide Onitekun (Research and Policy Officer, APRI) for their invaluable leadership, feedback and administrative support to the project.

DOI: **https://doi.org/10.59184/pb026.04**

Contents

List of abbreviations and acronyms

AI	Artificial intelligence
AM3	Africa's Methane Action: Mitigate, Monetise, Mobilise
APRI	Africa Policy Research Institute
bcm	Billion cubic metres
CCA	Climate Change Act
CCAC	Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants
CDP	Continuous Digital Platforms for monitoring gas flares
CH_4	Methane
CNG	Compressed natural gas
CO_2	Carbon dioxide
COP30	2025 United Nations Climate Change Conference
CWT	Continuous Emissions Monitoring Technologies
DCC-FMEnv	Department of Climate Change, Federal Ministry of Environment
DFID	Department for International Development [United Kingdom]
ESG	Environmental, social and governance
FCDO	Foreign, Commonwealth & Development Office [United Kingdom]
GGFR	Global Gas Flaring Reduction
GW	Gigawatt
GWP	Global warming potential
HPC	High-performance computing
IEA	International Energy Agency
IOC	International oil company
JV	Joint venture
KPIs	Key performance indicators
kt	Kilotonnes

$ktCH_4$	Kilotonnes of methane emissions
LDAR	Leak detection and repair
LNG	Liquefied natural gas
mcm	Million cubic metres
ML	Machine learning
MMR	Methane mitigation and reduction
MMRP	Methane Mitigation and Reduction Project
MMscf	Million standard cubic feet (gas volume)
MMscfd	Million standard cubic feet per day (large flow rate)
MRV	Measurement, reporting and verification
Mscfd	Thousand standard cubic feet (flow rate)
Mt	Million tonnes
$MtCO_2$	Million metric tonnes of carbon dioxide
$MtCO_2e$	Million metric tonnes of carbon dioxide equivalent
NCCC	National Council on Climate Change
NCCPRS	National Climate Change Policy and Response Strategy
NDC	Nationally Determined Contribution
NGFT	Nigerian Gas Flare Tracker
NMDPRA	Nigerian Midstream and Downstream Petroleum Regulatory Authority
NMET	Nigerian Methane Emissions Tracker
NNPCL	Nigerian National Petroleum Company Limited
NOSDRA	National Oil Spill Detection and Response Agency
NRS	Nigeria Revenue Service
NUPRC	Nigerian Upstream Petroleum Regulatory Commission
PIA	Petroleum Industry Act
SLCP	Short-lived climate pollutant
SPV	Special purpose vehicle
TWh	Terawatt-hour
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change

List of figures and tables

List of figures

List of tables

About this brief

This policy brief is a contribution from the Methane Mitigation and Reduction Project, implemented by APRI – Africa Policy Research Institute in partnership with the Department of Climate Change in Nigeria's Federal Ministry of Environment. It builds on recent work – including APRI's framing paper, mapping report, fact sheet, and commentary and short analysis on the benefit of methane mitigation and reduction in the petroleum sector – to provide a compelling case for treating methane emissions from Nigeria's oil and gas sector as not only an environmental threat but also a valuable economic and diplomatic resource for sustainable development.

Executive summary

Methane (CH_4) is a super-pollutant with a global warming potential that is 84–86 times greater than that of carbon dioxide (CO_2) when measured over a 20-year period. It is responsible for approximately 30% of observed global warming.[1] In Nigeria's oil and gas sector, methane emissions arise from flaring, venting, fugitive leaks, oil-spill biodegradation, polluted sediment flux (notably in the Ogoni axis) and abandoned wells. These emissions constitute both an environmental crisis and a major economic loss. According to the Nigerian Upstream Petroleum Regulatory Commission (NUPRC), Nigeria wastes an estimated 250–300 million standard cubic feet per day (MMscfd) of gas through flaring and leakage.[2] This is equivalent to USD 1.2–1.4 billion annually at prevailing domestic gas prices, and over USD 2.5 billion when valued as an equivalent of liquified natural gas (LNG).

Economic and emissions scale: why methane matters for Nigeria

- According to the recent global flaring report by the World Bank,[3] in 2024, flaring resulted in an estimated 389 million tonnes of carbon dioxide equivalent ($MtCO_2e$) emissions globally – of which 46 $MtCO_2e$ came from unburnt methane.
- In 2023, roughly 276 MMscfd of gas was flared in Nigeria, valued at about USD 1 billion (≈ N 1.452 trillion). Accordingly, Nigeria risks losing over USD 1.7 billion (≈ N 2.47 trillion) in 2025.[4]
- Secondary data spanning 2002–2024 shows that, among other greenhouse gases (GHGs), flaring in Nigeria emitted ~89.4 $MtCO_2e$ as methane and ~625 million metric tonnes of carbon dioxide ($MtCO_2$).[5]

These figures highlight that methane emissions in Nigeria are not only a climate burden but also a large, though forfeited, economic resource.

Co-benefits: environment, health, public welfare and energy access

Beyond climate mitigation, reducing methane emissions yields significant ancillary benefits:

- According to the United Nations Environment Programme (UNEP), methane is responsible for about a third of current global warming and contributes to ground-level ozone pollution, which drives premature deaths, worsens respiratory diseases, undermines crop yields and harms ecosystems.
- For Nigeria, reducing methane (and associated ozone or air pollution) could significantly improve public health outcomes, especially in the oil and gas host

communities that are vulnerable to flaring and leaks. This would lower healthcare burdens, improve lifespans and enhance the quality of life.

- Captured methane can be redirected into energy uses such as power generation, mini-grids, compressed natural gas (CNG) or micro-LNG for transport or industry, and gas-based industrial or digital economy applications. This would improve energy access, fuel economic activity and create jobs.

COP30 context: why this strategy matters now

The global environment following the 2025 United Nations Climate Change Conference (COP30) underscores methane as the fastest, most cost-effective lever for near-term climate mitigation. Flaring and fossil-gas methane are focal sectors for abatement efforts. Global frameworks now push for mandatory measurement, reporting and verification (MRV), elimination of routine flaring[6] and investment in methane capture and utilisation. Recent global reports (e.g., from the Global Flaring and Methane Reduction Partnership) emphasise that gas currently wasted via flaring could – if captured – support power generation or fuel supply in countries where energy access remains limited.

The global environment following COP30 underscores methane as the fastest, most cost-effective lever for near-term climate mitigation

For Nigeria, this global momentum translates into opportunity: methane no longer needs to be viewed solely as a liability. Rather, it is a strategic commodity whose conversion into productive use aligns climate commitments with energy security and economic development.

The commodification of methane: a strategic opportunity

Nigeria's adoption of a comprehensive methane mitigation and reduction plan would unlock multiple value streams:

1. **Revenue recovery:** Redirect flared or vented gas into saleable products (pipeline gas, CNG and micro-LNG, gas-to-power).
2. **Energy access and industrial growth:** Provide gas for power generation, small-scale industry, transport and domestic use – improving energy access and fuelling economic activity.
3. **Environmental and health gains:** Reduce GHG emissions, lower local air pollution, improve public health outcomes and reduce environmental damage.
4. **Job creation and economic development:** Build new industries around gas processing, distribution, utilisation and maintenance – creating skilled jobs and supporting local economies.

5. **Access to climate finance and carbon credits:** With robust MRV, methane reductions can be quantified, verified and potentially monetised via carbon markets or dedicated methane or climate funds, attracting investment and international support.

The idea of commodifying methane by capturing, processing and converting it into energy and digital economy applications provides a practical, mitigation-first pathway to cut emissions while generating measurable economic value. If Nigeria captures and commercialises at least 50% of the methane that is currently wasted across oil and gas systems, the country could unlock an estimated USD 1.5–2 billion in annual value. This would come through power generation, CNG or micro-LNG solutions, petrochemical feedstocks and high-performance computing applications such as artificial intelligence and machine learning workloads, data centres and Bitcoin mining. Such a strategy could also stimulate 50,000–80,000 specialised technical jobs and broaden fiscal revenues.

Critically, methane commodification is *not* an incentive for further upstream oil and gas development. It is a climate-aligned, near-term mitigation measure focused on capturing methane that is already being emitted or vented from existing and legacy infrastructure. The conversion of unavoidable emissions into productive uses makes the strategy the strategy apt for reducing the climate intensity of current operations without justifying new emissions-intensive projects. This distinction is essential to ensure alignment with international climate commitments, sustain credibility with global climate finance partners and prevent misinterpretation that could imply fossil fuel lock-in.

Governance challenges and the need for institutional reform

A key barrier to realising these opportunities is Nigeria's fragmented regulatory and institutional landscape. Upstream oversight, downstream regulation, environmental compliance, fiscal and revenue collection, and climate policy coordination are spread across multiple agencies. Without coordination and clear responsibilities, methane capture and utilisation projects struggle to attract investment, deliver compliance or scale up. Establishing a unified governance framework with clearly defined mandates, data-driven enforcement (via MRV) and streamlined commercialisation pathways is therefore essential. This can be achieved through a comprehensive structural review of the Petroleum Industry Act (PIA) and integrating the National Oil Spill Detection and Response Agency (NOSDRA) into the PIA framework towards achieving coherent regulatory efficiency that is galvanised with routine roundtable stakeholder engagements.

Programme design: a phased methane reduction and commercialisation strategy

The following is proposed with timelines:

- **Short term (2026):** Deploy MRV systems (satellite and ground-based), pilot the capture and utilisation of flared or vented gas at selected sites, begin regulatory reforms and strengthen enforcement.

- **Medium term (2027–2029):** Scale up gas-to-power and gas-to-use projects (CNG and micro-LNG), roll out infrastructure for distribution and utilisation, expand monitoring and begin carbon credit enabling processes.
- **Long term (2030–2033 and beyond):** Phase out routine flaring and venting, remediate abandoned wells, integrate methane-based gas supply into broader national energy plans, and institutionalise methane management as a mainstream component of oil and gas governance.

This strategy aligns with the global momentum on methane reduction following COP30, positioning Nigeria to attract climate finance flows while delivering domestic economic, energy and social benefits. Nigeria can accelerate a high-impact climate mitigation pathway by prioritising methane capture from both existing and legacy emissions. This strategy not only reduces a potent greenhouse gas but also strengthens national energy security and supports broad-based, inclusive economic growth.

Furthermore, Nigeria's methane-abatement potential is reinforced by well-established cost curves showing that a significant share of reductions can be achieved at low or even negative cost. Measures such as systematic leak detection and repair (LDAR), replacement of high-bleed pneumatic devices and flare gas recovery initiatives consistently rank among the most cost-effective mitigation options worldwide. For Nigeria, these interventions offer immediate, technically feasible opportunities to cut emissions and simultaneously generate commercial value from recovered gas. Prioritising these low-cost actions in the short to medium term will strengthen the economic justification for rapid implementation and mobilise the political will as well as the financing needed for scaled deployment.

Key recommendations

- Establish a Methane Governance Council to harmonise roles among regulatory, environmental, fiscal and climate agencies.
- Deploy robust MRV architecture (satellite and ground-based, with independent verification) to enable transparent measurement, reporting, compliance and carbon credit eligibility.
- Promote the commercialisation of captured methane through incentives for gas-to-power, CNG and micro-LNG, and industrial and digital uses.
- Link methane reduction and utilisation targets to national commitments (Nationally Determined Contribution or short-lived climate pollutant frameworks), with clear institutional responsibilities and realistic timelines.
- Prioritise the development of bankable methane capture and utilisation projects to attract climate finance, private investment and public–private partnerships.
- Frame methane as not simply a pollutant but also a long-term strategic resource for energy security, economic growth and a just energy transition – elevating Nigeria as a leading example in methane management in Africa.

1. Introduction and background

Methane (CH_4) is one of the most potent greenhouse gases (GHGs), with a global warming potential (GWP) that is approximately **80 times greater than carbon dioxide's (CO_2) over a 20-year horizon.**[7, 8] It is responsible for a significant share of short-term global warming and is increasingly recognised by the International Energy Agency (IEA)[9] and the United Nations Environment Programme (UNEP)[10] as a priority pollutant for decisive climate action.

According to the Africa Policy Research Institute's (APRI) 2024 *Methane mitigation and reduction mapping report in Nigeria's oil and gas sector*, the sector recorded an estimated **439.8 kilotonnes of methane emissions ($ktCH_4$)**[11] in 2010 – among the highest in Africa. This reflects Nigeria's position as Africa's largest oil producer, consistently outpacing other regional producers such as Libya and Algeria in crude output[12] (the country also ranks among the top natural gas producers globally).[13] The figure also reflects Nigeria's methane emissions from persistent gas flaring, venting and widespread fugitive leakages across upstream, midstream and downstream oil and gas activities. Roughly **27%** of these emissions originate from crude oil production, while **73%** arise from natural gas production, processing, transmission and distribution.[14] These figures place Nigeria among the top emitters of methane-intensive petroleum economies globally.[15]

Despite the scale of the challenge, methane emissions have historically received less regulatory attention than carbon dioxide

Despite the scale of the challenge, methane emissions have historically received less regulatory attention than carbon dioxide. Over more than four decades, Nigeria has introduced policies intended to curb gas flaring and methane releases – from the **Associated Gas Re-Injection Act (1979)** to the **National Gas Master Plan (2008)** to the more comprehensive **Petroleum Industry Act (2021).**[16] In parallel, the country has broadened its climate commitments through the Paris Agreement for climate change, the **Global Methane Pledge (2021)**, the **Climate Change Act (2021)**[17] and the recently updated third version of its Nationally Determined Contribution (**NDC 3.0**), which targets up to **47% emissions reduction by 2030** (conditional).

Yet implementation remains inconsistent. Routine flaring continues, venting is poorly controlled, methane leaks are under-reported and abandoned oil wells remain unmapped

or unremedied. Meeting these targets and addressing the methane burden requires a political economy–based understanding of the institutional, market and governance constraints that have slowed progress. Ultimately, methane mitigation should be mainstreamed as both a climate obligation and a national development opportunity.

APRI's Methane Mitigation and Reduction Project (MMRP) illuminates methane governance gaps, quantifies emission sources and articulates methane's commercialisation potential. APRI's 2024 mapping report[18] revealed systemic deficits in methane measurement, reporting and verification (MRV) and institutional coordination. Complementing this, the institute's short analysis[19] showed the untapped socioeconomic benefits of treating methane not as waste but as a **commodity**, one that can be captured, processed and channelled into productive uses such as gas-to-power, mini-grid, compressed natural gas (CNG) or micro-liquified natural gas (micro-LNG) and digital energy applications.

Case study insights from MMRP field work: local impact and needs

Findings from MMRP field missions in the **Bayelsa and Rivers states**, as well as site observations across selected upstream installations, reinforce Nigeria's methane challenge as deeply **local, community-facing and structurally rooted**:

- **Communities adjacent to flare stacks** reported chronic heat stress, soot deposition, crop damage and respiratory symptoms – effects that are consistent with the co-pollutants emitted alongside methane.
- **Artisanal refining zones** exhibited methane-rich venting from crude handling, unregulated burning and degraded sediments, pointing to non-industrial but significant methane sources.
- **Abandoned and inactive well clusters**, especially in the Niger Delta, were found to emit gas intermittently, with no structured monitoring or remediation plan.
- Operators acknowledged **measurement gaps**, noting that older facilities lack real-time leak detection systems, resulting in routine venting during pressure regulation, pigging and maintenance.
- **Community leaders identified lost electrification and economic opportunities**, linking gas wastage to persistent energy poverty despite proximity to major gas-producing assets.
- Regulators at state and federal levels highlighted **institutional overlap**, limited enforcement power and inconsistent access to site-level operational data.

These field insights underscore that methane mitigation is not only a technical problem – but it is also a **governance, equity and development imperative**. Local realities make clear that reducing methane will directly improve public health, enhance environmental conditions, create jobs and expand community benefits in oil-bearing areas.

1.1 Magnitude of Nigeria's methane losses

Nigeria's methane emissions reflect both a climate risk and a massive economic loss, with quantifiable gas volumes wasted annually through flaring, venting, leakage and abandoned infrastructure.

I. **Flaring (resource loss and methane slip)**

According to the World Bank's Global Gas Flaring Reduction (GGFR) Partnership,[20] Nigeria flared:

- **~7.4 billion cubic metres (bcm) of gas** in 2023 alone
- Equivalent market value: **USD 600–700 million** (depending on domestic gas price benchmarks)
- Associated methane 'slip' (unburnt CH_4 in flare stacks): **2–3%** of total flared gas, translating to:
  - **148–222 million cubic metres (mcm) (~130–190 kilotonnes (kt)) of CH_4** annually

II. **Venting (deliberate operational releases)**

Nigeria ranks among the top 10 countries for venting-related methane emissions globally. This overview is derived from the IEA's Methane Tracker Database (2024), which provides detailed, country-level methane emissions by source segment (venting, flaring, incomplete combustion, fugitive emissions) in Nigeria's oil and gas operations annually.[21]

III. **Fugitive leaks (pipelines, flowlines, processing facilities)**

Major leak hotspots include ageing manifolds, marginal field facilities, compressor stations and trunklines. The IEA estimates an additional:

- **~70–90 ktCH_4 lost** through fugitive leaks

IV. **Abandoned and orphaned wells[22] (unmonitored long-term emissions)**

Studies (UNEP, GGFR, EnergyPathways and field observations) indicate:

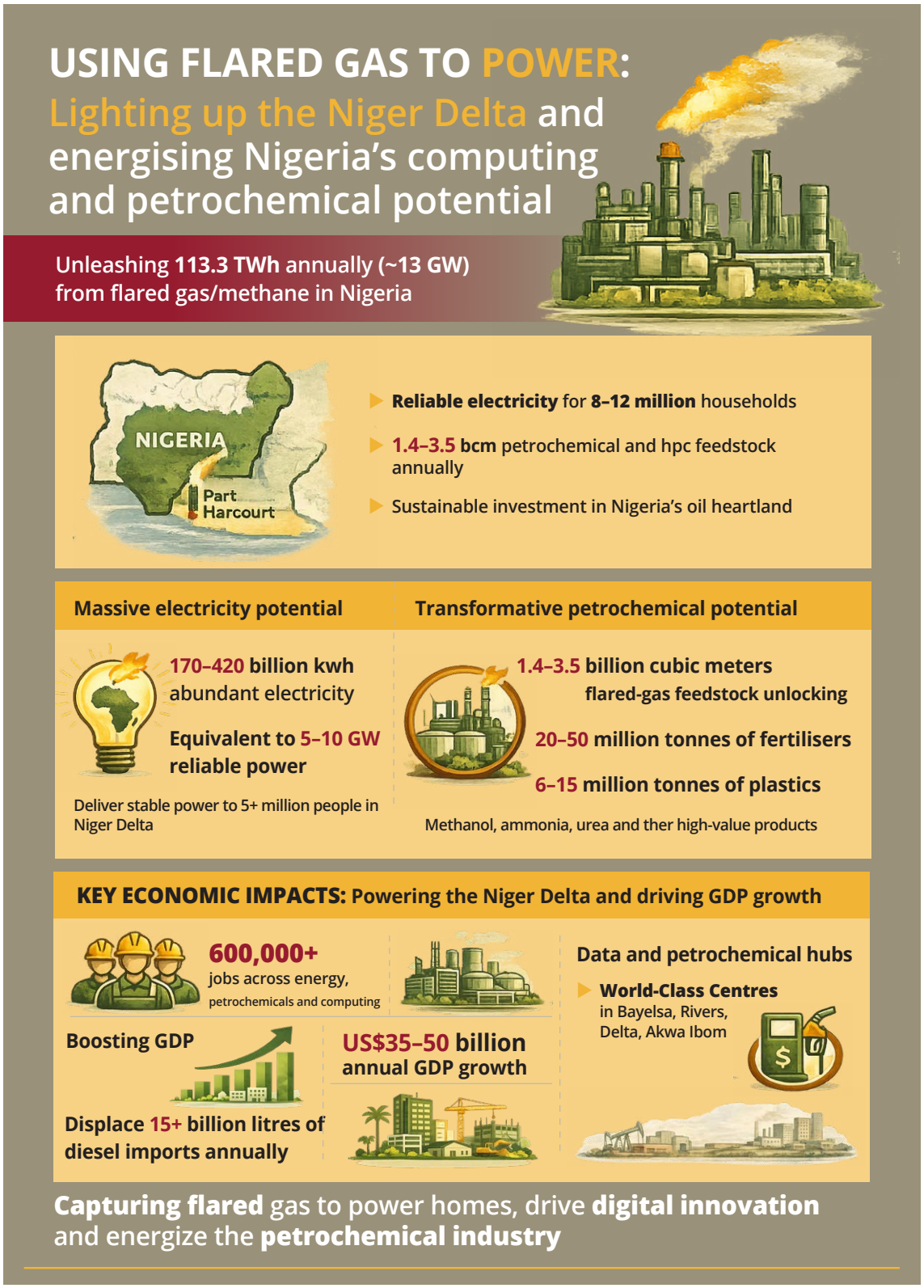
- Nigeria has **over 900 inactive, suspended or abandoned wells**, many of which are undocumented
- Estimated methane leakage: **10–25 ktCH_4 annually**, based on comparative basin analysis (United States Environmental Protection Agency and Alberta Energy Regulator methodologies)

V. **Total estimated methane losses in Nigeria**

When integrated:

- Total oil and gas methane emissions: **~440 ktCH_4 per year**[23]
- Equivalent market value (if captured): **0.44 million tonnes (Mt) of CH_4 ≈ 12.3 bcm of natural gas**, valued at **USD 1.1–1.5 billion annually**
- Climate impact (20-year GWP**): 440 ktCH_4 ≈ 37 million metric tonnes of carbon dioxide ($MtCO_2$)**, greater than the entire annual emissions of several African countries

Figure 1
Analysis of NGFT power generation potential from flared gas and methane over four years



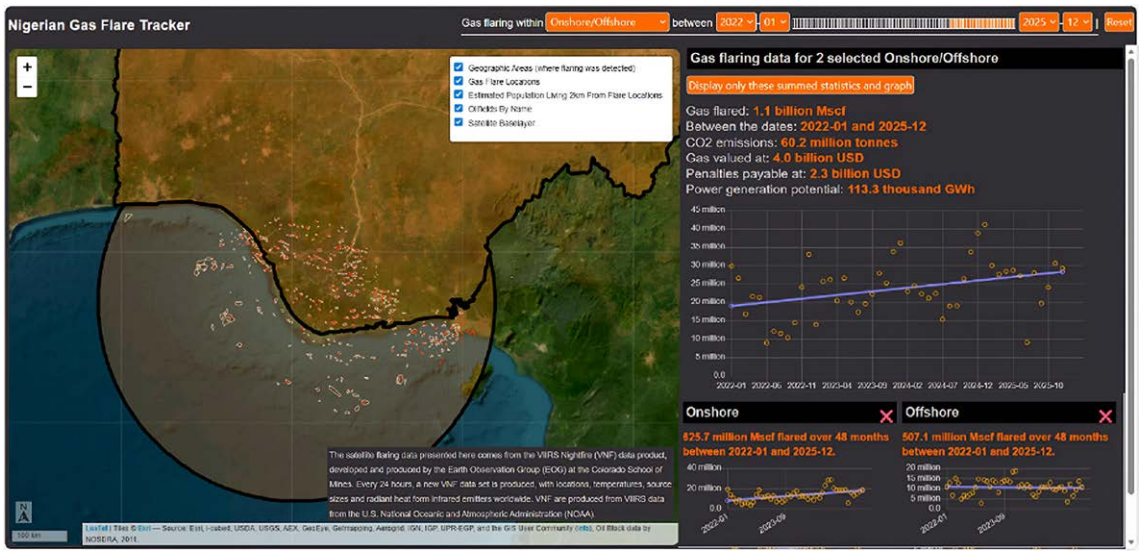
*Source: Information drawn from **Nigerian Flare Tracker**, redrawn by COMPRESS.dsl*

VI. Data from the Nigerian Gas Flare Tracker (NGFT), 2022–2025[24]

- **1.1 billion million standard cubic feet (MMscf)** flared over four years (2022–2025)
- CO_2 emissions: **60.2 Mt**
- CH_4 emissions: **21.8 Mt**
- Gas value: **USD 4.0 billion**
- Daily methane-rich emissions of **20–22 MMscf** from high-volume flaring clusters (Delta, Bayelsa, Rivers, Akwa Ibom)
- Site-level evidence of **flare malfunction, cold-venting, incomplete combustion** and chronic leak signatures detected from satellite overlays
- **Power generation potential:** 113.3 terawatt-hours (TWh), representing ~13 gigawatts (GW) of firm industrial power, which is more than twice of Nigeria's current grid output. This level of supply would fundamentally transform energy security, unlock large-scale industrialisation, displace billions of dollars in diesel imports, and deliver multi-billion-dollar productivity gains across manufacturing, services and digital sectors (Figure 1)

The NGFT confirms that Nigeria's methane losses are **spatially concentrated**, making flaring and methane emissions technically avoidable and economically convertible for societal benefits (Figure 2).

Figure 2
NGFT spatial concentration of gas flare and methane emissions sources



Source: ***Nigerian Flare Tracker***

1.2 Political economy analysis of the petroleum sector's methane mitigation and reduction (MMR)

This section leverages APRI's report *Clearing the air: Methane mitigation and reduction strategies in Nigeria's oil and gas sector* and complementary statutes, guidelines and institutional sources to examine the incentives, power dynamics and feasible pathways for reform and coordinated action.

Methane mitigation offers dual benefits: reducing the climate tsunami while unlocking a broad range of economic opportunities. APRI's *Clearing the air report*, launched in August 2025, underscores that harmonising Nigeria's methane governance is essential to catalyse action in a multi-regulatory environment. Key challenges include overlapping mandates, weak enforcement capacity and a lack of coherent coordination between agencies.

1.3 Imperative of a harmonised MMR governance structure in Nigeria's oil and gas sector

A. Problem framing

Methane abatement in Nigeria's petroleum sector is a high-impact, near-term climate lever with material co-benefits for health, revenues and energy security.[25] However, authority is split across:

- Upstream activities – through the Nigerian Upstream Petroleum Regulatory Commission (NUPRC)
- Midstream and downstream activities – through the Nigerian Midstream and Downstream Petroleum Regulatory Authority (NMDPRA)
- Environmental protection and response across upstream, midstream and downstream activities – through the National Oil Spill Detection and Response Agency (NOSDRA)
- Whole-economy climate steering – through the National Council on Climate Change (NCCC)
- National commercial operation – through the Nigerian National Petroleum Company Limited (NNPCL)
- Revenue administration – through the Nigeria Revenue Service (NRS)

Overlaps and gaps in the PIA 2021, the Climate Change Act (CCA) 2021 and the NOSDRA Act 2006 dilute accountability and slow enforcement.

1.3.1 Political economy drivers

- **Rents and revenues:** Operators and the government face trade-offs between short-term production targets and investments in leak detection and repair (LDAR), pneumatics retrofits and gas capture. Clear penalties, tax treatment and offtake certainty shift incentives towards abatement.[26, 27]

- **Information asymmetry:** Weak MRV and fragmented data systems create scope for under-reporting and regulatory forbearance. Digitised, shared data alters bargaining power and enables credible enforcement.[28, 29]
- **International pressure:** Access to export markets, climate finance and corporate capital now depends on transparent methane performance.[30, 31, 32]

1.3.2 Harmonising governance mechanisms and mandates

- **NUPRC (upstream regulator):** Set and enforce methane standards (LDAR frequency, instrumented pneumatics, venting prohibition, CWT/CDP for flares); approve flare gas commercialisation plans; require project-level MRV and public reporting.
- **NMDPRA (mid- and downstream):** Licence gathering, processing and transmission infrastructure; mandate interconnection and minimum specifications for captured gas; remove bottlenecks to grid or mini-grid and CNG or liquified natural gas (LNG) offtake.
- **NOSDRA (environmental protection and response):** Upgrade the Nigerian Gas Flare Tracker (NGFT) and host the **Nigerian Methane Emissions Tracker** to support investment grade data in high-performance computing (HPC) and artificial intelligence (AI), machine learning (ML), CNG and mini-grids. Lead environmental penalties on spill, flare and emission incident response.
- **NCCC (whole economy):** According to the CCA 2021, section **19 (1)** sets methane sub-targets within a five-year carbon budget. This aligns sectoral plans and recommends publishing an annual methane accountability report.
- **NNPCL (state-owned enterprise or commercial):** De-risk brownfield capture via joint ventures (JVs) and special purpose vehicles (SPVs); offtake anchor for power-to-load use cases (HPC and AI, ML, CNG, mini-grids); disclose JV methane key performance indicators (KPIs).
- **NRS (revenue administration):** Automate penalty assessment or collection using tracker data; offer targeted tax credits or accelerated capital allowances for abatement projects.

A harmonised governance framework should delineate complementary rather than overlapping mandates: the NUPRC and the NMDPRA focus on technical and operational regulation, NOSDRA on environmental oversight, the NCCC on climate policy integration, the NNPCL on operational leadership and the NRS on revenue collection assurance. This requires legal clarity, inter-agency agreements and a multi-stakeholder methane taskforce to prevent regulatory fragmentation. The table below provides a harmonisation pathway.

Table 1
Institutional role harmonisation for MMR in the oil and gas sector

Institution	Current mandate	Harmonised role in methane mitigation	Coordination interface
Department of Climate Change, Federal Ministry of Environment (DCC-FMEnv)	National climate policy leadership NDC coordination Short-lived climate pollutants (SLCPs) (through the Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants, CCAC) National GHG inventory oversight	Set periodic carbon budgets and methane sub-targets Integrate oil and gas methane into the NDC, the SLCP Action Plan and international reporting Coordinate data quality improvements for national inventories Provide policy coherence across regulators	NUPRC NMDPRA NOSDRA NCCC NRS DCC- FMEnv and CCAC Secretariat
Nigerian Upstream Petroleum Regulatory Commission (NUPRC)	Upstream petroleum regulation[33]	Enforce methane monitoring and reporting standards for producers	NOSDRA NMDPRA
Nigerian Midstream and Downstream Petroleum Regulatory Authority (NMDPRA)	Midstream and downstream regulation	Oversee gas utilisation and infrastructure for captured methane	NUPRC NOSDRA NNPCL
National Oil Spill Detection and Response Agency (NOSDRA)	Environmental compliance	Operate national flare and methane incident responses and data	NUPRC NCCC NMDPRA
National Council on Climate Change (NCCC)	Climate policy	Integrate methane into NDC and SLCP reporting	NOSDRA NRS
Nigerian National Petroleum Company Limited (NNPCL)	National oil company	Promote commercialisation of captured methane via JV, CNG and LNG initiatives backed by regulators	NUPRC NMDPRA NOSDRA
Nigeria Revenue Service (NRS)	Tax and revenue	Collect penalties, methane levies and carbon-related revenues	All regulators

Soure: compiled by author (2026)

B. Coordination mechanism

Establish a **Methane Governance Steering Committee** chaired by the NCCC, with the NUPRC, NMDPRA, NOSDRA, NNPCL and NRS as core members. Key deliverables include: (i) a common MRV protocol; (ii) a unified methane compliance dashboard; (iii) a national pipeline of methane commodification and commercialisation projects; and (iv) an annual public performance scorecard.

Given that Nigeria's well-known bureaucratic bottlenecks are likely to hinder reforms in the oil and gas sector, it is important to define a clear and efficient legal basis for this coordination mechanism. The steering committee can be operationalised without creating new institutions by leveraging existing statutory mandates under the CCA 2021 and the PIA 2021. The most practical and low-friction pathway is for the president, through the NCCC, to issue a concise executive directive invoking the NCCC's coordinating authority under the CCA while recognising the regulatory powers of the NUPRC and NMDPRA under the PIA and NOSDRA's Act of 2006. This avoids the delays associated with drafting new regulations or legislation, reduces ambiguity for implementing agencies and provides a legally sound coordination framework that can be activated immediately.

This 'smart legal pathway' ensures that the steering committee is formally recognised, empowered and inter-agency compliant, while preserving speed and enforceability. This is critical for MMR, where timeliness and clarity materially affect investment decisions and climate finance eligibility.

Table 2
Stakeholder power–interest map

Stakeholder	Interest in abatement	Relative power	Levers to align incentives
DCC-FMEnv	High	High	Policy coherence across regulators
NUPRC	High	High	Tightened or sequenced regulations Transparent MRV Credible penalties and compliance assistance
NMDPRA	High	Medium–high	Fast-tracked midstream permits Tariff frameworks to enable gas gathering or processing
NOSDRA	High	Medium	Data transparency Environmental penalties Integration with MRV
NCCC	High	High	Carbon budgets (DCC-FMEnv) ross-government coordination Donor alignment
NNPCL	Medium–high	High	JV retrofits SPVs for flare-to-power and CNG uses Disclosure norms
NRS	Medium	Medium	e-Invoicing of penalties Fiscal incentives Leakages closed
International oil companies (IOCs) and independents	Mixed	High	Compliance clarity Project finance Offtake certainty
States and communities	High	Medium	Benefit-sharing Jobs Health co-benefits Social licence

Source: from Mahmoud (2025)[34]

2. Methodology and case studies

2.1 Methodological approach

The MMRP's C*learing the air* report used a **mixed-methods, multi-stakeholder research design** combining qualitative and quantitative analyses. The structure is described in five major steps:

1. **Policy and regulatory review (desk-based analysis):** The study began with a comprehensive review of national and international policy and regulatory frameworks governing methane emissions in Nigeria's oil and gas sector, including flaring and venting provisions, environmental regulations, climate change commitments and broader petroleum sector legislation. This analysis was complemented by a systematic comparison with global standards and emerging best practices to assess the extent of alignment, identify regulatory gaps and evaluate Nigeria's coherence with international methane mitigation commitments.
2. **Stakeholder mapping and consultations:** The study identified and engaged a broad spectrum of stakeholders to ensure comprehensive insights into methane mitigation dynamics. Stakeholders included government agencies, oil and gas companies, civil society groups, local community representatives, research institutions and international partners. Through structured consultations and a national stakeholder validation workshop, these actors provided critical perspectives on the regulatory performance, operational practices, existing barriers, emerging opportunities and community-level impacts associated with methane emissions and abatement efforts.
3. **Field visits and empirical observation:** The research incorporated on-the-ground field visits to oil-producing states and selected oil and gas infrastructure sites across Nigerian south–south geopolitical zones – including the Bayelsa, Rivers and Cross River states – to directly observe operational realities, flaring and venting practices, and associated community impacts. These visits enabled the collection of qualitative evidence through community interviews, site-level observations and available operational data, providing essential ground-truthing of emissions sources, compliance behaviour and the lived experiences of affected communities.
4. **Quantitative data collection and comparative analysis:** The study aggregated methane emissions estimates from national inventories, published research and publicly accessible databases to approximate the overall sectoral methane burden that is attributable to Nigeria's oil and gas industry. These estimates were subsequently benchmarked against global best practices and internationally

recognised mitigation standards, enabling an assessment of Nigeria's relative performance, existing gaps and opportunities for aligning national actions with leading global methane reduction trajectories.

5. **Synthesis and gap analysis:** The study synthesised findings across regulatory, technical, institutional, financial and social dimensions to identify systemic gaps, operational barriers and opportunities for methane mitigation in Nigeria's oil and gas sector. Based on this integrated analysis, strategic recommendations were developed encompassing regulatory reforms, robust data and MRV system designs, commercialisation pathways for captured methane, financing strategies, and frameworks for enhanced stakeholder engagement.

2.2 Case studies and illustrative examples

The methodology supports multiple case studies and illustrative examples. These serve to contextualise methane emissions and mitigation potential in real operational, regulatory and community settings. The key characteristics of these case studies are:

- **Regulatory performance case studies:** Review of specific upstream and midstream operations to assess the implementation (or the lack thereof) of existing regulations (e.g., flaring reduction programmes, compliance with environmental laws). The aim is to highlight enforcement gaps, institutional overlap and regulatory incoherence.
- **Technology deployment and mitigation potential:** Identification of existing or potential deployment of methane control technologies (e.g., flare gas recovery, LDAR, vapour recovery from storage tanks) and evaluation of their applicability in the Nigerian context.
- **Socioeconomic and environmental impact studies – host communities:** Through field visits and stakeholder consultations, the report draws on community-level evidence (from oil-producing states) to illustrate the environmental, health and livelihood impact of flaring, venting, leaks and under-regulated operations. This supports the argument that methane mitigation is not only a climate priority but also a social justice, public health and development imperative.
- **Financial and governance landscape analysis:** As part of the mapping exercise, the report analyses the financing gaps, regulatory fragmentation, institutional overlaps and challenges in mobilising investment for methane reduction – using case study data from Nigeria's regulatory and industry context.

3. Highlighting the importance of data-centric regulatory enforcement and the methane emissions lifecycle

Accurate, transparent and verifiable data is the backbone of effective methane regulation and a prerequisite for transforming emissions from an environmental liability into an economic resource. Nigeria has demonstrated early leadership through the **Nigerian Gas Flare Tracker (NGFT)**, which was developed by NOSDRA with support from the UK's Foreign, Commonwealth & Development Office (FCDO, formally the Department for International Development (DFID)). The NGFT provides near-real-time satellite monitoring of flaring activities. Building on this success, the NGFT should be expanded to compute emission quantities in flares. The development of a standalone **Nigerian Methane Emissions Tracker (NMET)**, currently at the prototype stage, will allow regulators to move beyond modelled estimates and enforce compliance using empirical, site-specific data.

This **data-centric enforcement model** addresses Nigeria's credibility gap in emissions reporting. It also enables a shift from voluntary compliance to **mandatory, evidence-driven enforcement** aligned with Nigeria's NDCs, SLCP goals and global climate pledges. Nigeria can strengthen its regulatory frameworks by integrating the NGFT and NMET directly into compliance processes, ensuring methane emissions are not only accurately measured and reduced but also transformed into economic value.

3.1 Institutional roles in data-driven enforcement

- **NUPRC and NMDPRA:** Integrate NGFT and NMET outputs into operational oversight to monitor site-level emissions, enforce penalties and incentivise the adoption of methane capture and utilisation technologies.
- **NOSDRA:** Apply verified emissions data to strengthen environmental enforcement, underpin transparent reporting and engage communities on environmental accountability.
- **NCCC:** Mainstream methane tracking into Nigeria's national GHG inventories, ensuring consistency with NDC reporting obligations under the Paris Agreement for climate change.
- **NNPCL:** Use emissions intelligence to optimise operations, reduce system inefficiencies and demonstrate leadership among IOC JVs.
- **NRS:** Link verified methane and flare data to fiscal systems for the improved collection of penalties and potential methane commodification revenues.

3.2 Benefits of integrated MRV systems

- Enable near-real-time enforcement of flare penalties and corrective actions. Integrated MRV systems allow regulators to move from simple monitoring to enforceable compliance by linking high-resolution emissions data to predefined action thresholds. For example, once emissions exceed set limits, the system can automatically trigger mandatory operator responses such as leak repair within 7–14 days, flare-system diagnostics within 48–72 hours or an immediate shutdown of high-risk equipment. Embedding these thresholds and response timelines within the MRV framework signals regulatory seriousness, improves predictability for operators and ensures that penalties or mandated repairs activate quickly based on objective data rather than delayed inspections.
- Provide credible data for climate reporting under the United Nations Framework Convention on Climate Change's (UNFCCC) transparency framework.
- Strengthen investor and market confidence in Nigeria's operational and environmental sustainability, transparency, accountability and governance.

3.3 Methane lifecycle: from emissions to commodification

A robust regulatory approach must frame methane as not only a climate pollutant but also a resource with commercial and developmental value. The methane lifecycle model illustrates the pathway from harmful emissions to productive utilisation:

- **Emissions:** Methane released through flaring, venting and fugitive leaks in upstream, midstream and downstream operations.
- **Capture:** Deployment of monitoring, detection and abatement technologies (e.g., LDAR, vapour recovery units, CNG and micro-LNG, and satellite and drone remote sensing technologies for tracking, measuring, monitoring and quantification).
- **Commodification:** Harnessing captured methane for economic use, such as:
  - **Electricity generation** for local communities and industrial clusters.
  - **HPC**, **AI and ML applications** such as Bitcoin mining and big data processing, which represent innovative end-uses for captured methane. However, in the methane commodification lifecycle, power generation and local energy access solutions for underserved and host communities should be explicitly prioritised before allocating gas-flare-generated power to discretionary digital economy loads. This sequencing ensures that methane utilisation supports development gains, improves political acceptability and aligns with Nigeria's broader equity, inclusion and just transition objectives, while still enabling high-value digital applications once foundational energy needs have been met.
  - **Gas-to-transport solutions** including CNG or micro-LNG for vehicles.
  - **Integration into carbon markets** via methane abatement credits.

This lifecycle approach reframes methane, long regarded as an uncontrolled pollutant, as a **climate-smart commodity**, aligning Nigeria with its energy transition goals and simultaneously tapping into global methane finance and carbon markets.

4. Continuous review and extension of NDC targets and SLCP goals

The second version of Nigeria's Nationally Determined Contribution (**NDC 2.0**) pledges a **47% reduction in GHG emissions by 2030**, conditional on international support.[35] Although laudable, this timeline does not adequately reflect the methane-specific challenge: sectoral targets remain underdeveloped, institutional capacities are uneven and regulatory agencies still face coordination and financing gaps. A political economy perspective underscores that ambition must be matched with capability. To close this gap, Nigeria should review and recalibrate its methane-related NDC 3.0 and SLCP goals, setting explicit methane abatement milestones that are grounded in the mandates and resources of key institutions: the NUPRC, NMDPRA, NOSDRA, NCCC, NNPCL and NRS.

A pragmatic strategy is to adopt a phased NDC and SLCP roadmap extending to 2033–2035 (Table 3), with clearly sequenced short-, medium- and long-term tasks. Such a roadmap would synchronise regulatory reforms, infrastructure investments and market-ready methane capture technologies with realistic fiscal and governance timelines. Nigeria can reinforce its climate commitments by setting clear intermediate milestones such as sector-specific methane-reduction targets for 2027 and 2032 to preserve international credibility while ensuring that mitigation actions remain practical, enforceable, and properly funded. This transforms high-level pledges into concrete, measurable progress in the medium and long term.

Table 3
Proposed NDC and SLCP tasking by institution (short, medium and long term)

Timeline	NUPRC	NMDPRA	NOSDRA	NCCC	NNPCL	NRS
Short term (2026)	Mandate methane reporting by operators	Develop midstream methane evacuation plans	Expand flare tracker capacity	Integrate methane into NDC inventory	Pilot flare-to-power JVs	Collect penalties
Medium term (2027–2032)	Enforce zero routine flaring	Certify gas-to-power projects	Operate a methane registry	Publish annual methane reports	Scale CNG and LNG programmes	Levy methane fees
Long term (2033–2035)	Achieve 80% methane reduction	Mainstream methane into downstream pricing	Lead national MRV audits	Align the NDC with SLCP goals	Achieve 70% flare-to-market utilisation	Administer methane carbon market

Soure: compiled by author (2026)

5. Policy implications

Nigeria's determination to ramp up oil and gas production while positioning natural gas as the nation's 'transition fuel' under its **Decade of Gas initiative** presents both a challenge and an opportunity for methane mitigation. Expanding gas infrastructure pipelines, processing plants and compression and liquefaction facilities are essential to capture and commodify methane that would otherwise be flared or vented. Nigeria can turn methane its once treated as a wasted by product into a valuable economic resource by integrating methane recovery into its expanding gas infrastructure. This approach enables the country to generate power for both grid and off-grid systems, strengthen mini-grid operations, and provide a dependable fuel source for high-performance computing, AI workloads, and the emerging micro-LNG market. From a political economy perspective, this approach **aligns climate action with national development**, reduces fiscal exposure to volatile oil prices and positions Nigeria as a competitive, lower-carbon energy hub in the global economy.

By integrating methane recovery into the expansion of gas infrastructure, Nigeria can convert a historically wasted by-product into a strategic economic asset

- **Institutional coherence:** Streamlining mandates and clarifying complementary roles across the NUPRC, NOSDRA, NMDPRA, NCCC, NNPCL and NRS will prevent duplication, reduce regulatory uncertainty and foster coordinated methane governance. In addition, the PIA is currently undergoing comprehensive operational structural review – largely due to regulatory lacunae, institutional incoherence in environmental oversight (including the constrained mandate of NOSDRA) and statutory contradictions that have reportedly stalled the operationalisation of nearly 70% of its provisions. Given this, the reform process is both timely and necessary to advance institutional coherence. Moreso, the persistent reliance on executive orders as temporary corrective instruments underscores deeper structural misalignments within the PIA's implementation architecture. Accordingly, formally integrating NOSDRA into the PIA framework would enhance regulatory coherence, clarify environmental oversight

responsibilities and strengthen inter-agency collaboration. This alignment is essential to delivering holistic and effective petroleum sector governance across technical, commercial and environmental dimensions.

- **Fiscal and commercial opportunities:** Commodifying methane creates diversified revenue streams, strengthens energy security and enhances Nigeria's bargaining power in international carbon markets while lowering domestic climate risks.
- **Data governance:** Institutionalising methane MRV through robust trackers and transparent data-sharing protocols will enable evidence-based enforcement and bolster investor confidence.
- **International partnerships:** Extending and sequencing NDC timelines must be paired with resource mobilisation through donor funding, climate finance facilities, private investment and multilateral cooperation to secure technology transfer and long-term capital.

Coupling these policy measures with decisive infrastructure investments and a coherent regulatory framework, Nigeria can leverage MMR as both an environmental imperative and a growth strategy, thereby contributing meaningfully to global climate goals while strengthening economic resilience.

6. Recommendations and next steps

Nigeria stands at a defining moment in its energy and climate trajectory. Bold action on methane can determine the nation's economic resilience and environmental legacy. MMR is no longer a peripheral climate issue; it is central to the country's aspirations for sustainable growth, energy security and global competitiveness. Building on the evidence generated by **APRI's MMRP initiative**, Nigeria has the research foundation and technical insight needed to transition from pledges to measurable outcomes.

Bold action on methane can determine Nigeria's economic resilience and environmental legacy

The next phase of this effort – **Africa's Methane Action: Mitigate, Monetise, Mobilise (AM3)** – will leverage these insights to drive integrated, actionable measures across the petroleum value chain. AM3 signals a paradigm shift: it views methane as not simply a pollutant to be curtailed but also a valuable resource to be captured, commercialised and reinvested into national development priorities. Through this initiative, APRI and its partners aim to convert data and policy analysis into transformative, on-the-ground results.

Realising these ambitions requires a **whole-of-government collaboration**, where Nigeria's key regulatory bodies including the NUPRC, NMDPRA, NOSDRA, NCCC, NNPCL and NRS work in harmony rather than in silos. AM3 will catalyse these collaborations, foster institutional coherence and ensure that each agency's mandate is complementary and non-overlapping. The outcome will be a regulatory ecosystem that is capable of driving transparent MRV and delivering credible emissions reductions.

Equally important is the alignment of MMR goals with Nigeria's broader economic and energy priorities. Under AM3, methane capture and reuse will directly support the **Decade of Gas initiative**, power HPC centres and enable innovations in AI and ML. These pathways will not only reduce GHG emissions but also open new revenue streams, create jobs and strengthen Nigeria's role as a continental leader in climate-smart energy solutions.

The recommendations that follow are designed to translate these opportunities into measurable results. Rooted in APRI's MMRP findings and scaled through AM3, they present a **cohesive national roadmap** that integrates governance reforms, market incentives and data-driven enforcement. Nigeria can convert methane from a climate risk into a powerful

economic driver by taking these actions, ultimately positioning the country as a continental and global leader in climate innovation and responsible energy transformation.

I. **Constitute a National Methane Coordination Taskforce**

- Chair: NCCC.
- Members: NUPRC, NMDPRA, NOSDRA, NNPCL, NRS, DCC-FMEnv, Ministry of Petroleum and private sector operators.
- Mandate: Harmonise technical, commercial and environmental functions, ensuring no regulatory overlap while enabling complementary roles.

II. **Empower NOSDRA as the environmental lead for the oil and gas sector's environmental surveillance monitoring and governance (including methane emissions)**

- Amend or interpret the NOSDRA Act to explicitly cover the enforcement of methane and other SLCP regulations. This will help to address persistent regulatory fragmentation under the PIA and strengthen implementation outcomes. It is recommended that NOSDRA be formally integrated into the PIA governance framework through explicit statutory recognition, defined coordination protocols and shared compliance mandates. Institutionally embedding NOSDRA within the PIA architecture would eliminate overlapping environmental oversight functions, close operational gaps in methane monitoring and enforcement, and align upstream, midstream and downstream petroleum regulation with Nigeria's climate and environmental obligations.
- Establish a **National Methane Abatement Competence Centre** within NOSDRA to coordinate monitoring, enforcement and capacity building across the oil and gas value chain.

III. **Deploy a data-centric MRV enforcement architecture**

- Integrate the **Nigerian Gas Flare Tracker (NGFT)** and the **Nigerian Methane Emissions Tracker (NMET)** into licencing, permitting and environmental, social and governance (ESG) compliance frameworks.
- Require real-time satellite and ground-sensor data reporting by operators, enabling empirical enforcement and transparent public disclosure.

IV. **Adopt a stand-alone national methane strategy and action plan**

- Define short-, medium- and long-term abatement targets that are consistent with NDC 3.0 and SLCP commitments.
- Embed clear agency responsibilities and timelines (2026–2035) with measurable KPIs.

V. **Align NDC 3.0 and SLCP timelines with infrastructure and institutional realities**

- Extend the current 2030–2031 targets where necessary to 2033–2035, sequencing tasks to match capacity, financing and technology roll-out.

VI. Mobilise finance and market incentives

- Introduce fiscal tools such as carbon pricing, green bonds and performance-based tax credits to incentivise private-sector methane capture and reuse.
- Leverage national and international finance through the Central Bank of Nigeria, the Federal Ministry of Finance, the Global Methane Pledge, the Green Climate Fund, the Global Methane Hub and multilateral development banks.

VII. Accelerate methane commodification and utilisation

- Mandate the NUPRC to promote public–private partnerships for the capture and use of methane in power generation, CNG and micro-LNG, and HPC, AI and ML applications.
- Support domestic research and development and technology incubation to drive innovation in methane-based energy solutions through a partnership between the National Methane Coordination Taskforce and the Nigerian Content Development and Monitoring Board.

These steps provide a cohesive national roadmap that links governance reforms, data-driven enforcement and commercial incentives, which turn methane from a climate liability into a driver of sustainable economic growth and a key pillar of Nigeria's energy transition.

7. Conclusion: harnessing oil and gas methane for a resilient and prosperous Nigeria

Methane, a potent GHG, has long been treated as a mere by-product of oil and gas operations. It is also, however, an undervalued economic resource – one that Nigeria's regulatory and institutional landscape has so far underexploited for a wide range of societal benefits. The country's political economy of MMR therefore embodies both the complexity of fragmented governance and the immense promise of reform-driven growth. The bold decision to harmonise the mandates of Nigeria's multi-layered regulatory system, anchored by the NUPRC, NMDPRA, NOSDRA, NCCC and other relevant institutions, means that the country can transform methane emission from a wasted liability into a developmental asset. Institutionalising data-driven enforcement, strengthening environmental oversight and recalibrating methane targets with realistic timelines will enable climate action, a just energy transition and economic development to converge in a single, coherent governance framework.

This opportunity aligns with the **Decade of Gas initiative** and offers a bold, innovative path towards clean growth, digital innovation and broader energy access. With the right policy mix, stakeholder collaboration and investment in emerging technologies such as satellite-based monitoring, HPC and ML analytics, all connected to an end-to-end hydrocarbon accounting system, Nigeria can unlock new revenue streams, generate skilled jobs and reinforce its role as an African climate-smart energy leader.

To achieve these gains, Nigeria must bridge existing gaps between technical and commercial policy implementation and environmental regulatory enforcement

To achieve these gains, Nigeria must bridge existing gaps between technical and commercial policy implementation and environmental regulatory enforcement. **Short-term priorities** include establishing a **National Methane Abatement Competence Centre** within NOSDRA, integrating real-time monitoring systems like the gas flare tracker and methane emissions tracker into licencing and compliance frameworks, and introducing targeted fiscal incentives for private-sector methane capture. **Medium-term actions** should strengthen market-based mechanisms such as carbon pricing, green bonds and public–private partnerships to scale up methane recovery and utilisation while enhancing institutional capacity for transparent MRV. **Long-term strategies** call for embedding methane management into

Nigeria's NDC 3.0, expanding infrastructure for gas gathering and distribution, and cultivating international partnerships that mobilise climate finance and knowledge transfer.

Central to resolving policy fragmentation in the petroleum sector is the deliberate cultivation of coherent institutional coordination that is anchored in an integrated regulatory architecture. Environmental integrity, commercial viability and technological innovation must be structured to reinforce – rather than undermine – one another. Embedding this principle within the ongoing PIA reform process is essential to ensuring that methane management becomes a core pillar of Nigeria's economic transformation and climate policy, rather than a peripheral compliance issue.

Accordingly, the Federal Government of Nigeria should formally institutionalise NOSDRA's environmental mandate within the PIA framework through clear statutory recognition, defined inter-agency coordination mechanisms and harmonised enforcement protocols. Doing so would correct longstanding overlaps and gaps in environmental governance, reduce reliance on ad hoc executive orders and establish a unified compliance ecosystem for methane mitigation, flaring reduction, spill response and emissions monitoring.

Thus, by transitioning from fragmented oversight to an integrated, climate-responsive petroleum governance system, Nigeria can strengthen regulatory certainty, enhance investor confidence and improve implementation coherence across technical, commercial and environmental domains. With decisive leadership, creative policy design and sustained domestic and international partnerships, methane can be repositioned from a reputational and climate liability into a strategic economic asset that advances resilience, industrial competitiveness and Nigeria's standing in the emerging low-carbon global economy.

Endnotes

1 United Nations Environment Programme. (2024, July 19). *Facts about methane.* **https://www.unep.org/explore-topics/energy/facts-about-methane**

2 Guardian Nigeria. (2025, December 12). *FG issues 42 permits to firms under gas flare commercialisation programme.* **https://guardian.ng/energy/fg-issues-42-permits-to-firms-under-gas-flare-commercialisation-programme/**

3 World Bank. (2024). *Global gas flaring tracker report 2024*. **https://www.worldbank.org/en/programs/gasflaringreduction/publication/2024-global-gas-flaring-tracker-report**

4 Natsa, R. T. (2025, June 1). *Nigeria risks losing N3.43trn to gas flaring in five years, NEITI warns.* Business Day. **https://businessday.ng/news/article/nigeria-risks-losing-n3-43trn-to-gas-flaring-in-five-years-neiti-warns/?utm**

5 Okwilagwe, O. O., & Olubusoye, O. E. (2025). Environmental economic impacts and policy pathways of gas flaring in Nigeria from 2002 to 2024. *Discover Environment, 3*, 183. **https://doi.org/10.1007/s44274-025-00332-5**

6 Reuters. (2023, July 14). *NNPC Ltd. and TotalEnergies JV to eliminate routine flaring*. Reuters News

7 United Nations Environment Programme. (2024, July 19). *Facts about methane.* **https://www.unep.org/explore-topics/energy/facts-about-methane**

8 International Energy Agency. (2021). *Methane tracker 2021.* IEA. **https://www.iea.org/reports/methane-tracker-2021**

9 International Energy Agency. (2025). *Global methane tracker 2025: Understanding methane emissions*. **https://www.iea.org/reports/global-methane-tracker-2025/understanding-methane-emissions?utm**

10 United Nations Environment Programme. (2024, July 19). *Facts about methane.* **https://www.unep.org/explore-topics/energy/facts-about-methane**

11 Mahmoud, I. M. (2024, July 31). *Methane mitigation and reduction mapping report in Nigeria's oil and gas sector.* Africa Policy Research Institute. **https://afripoli.org/methane-mitigation-and-reduction-mapping-report-in-nigerias-oil-and-gas-sector**

12 Aduloju B. (2025, May 14). *OPEC: Nigeria retained position as Africa's biggest oil producer in April*. The Cable. **https://www.thecable.ng/opec-nigeria-retained-position-as-africas-biggest-oil-producer-in-april/?utm**

13 Nigerian Upstream Petroleum Regulatory Commission. (2024, July 25). *Nigeria: Leading crude oil producer in Africa*. **https://www.nuprc.gov.ng/nigeria-leading-crude-oil-producer-in-africa/**

14 Federal Republic of Nigeria. (2018). *Nigeria's national action plan (NAP) to reduce short-lived climate pollutants (SLCPs).* Federal Ministry of Environment, Department of Climate Change. **https://www.ccacoalition.org/sites/default/files/policy-documents/nigeria-s-national-action-plan-nap-to-reduce-short-lived-climate-pollutants-slcps-.pdf**

15 Mahmoud, I. M. (2024, July 31). *Methane mitigation and reduction mapping report in Nigeria's oil and gas sector.* Africa Policy Research Institute. **https://afripoli.org/methane-mitigation-and-reduction-mapping-report-in-nigerias-oil-and-gas-sector**

16 Federal Republic of Nigeria. (2021). *Petroleum industry act (PIA)*. **https://pia.gov.ng/wp-content/uploads/2022/08/PIA-2021_compressed-1.pdf**

17 Federal Republic of Nigeria. (2021). *Climate change act (CCA).* **https://ngfrepository.org.ng:8443/jspui/bitstream/123456789/6359/1/Climate%20Change%20Act%2c%202021.pdf**

18 Mahmoud, I. M. (2024, July 31). *Methane mitigation and reduction mapping report in Nigeria's oil and gas sector.* Africa Policy Research Institute. **https://afripoli.org/methane-mitigation-and-reduction-mapping-report-in-nigerias-oil-and-gas-sector**

19 Mahmoud, I. M. (2025, February 12). *The benefits of methane mitigation and reduction in Nigeria's oil and gas sector*. Short analysis, Africa Policy Research Institute. **https://afripoli.org/the-benefits-of-methane-mitigation-and-reduction-in-nigerias-oil-and-gas-sector**

20 World Bank. (2024, June 20). *2024 global gas flaring tracker report.* **https://www.worldbank.org/en/programs/gasflaringreduction/global-flaring-data**

21 International Energy Agency. (2025). *Methane tracker database: Country and sector estimates for methane emissions (2024).* **https://www.iea.org/data-and-statistics/data-product/methane-tracker-database**

22 Itugha, O. D. (2025, April). Impact of abandoned oil and gas extraction wells on Otuabagi/Oloibiri communities in Nigeria. *International Research Journal of Innovations in Engineering and Technology*, 9, 4. **https://irjiet.com/common_src/article_file/IRJIET9040331745721080.pdf**

23 Federal Republic of Nigeria. (2018). *Nigeria's national action plan (NAP) to reduce short-lived climate pollutants (SLCPs)*. Federal Ministry of Environment, Department of Climate Change. **https://batnoncenter.org/document/national-action-plan-to-reduce-short-lived-climate-pollutants-slcps/**; **https://www.ccacoalition.org/sites/default/files/policy-documents/nigeria-s-national-action-plan-nap-to-reduce-short-lived-climate-pollutants-slcps-.pdf**

24 National Oil Spill Detection and Response Agency. (2025). *Gas flare tracker*. **https://gasflaretracker.ng/**

25 Mahmoud, M. I. (2025, August 12). *Clearing the air: Methane mitigation and reduction strategies in Nigeria's oil and gas sector.* Africa Policy Research Institute. **https://afripoli.org/clearing-the-air-methane-mitigation-and-reduction-strategies-in-nigerias-oil-and-gas-sector**

26 Nigerian Upstream Petroleum Regulatory Commission. (2022). *Gas flaring and venting (prevention of waste and pollution) regulations, 2022 (draft).* **https://www.nuprc.gov.ng/wp-content/uploads/2022/12/Gas-Flaring-and-Venting-Regulations-2022-D.pdf**

27 World Bank. (2024). *Global flaring and methane reduction partnership (GFMR)*. **https://www.worldbank.org/en/programs/gasflaringreduction/global-flaring-data**

28 National Oil Spill Detection and Response Agency. (2025). *Gas flaring data for selected onshore/offshore sites, 2022–2025.* **https://nosdra.gasflaretracker.ng/gasflaretracker.html**

29 Mahmoud, I. M. (2024, July 31). *Methane mitigation and reduction mapping report in Nigeria's oil and gas sector.* Africa Policy Research Institute. **https://afripoli.org/methane-mitigation-and-reduction-mapping-report-in-nigerias-oil-and-gas-sector**

30 Aminu, M. D., Mbungu, G., & Mahmoud, M. I. (2024, September 3). *A sustainable path for methane mitigation in Nigeria's oil and gas sector.* Africa Policy Research Institute. **https://afripoli.org/a-sustainable-path-for-methane-mitigation-in-nigerias-oil-and-gas-sector**

31 Mahmoud, I. M. (2024, July 31). *Methane mitigation and reduction mapping report in Nigeria's oil and gas sector.* Africa Policy Research Institute. **https://afripoli.org/methane-mitigation-and-reduction-mapping-report-in-nigerias-oil-and-gas-sector**

32 United Nations Framework Convention on Climate Change. (2025). *2025 NDC synthesis report.* **https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs/2025-ndc-synthesis-report**

33 Nigerian Upstream Petroleum Regulatory Commission. (2022). *Gas flaring and (prevention of waste and pollution) regulations, 2022 (draft).* **https://www.nuprc.gov.ng/wp-content/uploads/2022/12/Gas-Flaring-and-Venting-Regulations-2022-D.pdf**

34 Mahmoud, M. I. (2025, August 12). *Clearing the air: Methane mitigation and reduction strategies in Nigeria's oil and gas sector*. Africa Policy Research Institute. **https://afripoli.org/clearing-the-air-methane-mitigation-and-reduction-strategies-in-nigerias-oil-and-gas-sector**

35 Federal Republic of Nigeria. (2018). *Nigeria's national action plan (NAP) to reduce short-lived climate pollutants (SLCPs).* Federal Ministry of Environment, Department of Climate Change. **https://www.ccacoalition.org/sites/default/files/policy-documents/nigeria-s-national-action-plan-nap-to-reduce-short-lived-climate-pollutants-slcps-.pdf**

About the author

Dr Mahmoud Ibrahim Mahmoud is an accomplished geospatial information and environmental scientist specialised in the applications of geographical remote sensing of the environment and geographic information systems (GIS), environmental monitoring, climate and energy nexus studies and emissions tracking. He is currently a Senior Climate Change Fellow working on methane mitigation and reduction in Nigeria with APRI – Africa Policy Research Institute. His research interests include emissions detection, gas flaring, spatial land-use planning, land administration, urban science, ecology and methane emissions reduction for climate change mitigation, environmental sustainability and political economic analysis.

This project is funded in part by the Government of Canada

Ce projet est financé en partie par le gouvernement du Canada

About APRI

APRI – Africa Policy Research Institute is an independent and non-partisan African think tank. It researches key policy issues affecting African countries and the African continent. APRI provides insights into the German and European Union policy-making processes on Africa. In addition, APRI provides policy options to African policy-makers and civil society actors.

About DCC

The Department of Climate Change (DCC) resides within Nigeria's Federal Ministry of Environment. It serves as a vehicle for driving national climate action efforts in the country.

Cover image – Pexels | Michael Pointner
Designed, typeset and artwork redrawn by COMPRESS.dsl | 801162 | www.compressdsl.com

Executive Director
Dr Olumide Abimbola

Imprint
APRI – Africa Policy Research Institute gGmbH
Prinzenstrasse 85D, 10969 Berlin, Germany

Contact
Isabella Roberts, Programme Manager
E-mail: **iroberts@afripoli.org**