

AUGUST 2025

Clearing the air: Methane mitigation and reduction strategies in Nigeria's oil and gas sector



DEPARTMENT OF CLIMATE CHANGE
FEDERAL MINISTRY OF ENVIRONMENT

This project is funded in part
by the Government of Canada

Ce projet est financé en partie
par le gouvernement du Canada

Canada 



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REPORT



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Acknowledgments and citation

This report was produced by APRI – Africa Policy Research Institute, an independent, African think tank with offices in Berlin, Germany and Abuja, Nigeria. APRI research key policy issues affecting the African continent.

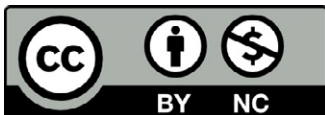
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The author gratefully acknowledges and appreciates the contributions and support of Balarabe Abbas Lawal, the Honourable Minister of Environment; Mahmud A. Kambari, the Permanent Secretary, Federal Ministry of Environment; Dr Iniobong Abiola-Awe, Director, Department of Climate Change (DCC) and by extension the team from Department of Climate Change, Federal Ministry of Environment, Nigeria for partnership and support in this project. Special thanks go to participants who joined the National Stakeholders' Engagement event for their immense contributions and feedback on the initial draft of this report. A big thank you to field work data collection participants in Bayelsa, Rivers and Cross River States.

The author extends a scholarly appreciation to Dr. Mohammed Dahiru Aminu, Policy Manager for Methane Pollution Prevention in Africa at the Clean Air Task Force and APRI Non-Resident Fellow, for peer-reviewing this report and offering valuable improvements to the document. In addition, the author would like to acknowledge and thank Dr Olumide Abimbola (Executive Director, APRI), Dr Grace Mbungu (APRI Alumnus who was Senior Fellow and Head of Climate Change Programme, APRI), Isabella Roberts (Fellow and Programme Officer, APRI) and Olumide Onitekun (who served as Research Assistant, APRI) for their invaluable leadership, feedback and administrative support to the project.

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Mahmoud, Mahmoud Ibrahim (2025). *Clearing the air: methane mitigation strategies in Nigeria's oil and gas sector*. Africa Policy Research Institute, Berlin, Germany.

DOI: <https://doi.org/10.59184/rp025.03>

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Acronyms

APRI	Africa Policy Research Institute
ACEP	Africa Centre for Energy Policy
AFOLU	Agriculture, Forestry and Other Land Uses
AGRA	Associated Gas Re-injection Act
BPD	Barrels per day
BTEX	Benzene, toluene, ethylbenzene and xylene
CATF	Clean Air Task Force
CCAC	Climate and Clean Air Coalition
CLN	Carbon-Limit Nigeria
CO₂	Carbon dioxide
CPI	Climate Policy Initiative
CSO	Civil Society Organisation
DCC	Department of Climate Change
DFI	Development Financial Institution
EGASPIN	Environmental Guidelines and Standards for the Petroleum Industry in Nigeria
ERA	Environmental Rights Actions
ETP	Energy Transition Plan
EU	European Union
FCDO	Foreign, Commonwealth and Development Office
FI	Financial Institution
FGD	Focus Group Discussion
GDP	Gross Domestic Product
GFMR	Global Flaring and Methane Reduction Partnership
GGFR	Global Gas Flaring Reduction Partnership
GHG	Greenhouse Gas

GMA	Global Methane Alliance
GMI	Global Methane Initiative
GMP	Global Methane Pledge
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
LDAR	Leak Detection and Repair
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
LTV	Long-Term Vision
MMBPD	Million barrels per day
MDA	Ministries, Departments and Agencies
MMRP	Methane Mitigation and Reduction Project
MOSR	Mineral Oils (Safety) Regulations
MRV	Monitoring, Reporting and Verification
NCCC	National Council on Climate Change
NCCP	Nigeria Climate Change Policy
NDC	Nigeria Delta University
NDU	Nationally Determined Contribution
NEITI	Nigeria Extractive Industries Transparency Initiative
NGFCP	Nigeria Gas Flare Commercialization Programme
NGLs	Natural Gas Liquids
NGO	Non-governmental Organization
NLNG	Nigerian Liquefied Natural Gas
NMDPRA	Nigerian Midstream and Downstream Petroleum Regulatory Authority
NNPC	Nigerian National Petroleum Company
NNPCL	Nigerian National Petroleum Company Limited
NNRA	Nigerian Nuclear Regulatory Authority
NOSCP	National Oil Spill Contingency Plan
NOSDRA	National Oil Spill Detection and Response Agency
NipeX	Nigerian Petroleum Exchange
NRGI	Premium Motor Spirit
NUPENG	Nigeria Union of Petroleum and Natural Gas Workers

NUPRC	Nigeria Upstream Regulatory Petroleum Commission
OGDC	Oil and Gas Decarbonization Charter
OGMP	Oil and Gas Methane Partnership
OPEC	Organization of the Petroleum Exporting Countries
OPM	Oxford Policy Management
PSC	Production Sharing Agreement
PEST	Political, Economic, Social, Technological
PIA	Petroleum Industry Act
PIER	Petroleum Industry Environmental Regulation
PIK	Potsdam Institute for Climate Impact Research
PPP	Public-private partnership
PPTA	Petroleum Profit tax Act
PSC	Production Sharing Contract
R&D	Research and Development
REMP	Renewable Energy Master Plan
SDG	Sustainable Development Goal
SDN	Stakeholder Democracy Network
SLCP	Short-Lived Climate Pollutant
SMET	Satellite-based Methane Emission Tracker
SPDC	Shell Petroleum Development Company
SWOT	Strengths, Weaknesses, Opportunities, Threats
TNP	Trans-Niger Oil Pipeline
TSCF	Trillion Standard Cubic Feet
UK	United Kingdom
UN	United Nations
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
US	United States
VOCs	Volatile Organic Compounds

Executive summary

Background and objective

Methane emissions from the oil and gas sector present a critical but under-addressed environmental and economic challenge for Nigeria. As the second-largest source of methane in sub-Saharan Africa, Nigeria faces increasing pressure to reduce emissions both to meet its **climate commitments** under the **Paris Agreement** and to remain competitive in an evolving global energy market. Despite these challenges, **methane mitigation and reduction offer Nigeria a low- or no-cost pathway** to significantly reduce short-lived climate pollutants (SLCPs) while improving operational efficiency in its oil and gas sector.

To better understand and address this issue, the Africa Policy Research Institute (APRI) launched the Methane Mitigation and Reduction Project (MMRP) in collaboration with the **Department of Climate Change** in the Nigerian Federal Ministry of Environment. The initiative offers a comprehensive review and assessment of Nigeria's current methane emissions landscape in the oil and gas sector; identifies gaps and opportunities across regulatory, technological, and financial dimensions; and proposes actionable strategies to reduce emissions across the oil and gas value chain while supporting national energy and economic goals.

The primary objective of the MMRP is to assess and enhance methane mitigation and reduction strategies within Nigeria's oil and gas industry. This involves evaluating the current state of emissions, analysing existing policy frameworks, identifying financing gaps and opportunities, and engaging stakeholders at all levels – from government agencies and private operators to civil society and local communities. By situating Nigeria's methane mitigation agenda within broader sustainable development and climate goals, the project aims to generate practical, evidence-based recommendations to support the country's transition toward a lower-emissions and more economically resilient energy future.

The MMRP initiative has produced a suite of strategic outputs, including a **Framing Paper, Mapping Report, Commentary, Fact Sheet and Short Analysis**. Together, these provide a comprehensive insight into Nigeria's methane emissions landscape. They also compile Nigeria's key strengths and achievements, identify key regulatory and technological gaps, and offer actionable pathways for aligning the oil and gas sector with global methane reduction goals.

Nigeria's key strengths and achievements

Regulatory commitment

Nigeria was one of the first African countries to sign the Global Methane Pledge (GMP) and has expressed intent to align with international frameworks such as the OGMP 2.0 and the Oil and Gas Decarbonization Charter (OGDC).

Industry legislative framework

The 2021 Petroleum Industry Act (PIA) introduces reforms that create a basis for technological and commercial accountability, including the establishment of distinct regulatory agencies (the Nigeria Upstream Regulatory Petroleum Commission (NUPRC) and the Nigerian Midstream and Downstream Petroleum Regulatory Authority (NMDPRA).

Sectoral environmental legislation

The 2006 National Oil Spill Detection and Response Agency (NOSDRA) Act is a critical environmental legislation enacted to oversee oil and gas pollution in Nigeria's petroleum industry and has demonstrated technical expertise through the Nigerian Gas Flare Tracker and Oil Spill Monitor for pollution response experience.

Gas flaring initiatives

Programmes like the Nigeria Gas Flare Commercialization Programme (NGFCP) and associated penalties under the PIA demonstrate an effort to discourage routine flaring and venting.

Technical partnerships

Engagement with multilateral stakeholders (e.g. DFID/FCDO, World Bank's GGFR, UNEP, CCAC) for capacity-building, financing and data infrastructure shows Nigeria's openness to international collaboration.

Project scope and methodology

The project adopted a multi-pronged methodology, including:

- A review of national and international policy and regulatory frameworks.
- Stakeholder mapping and consultations across government, private sector, civil society, international partners and host communities.
- Field visits to key oil-producing states (Bayelsa, Rivers, Cross River, Anambra, Lagos and Abuja).
- Case studies on regulatory performance, technology deployment and socio-economic impacts.
- Qualitative and quantitative data collection and comparative analysis with global benchmarks.

Key findings

Policy and institutional frameworks

Nigeria has several methane-related policies (e.g. the National Gas Policy, NDCs, NGFCP, SLCP Action Plan), but these are often **fragmented, conflicting and weakly enforced**. Notable issues include:

- **Conflicting targets:** 2025 is the deadline set by the petroleum ministry, as opposed to the deadline of 2030 set by the LTV-2050.
- **Overlapping mandates** between NOSDRA, NUPRC, NMDPRA and the Ministry of Environment.
- **Data credibility crisis:** Industry self-reporting often underestimates emissions compared to satellite-based evidence.
- **Limited use of MRV systems** and lack of an integrated legal framework.

Stakeholder perspectives

- **Government agencies** such as NOSDRA and NMDPRA demonstrate high awareness but face coordination and enforcement challenges.
- **Private organisations** cite high costs, weak incentives and lack of sectoral coordination as key barriers.
- **International partners** underscore the need for stronger data systems, institutional coherence and investment incentives.
- **Academic institutions** like Niger Delta University offer untapped potential but require funding and engagement.
- **Host communities** report severe environmental and health impacts from flaring and emissions but are largely excluded from policy and mitigation processes.

Financing landscape

- Nigeria needs **US\$ 1.5 billion** in methane mitigation investment by 2030 yet faces major funding gaps.
- **Global methane finance is disproportionately low** in the fossil fuel sector, where Nigeria's mitigation potential is greatest.
- **Private capital** and climate funds are underutilised, while **public financing is volatile**.
- Promising initiatives like **flare-gas-to-energy and carbon markets** remain underdeveloped.

Opportunities for action

The project identified clear opportunities to transform Nigeria's methane agenda into a strategic economic and climate advantage:

Opportunity	Potential impact
Integrated methane governance framework	Aligns policies, timelines and enforcement
Enhanced MRV using satellite tech (e.g. NGFT, SMET)	Improves data credibility and transparency
Carbon markets and green bonds	Attracts climate0 finance and incentivises mitigation
Host community engagement	Builds trust and ensures just energy transition
Technology deployment (e.g. LDAR, vapour recovery)	Reduces emissions, creates jobs and enhances efficiency

Recommendations

Theme	Potential impact
Policy & regulation	<ul style="list-style-type: none"> Strengthen methane-specific regulations (e.g. LDAR mandates, emissions caps) Improve inter-agency coordination through a national methane governance framework Develop a National Methane Strategy with clear targets, timelines and financing plans
Operation & industry	<ul style="list-style-type: none"> Expand access to green finance, carbon markets and PPPs Leverage global platforms (e.g. Global Methane Pledge Fund, COP28 commitments) Develop infrastructure for gas commercialisation and methane reuse
Finance & investment	<ul style="list-style-type: none"> Expand access to green finance, carbon markets and PPPs Leverage global platforms (e.g. Global Methane Pledge Fund, COP28 commitments) Develop infrastructure for gas commercialisation and methane reuse Commodify methane and incentivise local sustainability financing initiatives in the oil and gas sector

Conclusion

Methane mitigation and reduction is a powerful, underutilised lever for Nigeria's climate ambition and economic resilience. If fully implemented, the recommendations of this report can unlock new investment, reduce environmental and health risks, support the just energy transition and position Nigeria as a regional leader in climate-smart oil and gas governance.

The MMRP concludes that **a coordinated national methane plan – backed by political will, technology, financing and community inclusion – is essential** for transforming Nigeria's methane challenge into a development opportunity. Now is the time for bold, practical action.

SECTION ONE: Introduction

Country context and methane landscape

Snapshot of Nigeria's landscape

Nigeria, with a population exceeding 200 million, is Africa's most populous nation and home to over 250 ethnic groups and languages.¹ This diversity fosters a rich cultural tapestry but also presents challenges in governance, as managing such a multi-ethnic and multi-religious population requires inclusive policies and frameworks. Politically, Nigeria operates as a federal republic comprising 36 states and the Federal Capital Territory, Abuja, with a democratic system that has seen successive transitions since 1999. The political landscape is often characterised by regional tensions, security challenges and governance deficits that influence policy implementation, especially in critical sectors such as energy and the environment. Despite these challenges, Nigeria continues to assert its leadership role in regional and global affairs, leveraging its strategic position as Africa's largest economy and its active participation in multilateral initiatives like the Global Methane Pledge.

Nigeria also has Africa's largest economy, driven primarily by its oil and gas sector, which accounts for over 82.5% of export revenues and a significant portion of government income. This reliance also accounts for a substantial portion of the country's greenhouse gas (GHG) emissions. In 2018, fugitive emissions from Nigeria's oil and gas sector were the top source of GHG emissions within the energy sector, contributing 33% of the total 209 million tonnes of carbon dioxide (CO₂) equivalent released.² Consequently, the oil and gas sectors and their contributions to the climate crisis call for a strategic and systematic approach to limit any negative consequences and to maximise potential benefits for people and the planet.

In addition to oil and gas, Nigeria's economy benefits from a growing agricultural sector, flourishing technology hubs and a youthful labour force. Geographically, Nigeria spans diverse terrains, from the arid Sahel in the north to the lush rainforests and river deltas in the south. This geographical diversity supports a wide range of economic activities but also exposes the country to environmental challenges such as desertification, flooding and oil pollution in the Niger Delta. Addressing these issues while pursuing sustainable development remains a priority for the nation.

Overview of Nigeria's energy sector

Characterised by a diverse mix of energy sources, including fossil fuels and renewable energy, Nigeria's energy sector is a vital component of its economic framework. The oil and gas industry plays a predominant role in this landscape, contributing significantly to the country's revenue and export earnings. As of 2023, fossil fuels, primarily natural gas, accounted for more than 75% of

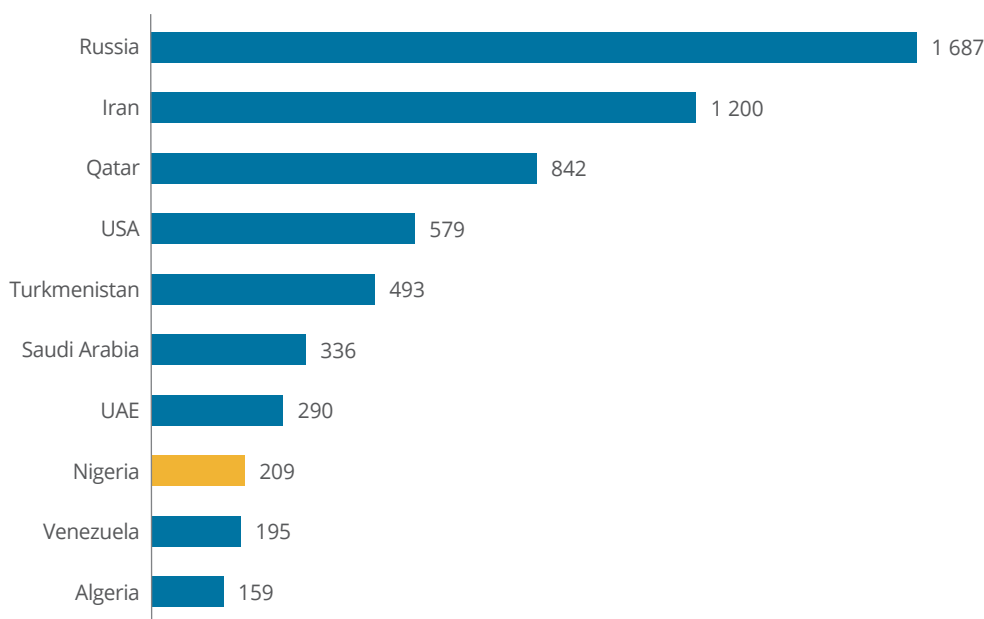
Nigeria's total electricity generation, with low-carbon or clean energy from hydropower contributing approximately 25%.³ Despite these contributions, overdependence on oil and gas has created vulnerabilities, including exposure to global price fluctuations and underinvestment in infrastructure for sustainable energy delivery.

Natural gas, in particular, holds significant promise in bridging Nigeria's energy gap⁴ due to its abundance and lower carbon intensity compared to crude oil. The Nigeria Electricity System Operator reported a forecast daily peak demand of 20 GW against an installed generation capacity of 13 GW, yet the all-time highest generation is merely 5.8 GW.⁵ This reflects inefficiencies in harnessing energy resources. In response to these challenges, Nigeria has initiated several strategic frameworks aimed at enhancing its energy mix and increasing the share of renewable sources. For example, the Renewable Energy Master Plan (REMP) aims to elevate the contribution of renewable energy to total electricity generation from 13% in 2015 to 23% by 2025 and 36% by 2030. The REMP includes investments in solar, wind, biomass and small hydro projects to support rural electrification and improve overall energy access.⁶ In addition, the government is exploring decentralised systems to complement the centralised grid-based approach, thereby enhancing energy security and reliability. However, oil and gas remain integral to Nigeria's energy strategy, not only as a source of power generation but also as a critical enabler for funding the transition toward cleaner energy and achieving broader energy security goals.

Overview of Nigeria's oil and gas sector

As Africa's leading oil and gas producer, Nigeria occupies a strategic position in global energy dynamics. The country's vast hydrocarbon resources include the largest proven natural gas reserves in Africa.⁷ Additionally, Nigeria ranks 8th globally in terms of total proven gas reserves (trillion standard cubic feet [TSCF]), further underscoring its significance in the global energy landscape

Figure 1
Top 10 countries by proven natural gas reserves (TSCF)



Source: OPEC Annual Statistical Review Bulletin 2023

(Figure 1). However, Nigeria's reliance on oil and gas, which together account for over 90% of export earnings and a significant share of government revenue, presents a dual challenge of economic dependency and environmental vulnerability. The sector is also responsible for a substantial portion of the country's GHG emissions, particularly methane – a potent climate pollutant.

The oil and gas sector remains a cornerstone of the Nigerian economy, contributing over 82.5% of the country's export value,⁸ 37% of the federal government's revenue in 2022,⁹ and about 6% of 2023's GDP.¹⁰ Specifically, the 2021 Petroleum Industry Act (PIA) is poised to further enhance the sector's economic impact by improving regulatory efficiency, attracting foreign investment and unlocking stalled projects. This landmark legislation aims to modernise regulations and fiscal structures, fostering greater transparency and efficiency. Industry experts anticipate the PIA will address long-standing issues related to production sharing contracts (PSCs), paving the way for several currently stalled projects. As called for in the PIA, the Nigeria National Petroleum Corporation (NNPC) has transitioned to a commercial entity operating as the Nigerian National Petroleum Company Limited (NNPCL).

Institutional changes under the regulatory reforms have transformed the previous upstream (exploration and production) and downstream (refining and distribution) regulators into the Nigerian Upstream Petroleum Regulatory Commission (NUPRC) and the Nigerian Midstream and Downstream Petroleum Regulatory Authority (NMDPRA).

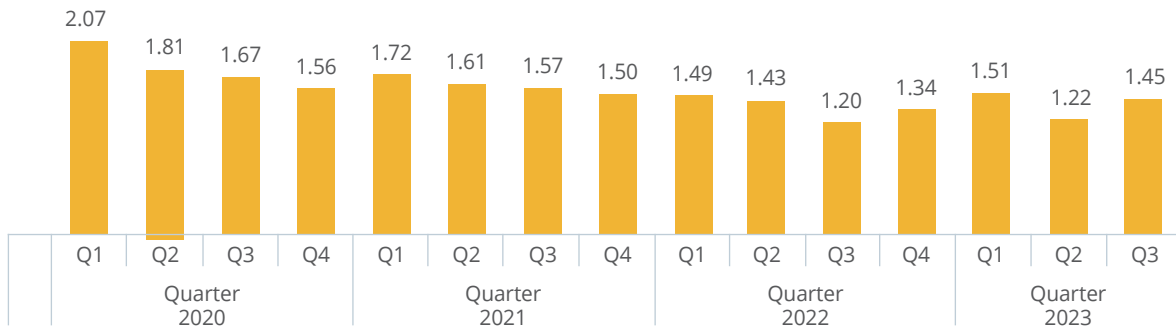
The PIA also repeals several outdated laws, streamlining regulations and potentially reducing administrative burdens. These include:

- Associated Gas Reinjection Act¹¹
- Hydrocarbon Oil Refineries Act¹²
- Motor Spirit (Returns) Act¹³
- Nigerian National Petroleum Corporation (NNPC) (Projects) Act¹⁴
- NNPC Act (where NNPC ceases to exist under section 54[3] of the Act)
- Petroleum Products Pricing Regulatory (Establishment) Act
- Petroleum Equalisation Fund Act
- Petroleum Profit Tax Act (PPTA)
- Deep Offshore and Inland Basin Production Sharing Contract Act

Despite the landmark legislation, Nigeria's oil production has been on a downward trend since 2021, with average daily output dropping from 1.64 million barrels per day (MMbpd) in Q1 2021 to 1.37 MMbpd in Q4 2023.¹⁵ Notably, the sharpest drops occurred in Q3 2022 and Q2 2023 (see Figure 2). These coincided with reports of heightened oil theft, suggesting this issue plays a significant role in limiting production capacity and Nigeria's ability to meet its Organisation of the Petroleum Exporting Countries (OPEC) quota of 1.83 MMbpd, which came into effect in September 2022.¹⁶ The drop in production also explains why Nigeria has failed to capitalise on the currently high energy prices following the Russia-Ukraine conflict. According to the NUPRC, in Q1 2022, the country lost an

Figure 2

Nigeria's oil production (MMbpd)



Source: Nigeria Bureau of Statistics (Author's analysis)

estimated US\$ 1 billion in revenue to crude theft.¹⁷ In Q1 2022, the country saw average daily oil theft increase from about 108,000 bpd, up from the 103,000 bpd it lost in 2021.¹⁸ In mid-June 2022, the Trans-Niger oil pipeline (TNP), which hauls 180 000 bpd across Nigeria, stopped transporting crude due to theft. However, in April 2023 Shell reported that after a year of TNP being shut down, it had plugged 460 illegal pipelines and resumed operations.¹⁹

In addition to crude theft challenges, foreign participation in Nigeria's oil and gas sector faces several regulatory challenges. For instance, the Central Bank's foreign exchange controls and the Nigerian Content Act, which sets limits on foreign management, mandate specific local participation in engineering, welding and fabrication, and restricts imports. While these pose barriers to entry, successful international companies employ effective strategies to manage them. Additionally, foreign companies must register with relevant regulatory agencies (NUPRC or NMDPRA) depending on their activities. Recognising the need for improved transparency, the government is overhauling the Nigerian Petroleum Exchange (NipeX) portal to enhance clarity in inventory management.

While the sector is faced with significant challenges, the recent launch of the US\$ 16 billion Dangote refinery offers a glimmer of hope. The refinery is capable of refining 650,000 bpd, which could rewrite Nigeria's energy story.²⁰ This milestone marks a crucial step toward energy independence, and positions Nigeria as a key player in the global energy market.

However, the environmental toll of the oil and gas sector cannot be ignored. Issues such as oil spills, gas flaring and methane emissions persist, resulting in widespread pollution, loss of biodiversity and serious health challenges for communities in oil-producing regions. Methane emissions alone reached approximately 10.5 million metric tonnes of methane equivalent in 2020,²¹ making the sector a significant contributor to global GHG emissions. Tackling these environmental issues is critical not only for safeguarding public health and ecosystems but also for reconciling Nigeria's economic goals with its climate commitments under the Paris Agreement. Proactive mitigation measures will be vital to achieving a sustainable balance between development and environmental responsibility.

Background and context of methane mitigation in Nigeria

The background and context of methane mitigation in Nigeria's oil and gas sector are informed by key insights from the project's previous deliverables: the **Framing Paper**,²² **Mapping Report**²³ and **Short Analysis on the Benefits of Methane Mitigation and Reduction**.²⁴ As highlighted in the Framing Paper, global momentum for methane reduction was underscored during the recent COP28 conference in Dubai. Key developments included over US\$ 1 billion in new funding grants for methane action mobilised by Global Methane Pledge (GMP) partners, alongside commitments from major oil and gas companies to achieve net-zero methane emissions and end routine gas flaring by 2030. Nigeria's leadership role as a GMP Champion, alongside nations such as Brazil, Canada and South Korea, reflects its commitment to aligning national methane reduction efforts with global climate goals. President Bola Ahmed Tinubu's statements at COP28 reinforced this commitment, emphasising the administration's determination to end gas flaring and enhance sustainability in the oil and gas sector.

Building on this global context, the Mapping Report provides a detailed analysis of Nigeria's domestic methane emissions landscape. It highlights the critical role of the oil and gas sector in the national economy, contributing over 82.5% of export value and 37% of federal government revenue. However, it also identifies this sector as the largest source of methane emissions, accounting for 45% of the country's total GHG emissions in 2020, equivalent to 10.5 million metric tonnes of methane. The report attributes these emissions to factors such as leaks from oil and gas infrastructure, as well as venting and flaring of natural gas, with gas production, processing and distribution accounting for 73% of the emissions. According to the Short-Lived Climate Pollutants National Action Plan (SLCP NAP), 439.8 kilotonnes of methane emissions were recorded within the sector, underscoring the urgency for targeted mitigation strategies.

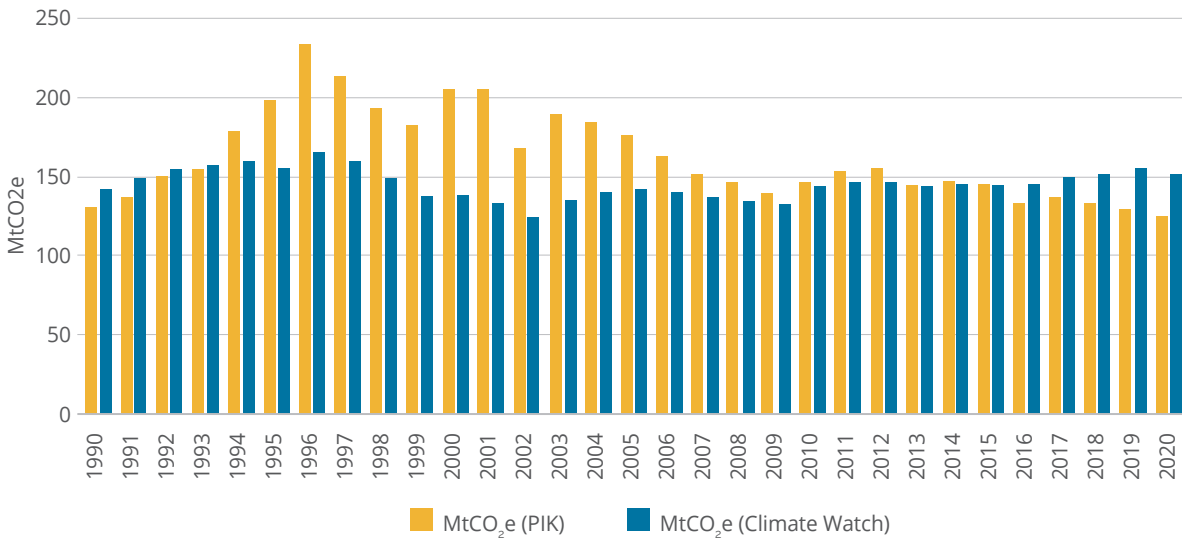
Despite these challenges, Nigeria is taking proactive steps toward methane mitigation. The establishment of comprehensive methane guidelines by regulatory bodies like the Nigerian Upstream Petroleum Regulatory Commission (NUPRC) reflects a commitment to developing a robust framework for reducing emissions within the oil and gas sector. These guidelines aim to enhance leak detection and repair (LDAR) practices while fostering stakeholder engagement. The insights from the **Framing Paper**, **Mapping Report** and **Short Analysis on Benefits of Methane Mitigation** emphasise the need for collaborative efforts and innovative strategies to effectively address methane emissions, aligning with Nigeria's broader climate action agenda.

Overview of methane emissions sources

According to Climate Watch Data, methane emissions from the oil and gas sector in Nigeria have been increasing steadily since 2010 (see Figure 3).²⁵ In 2020, methane emissions from the sector reached an estimated 10.5 million metric tonnes of methane equivalent (MMt CH₄e). This is equivalent to about 45% of Nigeria's total greenhouse gas (GHG) emissions.²⁶ The increase is due to several factors, including growing oil and gas production, leaks from oil and gas pipelines and other infrastructure, and venting and flaring of natural gas. Therefore, as the continent's largest oil producer and a strategic player in the global energy transition, Nigeria is uniquely positioned to demonstrate how methane mitigation and reduction pathways can serve as a cornerstone for sustainable development.²⁷ ²⁸ This further justifies that Nigeria's oil and gas sector holds immense potential to lead the global fight against methane emissions while unlocking transformative socio-economic opportunities, particularly on the continent.

Figure 3

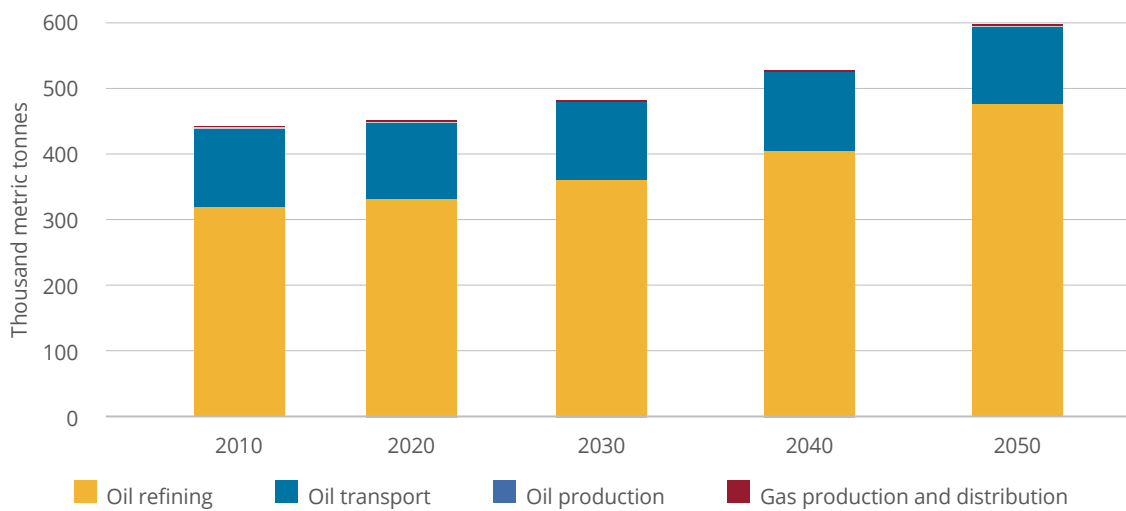
Nigeria's methane emissions from energy sources, comparison with PIK and Climate Watch, 1990–2020



Source: Climate Watch, Potsdam Institute for Climate Impact Research (PIK) (Author's analysis)

Figure 4

Methane emissions from the oil and gas sector from 2010–2050 under the baseline scenario



Source: Nigeria's SLCP National Action Plan

According to the SLCP NAP, Nigeria recorded an estimated 439.8 kilotonnes of methane emissions within the oil and gas sector in 2010.²⁹ These emissions included diverse activities such as gasoline distribution and handling; oil production, refining and transport; and gas production, processing and distribution. Notably, 73% of these emissions emanated from gas production, processing and distribution, while 27% were associated with oil production (see Figure 4).³⁰

According to the International Energy Agency (IEA),³¹ the following are the main sources of methane emissions in the oil and gas sector in Nigeria:

- **Venting and flaring of natural gas:** When natural gas is produced, it often contains impurities that must be removed before it can be transported and sold. This process, known as gas sweetening, produces a byproduct of methane-rich gas that is often vented or flared into the atmosphere. Venting and flaring are major sources of methane emissions in the oil and gas sector worldwide.
- **Leaks from oil and gas infrastructure:** Oil and gas pipelines, storage tanks and other infrastructure can leak methane into the atmosphere. Leaks can be caused by a variety of factors, such as corrosion, faulty valves and damaged equipment.
- **Equipment leaks:** Certain types of equipment used in the oil and gas sector, such as pneumatic controllers, glycol dehydrators, valves/flanges, large storage tank vents, cold venting, flares and compressors, can leak methane. These leaks are often small, but they can add up to a significant amount of methane emissions over time.
- **Incomplete combustion of natural gas:** Natural gas can also be a source of methane emissions when it is not completely burned. This can happen in a variety of situations, such as during the operation of natural-gas-powered engines or when natural gas is used for cooking or heating.

The IEA estimates that, by implementing existing technologies and practices, methane emissions from the oil and gas sector in Nigeria could be reduced by as much as 75%.³² This would make a significant contribution to reducing Nigeria's GHG emissions and mitigating the effects of climate change.

Global and national significance of addressing methane emissions

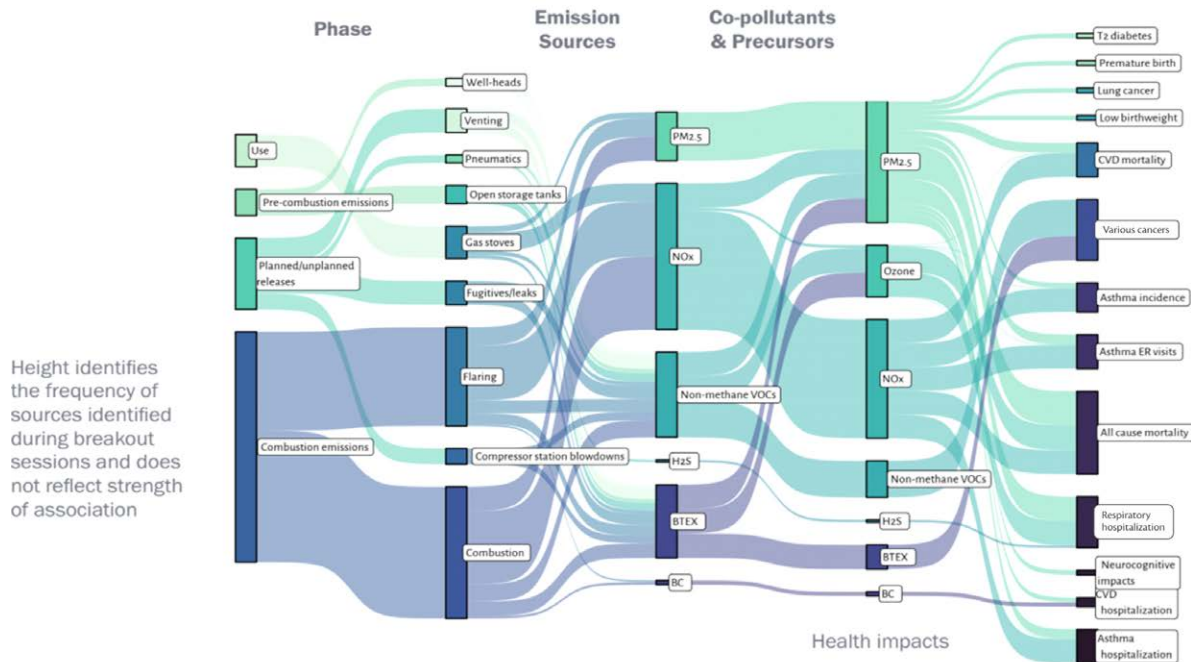
Drawing from the Methane Mitigation and Reduction Project (MMRP) mapping report, the imperative to address methane emissions stems from a well-established scientific consensus on methane's detrimental impact on Earth's climate and human well-being.³³

Methane, with over 80 times the warming potency of carbon dioxide over a twenty-year span, significantly contributes to global warming, necessitating accelerated reductions to meet the 1.5°C or 2°C temperature targets set by the Intergovernmental Panel on Climate Change (IPCC) by 2030.³⁴

Methane emissions from the oil and gas sector can be categorised as either 'fugitive' or 'vented/flared'. Fugitive emissions are unintentional leaks from equipment like pumps and valves, while vented methane escapes directly from storage tanks, often carrying harmful co-pollutants like volatile organic compounds (VOCs) and BTEX (benzene, toluene, ethylbenzene and xylene).³⁵ ³⁶ In some cases, particularly during oil extraction, methane is intentionally flared to burn off excess gas, releasing co-pollutants such as nitrogen oxides (NOx)³⁷ and particulate matter 2.5 (PM2.5).³⁸ Regardless of the source, these methane emissions and their associated co-pollutants can have

Figure 5

An alluvial chart showing the co-pollutants and precursors that emerge from specific sources within the oil and gas value chain and their interactions with and subsequent impacts upon human health



Source: *Methane and Health (Dialogue Series)*, Environmental Defense Fund, 2023

detrimental impacts on human health (see Figure 5). For example, a study investigating the long-term health effects of PM_{2.5} found a positive correlation between exposure and the incidence of ischemic heart disease in older adults, smokers and individuals with pre-existing conditions like high blood pressure and diabetes.³⁹ Notably, the study linked higher PM_{2.5} concentrations with a stronger association.⁴⁰

A study from Abt Global illustrates the social benefits of prioritising investments in methane abatement.⁴¹ Abt Global explored 16 out of over 40 methane reduction solutions in energy, agriculture and waste sectors. Collectively, these 16 technologies could help reduce 20% of annual methane emissions by 2050. The social benefits of eliminating methane could be US\$ 3,000–3,100 per tonne.⁴²

According to the Climate and Clean Air Coalition (CCAC) Secretariat, methane plays a crucial role in the formation of ground-level (tropospheric) ozone, a major component of smog and a serious public health hazard.⁴³ Reducing methane emissions by 45% within this century, a realistic possibility, has the potential to prevent an astonishing 260,000 premature deaths in Nigeria annually.⁴⁴ Importantly, the oil and gas sector, a significant contributor to methane emissions, also presents one of the most fertile grounds for impactful action.

Beyond its critical role in climate action, mitigating methane emissions presents a strategic opportunity to achieve multiple sustainable development goals (SDGs) and broader development objectives, generating significant co-benefits for human capital and economic development.

Table 1

Co-benefit of methane mitigation with SDGs

SDG	Description	Co-benefits of methane mitigation
3: Good health and well-being	Ensure healthy lives and promote well-being for all ages.	Improved air quality near oil and gas operations and waste management facilities, leading to reduced respiratory illnesses and healthcare costs.
13: Climate action	Take urgent action to combat climate change and its impacts.	Reduction in potent GHG, contributing significantly to curbing global warming, safeguarding food security (SDG 2), water resources (SDG 6) and ecosystems (SDG 15).
9: Industry, innovation and infrastructure	Foster industrial innovation, improve infrastructure efficiency and enable sustainable growth through advanced emission reduction technologies.	Methane mitigation delivers broad co-benefits by advancing clean energy access, accelerating climate action, improving urban air quality, promoting resource-efficient production and driving green jobs and innovation. This includes affordable and clean energy (SDG 7), climate action (SDG 13), sustainable cities and communities (SDG 11), responsible consumption and production (SDG 12) and decent work and economic growth (SDG 8).
7: Affordable and clean energy	Ensure access to affordable, reliable, sustainable and modern energy for all.	Generation of valuable co-products like biogas and electricity, contributing to clean energy access and economic development (SDG 8).
10: Reduced inequalities	Reduce inequality within and among countries.	Addressing a potent climate pollutant allows for faster progress towards achieving the Paris Agreement goals, contributing to a more sustainable and equitable future for all (SDG 17).

Source: Author's compilation and contextualisation

Overview of national and international methane reduction targets and commitments

Methane, a potent GHG with over 80 times the warming potential of carbon dioxide in the short term, represents a critical focus for achieving global climate objectives. On paper, Nigeria has made significant efforts to mitigate and reduce methane emissions at both the national and international levels. The following outlines the country's key actions and commitments to addressing methane emissions.

National commitments

Nigeria has demonstrated strong commitment to addressing methane emissions through various national policies and frameworks:

Table 2
National commitments

Policies/action plans	Commitments
Nigeria's Nationally Determined Contribution (NDC)	As part of its commitment to the Paris Agreement, Nigeria's NDC includes a commitment to reduce methane emissions by 60% from 2010 levels by 2030.
Nigeria's 2050 Long-Term Vision (LTV-2050)	Nigeria's LTV-2050 outlines a comprehensive strategy for achieving a low-carbon, climate-resilient and high-growth circular economy by 2050. The vision includes a specific target to reduce emissions by 50% by 2050 and achieve net-zero emissions across all sectors of development by 2070. ⁴⁵
Nigeria's Short-Lived Climate Pollutants National Action Plan (SLCP NAP)	The key purpose of the SLCP action plan is to reduce methane emissions by 61% by 2030. The emission reduction potential resulting from the implementation of the Oil and Gas SLCPs Abatement Measures for methane suggest methane emission reductions of 14.7kt in 2020 to 103kt and 161.09kt in 2030 and 2050 respectively, representing a 50% reduction in methane emissions from this sector. This ambitious goal aligns with the global effort to mitigate climate change and aligns with Nigeria's commitment under the Paris Agreement. ⁴⁶
Nigeria's Energy Transition Plan	The Nigeria Energy Transition Plan (ETP) is a home-grown, data-backed, multipronged strategy developed for the achievement of net-zero emissions in terms of the nation's energy consumption. The ETP sets out a timeline and framework for the attainment of emissions reduction across five key sectors: power, cooking, oil and gas, transport, and industry.
National Oil Spill Contingency Plan (NOSCP)	Nigeria's NOSCP, revised in 2020, outlines a comprehensive framework for the prevention, preparedness and response to oil spills in Nigeria. The plan aims to minimise the environmental, social and economic impacts of oil spills by providing a coordinated and effective response to these incidents. ⁴⁷
Guidelines for Management of Fugitive Methane and Greenhouse Gas Emissions in the Upstream Oil and Gas Operations in Nigeria	The purpose of these guidelines is to establish the actions and mechanisms that operators shall adopt for the prevention and control of GHG/methane emissions from upstream oil and gas operations. ⁴⁸

International commitments and pledges

In the past few years, Nigeria has taken a leading role on the global and regional stages in implementing measures to address emissions from the oil and gas sector. Internationally, Nigeria is a member of the Global Flaring and Methane Reduction (GFMR) Partnership and a supporter of the Zero Routine Flaring by 2030 initiative. Data from an initiative led by the World Bank showed that Nigeria has successfully reduced natural gas flaring by approximately 70% since 2000.⁴⁹ Table 3 below highlights Nigeria's international commitments relevant to methane mitigation.

Table 3

Nigeria's international commitments to methane mitigation and reduction

Party/initiatives	Pledge and declarations
Climate and Clean Air Coalition (CCAC)⁵⁰	Nigeria is a member of the CCAC, a global coalition of governments, intergovernmental organisations, businesses and civil society organisations committed to addressing climate change and air pollution. The CCAC has a specific working group focused on reducing methane emissions, in which Nigeria actively participates.
Global Gas Flaring Reduction (GGFR) Partnership and Zero Routine Flaring by 2030 Initiative⁵¹	GGFR seeks a world free of routine gas flaring and venting. ⁵² GGFR helps identify solutions to the array of technical and regulatory barriers to flaring reduction. To achieve this, the partnership develops country-specific flaring reduction programmes, conducts research, shares best practices, raises awareness, secures global commitments to end routine flaring and advances flare measurements and reporting. Nigeria has endorsed the Zero Routine Flaring by 2030 Initiative, a World Bank-led initiative to eliminate routine flaring of associated natural gas by 2030.
Global Methane Alliance (GMA)⁵³	Nigeria joined the GMA in 2019 at a high-level meeting hosted by the CCAC and the United Nations Environment Programme. Countries who join the alliance commit to absolute methane reduction targets of at least 45% by 2025 and a 60–75% reduction by 2030, though this depends on their oil and gas sector and overall methane emissions.
Global Methane Initiative (GMI)⁵⁴	Nigeria is a partner of the GMI, a United States-led initiative that provides technical and financial support to developing countries to reduce methane emissions from the oil and gas sector. The GMI aims to reduce emissions in the oil and gas sector between 2020 and 2050. Specifically, there is a target to reduce emissions by 25.917MMTCoE in 2020, followed by further reductions to 26.243MMTCoE in 2035 and 27.246MMTCoE in 2050.
Oil and Gas Methane Partnership (OGMP)⁵⁵	The OGMP is an EU-US-led effort gathering 150 countries to reduce global methane emissions by 30% by 2030. ⁵⁶ In 2022, Nigeria joined the OGMP 2.0, a global initiative to reduce methane emissions from the oil and gas sector. ⁵⁷ As part of this initiative, Nigeria committed to measuring and reporting methane emissions from its oil and gas operations, implementing methane emission reduction technologies and developing regulations to reduce methane emissions.
United Nations Framework Convention on Climate Change (UNFCCC)⁵⁸	Nigeria is a signatory to the Paris Agreement. At COP21 in 2015, Nigeria submitted its first Nationally Determined Contribution (NDC) ⁵⁹ to the Paris Agreement, which includes a commitment to reduce methane emissions by 45% from 2010 levels by 2030. As part of 2021's COP26 Glasgow Climate Pact, Nigeria reaffirmed its commitment to the Paris Agreement and joined the Global Methane Pledge, a voluntary initiative to reduce methane emissions by 30% from 2020 levels by 2030. ⁶⁰

Source: Various; author's compilation

Project objective and scope

The primary objective of the **Methane Mitigation and Reduction Project (MMRP) in Nigeria's oil and gas sector** is to comprehensively assess and enhance methane mitigation and reduction strategies within Nigeria's oil and gas industry. This involves understanding the status of methane emissions, evaluating existing policies and frameworks, assessing the financial landscape of methane mitigation and identifying challenges and opportunities for effective reduction efforts. The project seeks to contextualise Nigeria's methane agenda within the broader climate change and sustainable development landscape, while also mapping key stakeholders involved in mitigation efforts, from international organisations to local communities. Through these objectives, the project aims to contribute significantly to Nigeria's efforts in mitigating climate change impacts while promoting sustainable development within its oil and gas sector.

The project's scope encompasses a multi-faceted approach to address methane emissions in Nigeria's oil and gas sector by:

- Engaging with stakeholders at multiple levels (governmental, non-governmental, local communities) to ensure a comprehensive understanding of the challenges faced.
- Analysing existing policies considering national climate commitments and global standards to identify gaps that need addressing.
- Exploring innovative financing solutions to support effective implementation of methane mitigation and reduction strategies.
- Fostering collaboration among stakeholders to ensure a unified approach towards tackling methane emissions.

This final report synthesises findings from research activities and deliverables – including framing papers, mapping reports, workshops, analyses and commentaries, and field studies – to develop actionable recommendations that align with national priorities and global climate commitments.

Overarching project approach and methodology

The overarching project methodology was designed to comprehensively analyse methane mitigation in Nigeria's oil and gas sector through a combination of desktop research, stakeholder consultations, field studies and data collection. The approach integrates global best practices, national policies and local realities to ensure a holistic and evidence-based assessment. The methodology is structured as follows:

Literature review

The literature review established the foundational context for methane mitigation efforts in Nigeria. It involved an extensive review of global, regional and national documents, including policy reports, regulatory frameworks and scientific studies. Key aspects included:

- **International review:** Analysis of global methane initiatives, emission measurement methodologies, best practices and regulatory models. Sources included the International Energy Agency (IEA) Methane Tracker, the Global Methane Initiative and the United Nations Framework

Convention on Climate Change (UNFCCC) reports. This review helped in identifying successful global strategies that could be adapted to Nigeria's context.

- **National review:** Examination of Nigeria's regulatory landscape, including policies such as the Nationally Determined Contributions (NDCs), the Petroleum Industry Act (PIA), the National Oil Spill and Detection Agency (NOSDRA) Act and the SLCP National Action Plan endorsed by the National Executive Council in 2019. The review identified gaps in existing policies and areas to be strengthened.
- **Sector-specific review:** Review of technical and financial mechanisms for methane reduction, gas flaring regulations and oil and gas industry standards. This analysis provided insights into industry compliance levels and existing barriers to effective mitigation.

Mapping of policies, strategies and stakeholders

A structured mapping exercise was conducted to understand the methane mitigation ecosystem in Nigeria, covering:

- **Policy and strategy mapping:** Identifying key national and international policies related to methane emissions, including legislative instruments such as the Petroleum Act, Gas Flaring Regulations and the Nigerian Gas Master Plan. This process involved analysing the effectiveness of these policies and their alignment with international commitments.
- **Stakeholder mapping:** Profiling the roles and responsibilities of government agencies, industry actors, civil society organisations (CSOs) and international partners in methane mitigation efforts. This process helped in determining key actors responsible for implementation and monitoring.
- **Local action mapping:** Analysing state and community-level initiatives addressing methane emissions, particularly in oil-producing regions. The study examined community-based responses to methane leakage and the effectiveness of local interventions.

Stakeholder engagement

Stakeholder engagement was critical to validating findings and ensuring diverse perspectives were incorporated. Engagement methods included:

- **Interviews:** Semi-structured interviews with government officials, industry representatives, environmental experts and community leaders were held to assess policy implementation, technological adoption and financing mechanisms. The interviews also gathered insights into enforcement challenges and industry perspectives.
- **Workshops:** A cross-sector, hybrid, validation workshop engaged 155 participants to refine recommendations and foster dialogue on best practices. The workshop allowed direct interaction among stakeholders, providing clarity on emerging issues.
- **Focus group discussions (FGDs):** FGDs captured community experiences with methane emissions and mitigation efforts. The discussions provided qualitative insights into the socio-economic and environmental impacts of methane pollution.

- **E-questionnaires:** These were used to supplement the interviews and FGDs, particularly for international stakeholders and those unable to attend in-person engagements. This approach expanded participation and ensured a more comprehensive dataset.

Field stud and case studies

The field study employed a mixed-methods approach to obtain empirical insights into methane mitigation practices. Key activities included:

- **Site visits:** Site visits took place to oil and gas facilities in Anambra, Rivers, Bayelsa, Lagos and Abuja to assess on-the-ground implementation of methane mitigation technologies and regulatory compliance. The visits allowed for direct observation of industry practices and verification of self-reported data.
- **Case studies:** These facilitated deep-dive assessments of specific mitigation projects or community-level initiatives. The case studies focused on:
 - methane detection and measurement technologies deployed in Nigeria, assessing their efficiency and cost effectiveness;
 - the effectiveness of regulatory enforcement in reducing methane emissions, examining cases where enforcement was either successful or challenging;
 - the socio-economic impact of methane reduction initiatives on local communities, exploring whether mitigation efforts improved community livelihoods or presented additional challenges.

Data collection and analysis

A combination of primary and secondary data was collected to provide a comprehensive analysis:

- **Qualitative data:** Interviews, FGDs and case studies providing rich contextual insights into the challenges and opportunities in methane mitigation. A thematic analysis was conducted to identify key trends and stakeholder concerns.
- **Quantitative data:** Statistical analysis of methane emission trends, regulatory compliance reports and investment flows in methane reduction initiatives. This included reviewing industry-reported emissions data and independent third-party assessments.
- **Comparative analysis:** A benchmarking exercise comparing Nigeria's methane mitigation progress with international best practices to identify areas for improvement. This provided insights into what policy, financial and technical measures have worked in other contexts.

In conclusion, this multi-faceted methodological approach ensures a robust and representative analysis of methane mitigation efforts in Nigeria. By integrating global lessons, national policies and localised insights, the study provides actionable recommendations for strengthening methane reduction strategies in the oil and gas sector. The approach ensures that findings are rooted in both empirical evidence and stakeholder realities, thereby enhancing the relevance and applicability of the proposed recommendations.

Report structure

This synthesis report is organised into the following sections:

- **Section 1 – Introduction and background:** This section provides an overview of the context within which the methane mitigation study operates, including the landscape of Nigeria's energy sector and oil and gas industry and the significance of addressing methane emissions.
- **Section 2 – Key findings from the mapping report, stakeholder engagement and field study:** This section synthesises the main findings from key reports and engagements, including the Methane Mitigation and Reduction Project Mapping Report, stakeholder consultations and the field study.
- **Section 3 – Analysis and discussion:** This section presents a detailed analysis and discussion of the findings, with a focus on policy coherence, stakeholder consultations, financing mechanisms and comparisons with other countries' methane mitigation efforts.
- **Section 4 – Conclusion and recommendations:** This section summarises the findings and offers actionable recommendations for future methane mitigation efforts in Nigeria. It reflects on the lessons learned and provides suggestions for policy and practice improvements based on the study's outcomes.

SECTION TWO

Key findings from the mapping report, stakeholder engagement and field study

Methane Mitigation and Reduction Project Mapping Report

Introduction

The mapping report examines and evaluates the landscape of methane mitigation and reduction efforts within Nigeria's oil and gas sector. Through a structured analysis across multiple dimensions, the report provides a holistic understanding of the current state, challenges, opportunities and potential pathways for enhancing methane mitigation strategies in alignment with national priorities and global climate action imperatives.

The objectives of the Methane Mitigation and Reduction Mapping Report are as follows:

- **Understanding the landscape:** The report presents a general overview of Nigeria's oil and gas sector, analysing the recent trends and background. It assesses national priorities and urgency within the climate action agenda and summarises existing research on methane mitigation in the oil and gas sector, exploring potential benefits and synergies with broader climate strategies and SDGs.
- **Assessing existing policy frameworks:** The report provides a critical review of Nigeria's methane mitigation policy framework, drawing on the country's NDCs, publicly available national and regional legislation, government reports and World Bank publications. It assesses the scope, sectoral focus, implementation strategies and project case studies – particularly around gas flaring – to evaluate how methane mitigation is being addressed. The analysis highlights key gaps in policy alignment, effectiveness and enforcement.
- **Mapping of stakeholders:** The report maps the stakeholders involved in methane mitigation across all levels, from international organisations to local communities, including both government and non-governmental entities. Analysing their roles and involvement reveals collaboration dynamics, identifies gaps and assesses partnership effectiveness, guiding future efforts towards a unified agenda against methane emissions.
- **Methane financing landscape:** The report dives deep into the financial landscape of methane mitigation in Nigeria's oil and gas sector, analysing funding sources, distribution and effectiveness. By identifying gaps and opportunities, the aim is to optimise financing strategies for tackling emissions and achieving national priorities.
- **Synthesising findings and recommendations:** This final section binds the entire document by synthesising and analysing the effectiveness of current policies, strategies and financing, and identifying gaps and opportunities. It also identifies best practices for advancing methane

mitigation, and highlights how these efforts can align with broader national development and climate action plans. It also suggests roadmaps for achieving sustainable and impactful methane reduction and mitigation in Nigeria's oil and gas sector.

Methodology and approach

The mapping report used a mixed-method research approach in combination with several tools. It is built on early-stage stakeholder engagement, robust desktop research and a national stakeholders' workshop. This provided a holistic understanding of the current state, challenges, opportunities and pathways for enhancing methane mitigation strategies in alignment with national priorities and global climate and sustainable development goals.

The approach and methodology adopted for this task was designed to make the procedure compatible with Nigeria's context and realities. The methodology ensured that the approach is representative and captures the entire landscape of Nigeria's oil and gas sector (policies, regulatory frameworks, strategies, finance and stakeholder layout). The following steps were taken to achieve the detailed objectives set for this report.

Early-stage stakeholder engagement

The state-of-play and fact-finding mission started by engaging relevant stakeholders based on their role in the oil and gas sector. The interactions with the ministries, departments and agencies (MDAs) of government, such as the Federal Ministry of Environment and the Department of Climate Change, provided basic information and guidelines on the current operational and regulatory practices in the sector.

International-level review

This task reviewed existing efforts to combat methane emissions at the international, regional and national levels. These included initiatives documented by organisations like the Global Methane Initiative and the International Energy Agency (IEA). Desktop research also leveraged relevant blogs and insight reports for data sources.

National-level review

This task focused primarily on a review and analysis of stakeholders, financial architecture and flows, draft strategy, laws, and documents from the Nigerian government that form the current policy and regulatory environment with respect to methane. Among others, the following policies and legislations were reviewed: the NDC; the Climate Change Act; the Petroleum Act 1969; the 2021 PIA; the NOSDRA Act; the SLCP National Action Plan; the Draft Guidelines for Reducing Methane Emissions from the Oil and Gas Operations in Nigeria 2021/2022; the Gas Flaring, Venting and Methane Emissions (Prevention of Waste and Pollution) Regulations (Federal Government of Nigeria, 2023); the Associated Gas (Re-injection) Act 1979 (AGRA) and Associated Gas Re-injection (Continued Flaring of Gas) Regulations 1985; the Environmental Guidelines and Standards for the Petroleum Industry in Nigeria (EGASPIN) 2018; the Flare Gas (Prevention of Waste and Pollution) Regulations (Federal Government of Nigeria, 2018); the Nigerian Gas Flare Commercialisation Programme (NGFCP) 2016; the National Gas Policy 2017; the Methane Mitigation and Reduction Mapping Report

in Nigeria's oil and gas sector 2024; the Nigeria Gas Masterplan 2017; Nigeria's Climate Change Policy (NCCP) 2021; and the addition of fugitive methane emissions monitoring and leak detection and repair (LDAR) in revision of both the Mineral Oils (Safety) Regulations (MOSR) 1997 and the draft Petroleum Industry Environmental Regulation (PIER) 2019.

Stakeholder mapping

The stakeholder mapping analysed how methane abatement is understood and addressed in Nigeria across different societal levels and stakeholder groups. Additionally, it identified the roles, interests and influence of key players involved in methane mitigation and reduction efforts using a combination of Mendelow's Matrix and the Salience Model.^{61 62} This involved:

- State actors: government agencies, regulators and policy- and decision-makers.
- Non-state actors: oil and gas companies, operators, investors, NGOs, research institutions, civil society organisations and communities.
- Global entities: international organisations, donors and financial institutions.

National stakeholders' validation workshop

Upon completion of the draft mapping report, a national stakeholders' validation workshop was convened. This hybrid meeting attracted 96 in-person and 59 online participants, among them high-level government officials such as the Honourable Minister of State and the Permanent Secretary from the Federal Ministry of Environment. It was also attended by other policymakers and relevant stakeholders from across the private sector and various MDAs, including representatives from:

- Nigeria's Presidency
- Federal Ministry of Environment
- Federal Ministry of Petroleum Resources
- Nigerian Upstream Petroleum Regulatory Commission
- Nigerian Midstream and Downstream Petroleum Regulatory Agency
- Federal Ministry of Science and Technology
- Nigerian Governors' Forum
- National Oil Spill Detection and Response Agency
- Clean Air Task Force
- Civil society organisations
- Oil and gas value chains
- Media.

Key findings from the mapping report

The section highlights the key findings from the MMRP mapping report.

Key insights from institutional and policy frameworks

Table 4 below summarises Nigeria's most relevant policy and regulatory instruments for methane mitigation in the oil and gas sector, outlining each instrument's purpose alongside the principal gaps or implementation challenges that still need to be addressed.

Table 4
Selected enacted policies and regulations

Policy instrument	Description and intended role	Key gaps or issues
National Oil Spill Contingency Plan (NOSCP) and National Oil Spill Detection and Response Agency (NOSDRA) Act (2006)	This framework for national spill response establishes NOSDRA with the mandate to enforce environmental standards. NOSDRA has begun using independent monitoring (the Nigerian Gas Flare Tracker (NGFT)) and is piloting a satellite-based methane tracker (GMET) to detect flaring and leaks. These tools strengthen oversight of methane releases even as conventional mandates focus on spills.	<ul style="list-style-type: none"> • NOSDRA's mandate has traditionally centred on oil spills, not routine flaring: it relies on coordination with the upstream regulator (NUPRC) to impose penalties. Enforcement powers over flaring/venting are weak and overlaps exist between agencies. • Penalties for detected flaring have not been systematically collected: many fines remain unpaid. Independent satellite data (NGFT/GMET) often reveal more flaring than industry reports, creating friction over data validity and enforcement.
Nigerian Gas Flare Commercialisation Programme (NGFCP, 2016)	A market-based incentive scheme to eliminate routine flaring. The government auctions the rights to flare sites to third-party investors who capture and market the gas. It aims to turn flare gas into an asset by providing free allocation of gas volumes and/or credits, motivating companies to end routine flaring.	<ul style="list-style-type: none"> • Target unmet: The initial goal to end routine flaring by 2020 was not achieved. Delays in bidding rounds and investments have slowed deployment. • Weak incentives: Although designed to leverage the 'polluter pays' principle, in practice the NGFCP's benefits depend on transparent and timely auction processes; systemic issues (bureaucratic delays, financing hurdles) have hampered participation. • Data credibility crisis: Satellite evidence shows flaring is far higher than companies report, exposing developers to contract breaches and financing risks, and leaving government emissions inventories – and its credibility – undermined.
National Gas Policy (2017) and Nigerian Gas Master Plan (2017)	Comprehensive strategy documents setting the vision for Nigeria's gas sector. They prioritise expanded gas production and domestic use and explicitly commit to reducing wasteful flaring by improving infrastructure and raising flaring penalties. The National Gas Policy calls for collaboration with industry and investors to develop flare-capture projects.	<ul style="list-style-type: none"> • Implementation lag: Many planned gas projects (compression plants, pipelines, domestic markets) have been slow to materialise, so flared gas remains underutilised. • Low penalties (historically): The gas policy itself noted that the flaring penalty was 'too low to act as a disincentive'. Flaring remained more profitable than capture for years. (Penalties were substantially increased only in later regulations.) • Coordination: These policies articulate broad goals but lack a dedicated enforcement mechanism. Multiple agencies share responsibilities (Ministry of Petroleum, NUPRC, NMDPRA, etc.), requiring stronger inter-agency coordination to translate policy into action.

Policy instrument	Description and intended role	Key gaps or issues
SLCP National Action Plan (2019)	National plan adopting 22 sectoral measures to cut short-lived pollutants. In oil and gas, it targets methane from flaring, venting and fugitive emissions, aligning with Nigeria's climate commitments. The SLCP plan embeds methane reduction in a broader strategy to improve air quality and climate outcomes.	<ul style="list-style-type: none"> • Non-binding framework: The SLCP plan sets targets (e.g. ~60% methane cut by 2030 in oil/gas) but lacks statutory force or earmarked funding. Progress depends on implementing agencies taking ownership of the measures. • Institutional overlap: Responsibilities are spread across the climate department, petroleum regulators and environment agencies, causing potential duplication or gaps. • Measurement/tracking: There is no clear reporting system for the SLCP measures; weak monitoring, reporting, verification (MRV) in oil and gas makes it hard to assess implementation of plan actions.
Flare Gas (Prevention of Waste and Pollution) Regulations (2018)	Statutory regulations banning routine flaring and prescribing penalties. They raised the gas flaring fee substantially and introduced a mechanism for the government to auction off otherwise-flared gas to third parties (akin to the NGFCP model). These are the primary flaring control rules in Nigeria (up to their replacement in 2023).	<ul style="list-style-type: none"> • Enforcement shortfalls: Despite strict rules, enforcement has been weak. Nigeria Extractive Industries Transparency Initiative (NEITI) data show that many companies continued flaring and did not pay the fines due under these regulations. • Policy turnover: The 2018 regulations were superseded in 2023 by new Gas Flaring, Venting and Methane Emissions Regulations, broadening the scope to venting and fugitive methane. The transition has created uncertainty about which rules apply and how fines are computed. • Technical gaps: Weak metering and incomplete leak-detection technology mean true flaring/venting volumes are often under-reported, undermining compliance. The reliance on self-reporting and limited third-party validation makes it difficult to ensure companies meet the stricter standards.
Nigeria's Nationally Determined Contribution (2021)	The 2021 climate pledge to the UN includes an ambitious methane goal: ~60% reduction of oil and gas sector methane emissions by 2031 (from a business-as-usual baseline). This places methane abatement within Nigeria's formal climate strategy and links it to international support and reporting.	<ul style="list-style-type: none"> • Conditional target: The 60% methane cut is conditional on external finance, technology and capacity-building; domestic policies to achieve it are mostly implicit. • Insufficient current action: Analyses note that existing policies (like the Decade of Gas, the NDC itself, etc.) will fail to meet these targets without significant new measures. • Fragmentation of efforts: Methane goals appear in multiple documents (NDC, SLCP plan, Decade of Gas, industry guidelines) without a unified enforcement framework. This can dilute accountability and slow progress unless harmonised.

Source: various; Author's analysis

Nigeria's record on gas-flaring and methane control tells a clear story: plenty of rules, little impact. Conflicting deadlines (2025 from the Petroleum Ministry vs 2030 in the Environment Ministry's Long-Term Vision), overlapping mandates and fragmented enforcement leave operators navigating a maze while flares keep burning. Without a single, authoritative framework for methane, responsibilities blur, penalties go uncollected and reliable emissions data remain scarce undermining both climate pledges and community trust in the Niger Delta.

Some progress is visible. NOSDRA's satellite-based Gas Flare and Methane Emission Trackers have lifted the veil on under-reported flaring and created a public record of leaks. Yet technology alone cannot substitute for coherent governance. Nigeria now needs: (1) a unified timetable and legal basis that binds all agencies; (2) stronger MRV standards so financiers and communities can verify results; and (3) cross-agency taskforces that align penalties, incentives and project approvals. Getting this right would unlock climate finance, advance energy justice for host communities and give credibility to Nigeria's 60% methane-cut pledge – turning today's patchwork of policies (summarised in Table 4) into a coordinated national strategy.

Key insights from stakeholder mapping

The stakeholder assessment was identified as an ongoing process and may evolve as new stakeholders are introduced. A preliminary stakeholder analysis identified the various interests of stakeholder groups and the influence these groups may have on methane mitigation and reduction in Nigeria's oil and gas sector. The analysis will shape the design of future stakeholder consultation events and determine which stakeholders to engage and when.

The understanding of key stakeholders in Nigeria's oil and gas sector is essential for generating relevant and context-specific insights to inform and support effective and sustained methane reduction and mitigation. This section therefore provides an overview of relevant government agencies, industry players, CSOs and international partners. The grouping of stakeholders involved provides a general overview of the methane mitigation and reduction landscape in Nigeria's oil and gas sector (see Table 5).

Table 5

Landscape of broad methane mitigation and reduction multi-stakeholders in the oil and gas sector

Policy stakeholders; technical, commercial and environmental regulators	Oil and gas operators; production, processing, transmission/storage and distribution	Science & technology innovation (R&D)	CSOs, host communities and the international community
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The preliminary mapping analysis of the oil and gas stakeholder landscape in Table 6 below has been developed using the Mendelow and the Salience mapping model. It is subject to further validation at the upcoming workshop.

Table 6

Preliminary analysis of the multi-stakeholders using Mendelow's Matrix and the Saliency Mapping Model

Stakeholders	Mendelow's mapping	Saliency, mapping
Governments, commercial and environmental regulators, policymakers	High power/high interest	High saliency
Oil and gas operators (production, processing, transmission/storage, distribution)	High power/high interest	High saliency
Science and technology innovation (R&D)	Low power/high interest	Medium saliency
Public international finance institutions	Low power/high interest	Medium saliency
Private corporations and financial institutions	Low power/high interest	Medium saliency
CSOs, host communities, the international community	Low power/low interest	Low saliency

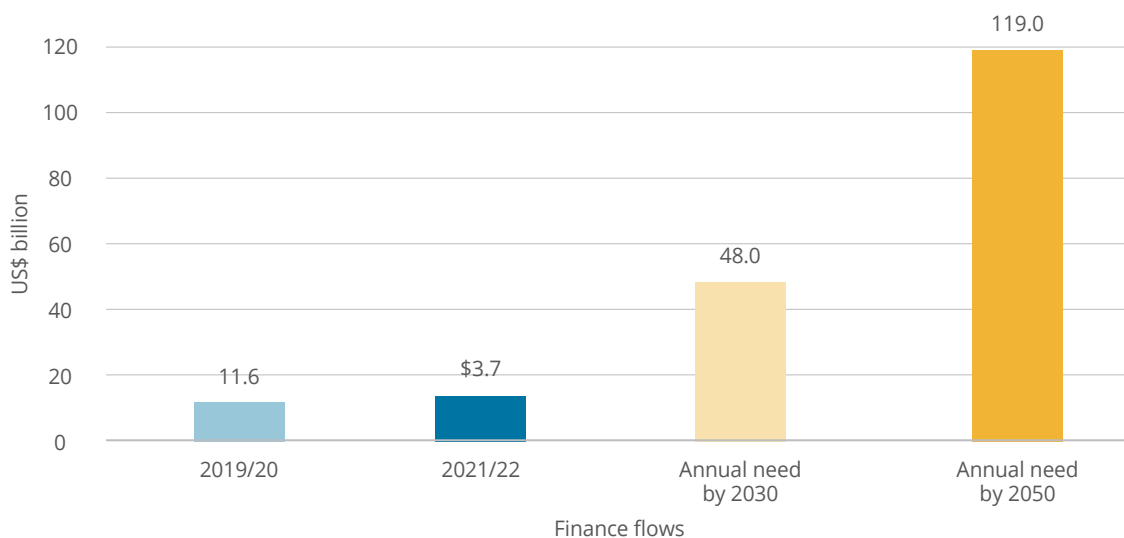
Key insights from the financing landscape and mechanism: sources of finance

While methane reduction offers one of the most effective climate investments, global funding lags far behind the estimated annual need of US\$ 48 billion by 2030 (see Figure 6).⁶³

Funding has experienced a modest 18% increase since 2019/20 (rising from US\$ 11.6 billion to US\$ 13.7 billion in 2021/22), but the projected needs skyrocket between 2030 and 2050.⁶⁴ The current methane mitigation finance flows are insufficient to meet global climate goals. This underscores the urgency to accelerate financial support.

Figure 6

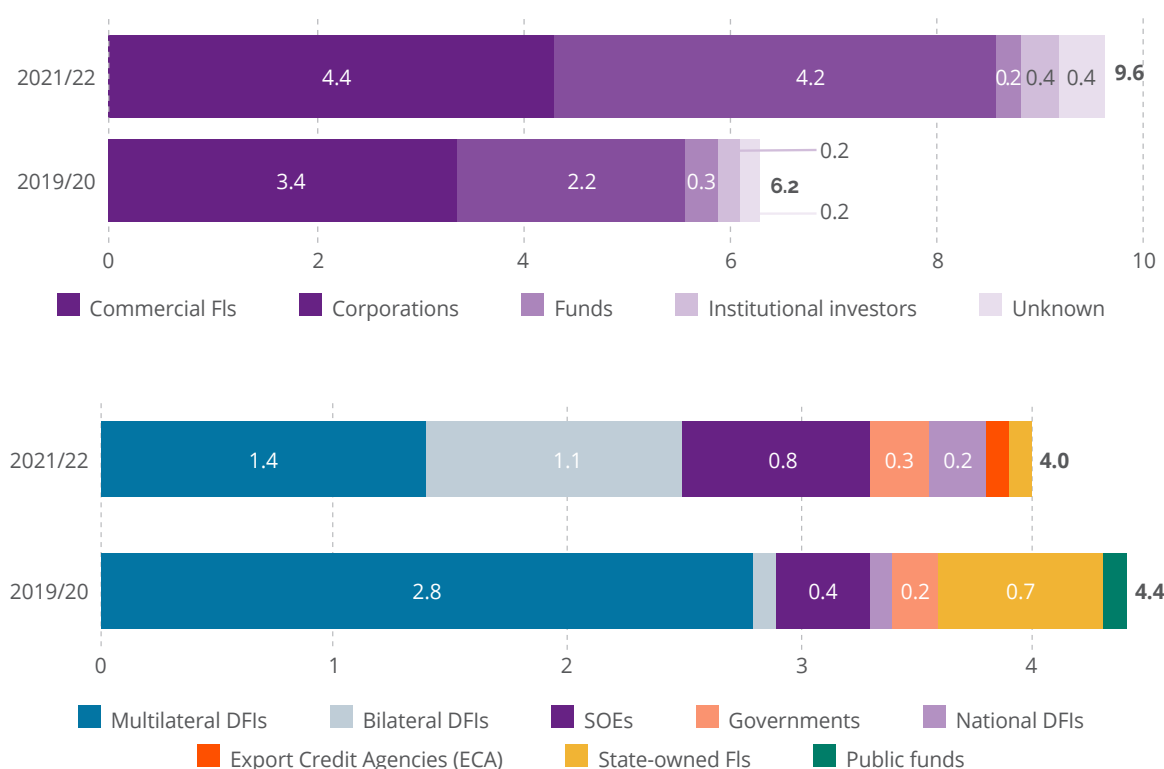
Global finance to methane abatement from 2019/20 and 2021/22 vs annual needs (2030 and 2050) (USD billion)



Source: adapted from Climate Policy Initiative, CPI

Figure 7

Sectoral distribution of methane reduction finance 2019/20 and 2021/22)



Source: Climate Policy Initiative, 2023

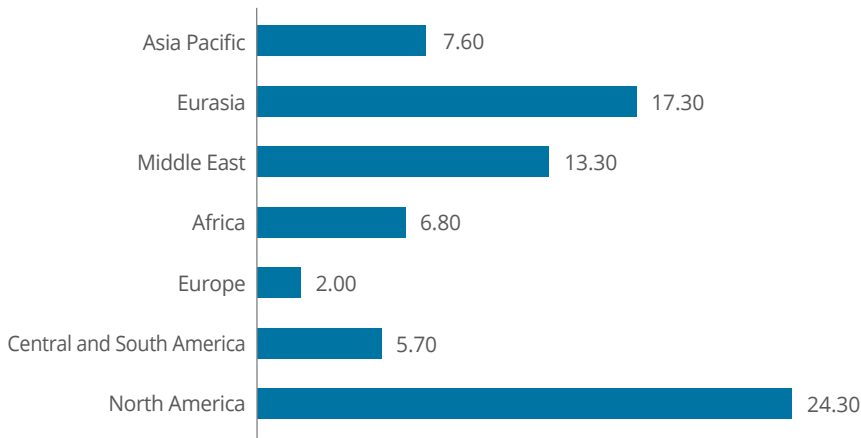
Private sources formed the largest portion of methane finance globally in 2021/22, amounting to US\$ 9.6 billion.⁶⁵ This marks a significant 55% increase from that tracked for 2019/20. Private finance drove the overall methane finance increase in 2019/20, mostly through commercial financial institutions (US\$ 4.4 billion) and corporations (US\$ 4.2 billion).⁶⁶

The largest public sources globally were multilateral and bilateral development financial institutions (DFIs), contributing US\$ 1.4 billion and US\$ 1.1 billion, respectively (see the Climate Policy Initiative [CPI] 2023 report). Multilateral DFI finance saw a 50% drop, driving the overall decline in public finance, much of which was due to China's reductions of US\$ 500 million for agriculture, forestry and other land use (AFOLU) and US\$ 1 billion for waste, according to the CPI 2023 report. China's higher flows in 2019/20 were driven by a one-time sustainable livestock project as well as funding for waste-to-energy plants.

While the global majority of methane reduction funding currently flows to the waste and agriculture sectors, a critical gap exists in financing for the fossil fuel industry, despite its significant contribution to the problem. The largest recipient sector of methane reduction finance in 2021/2022 was AFOLU (US\$ 7.5 billion), followed by waste (US\$ 6.1 billion) and fossil fuels (US\$ 10.6 million) (see Figure 10 below). Accounting for 37% of human-caused methane emissions, the fossil fuel sector alone requires at least US\$ 11.2 billion in annual investment by 2030.^{67 68}

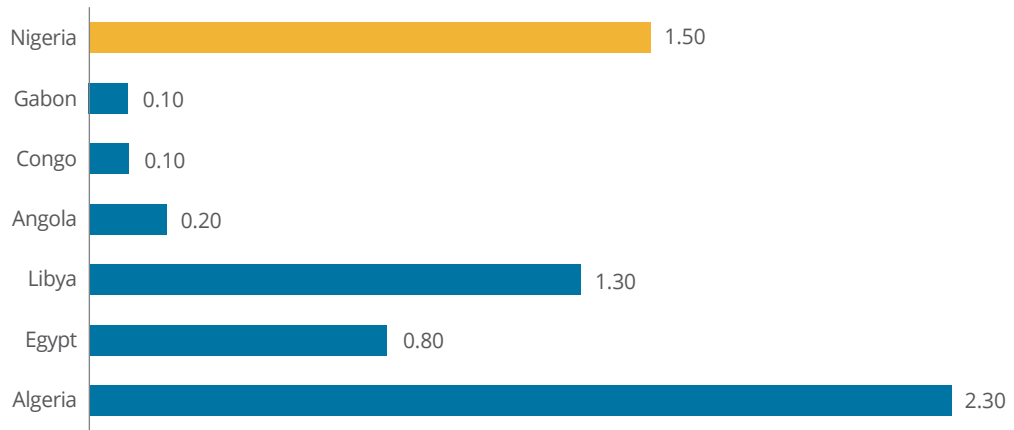
This funding gap is particularly concerning for the oil and gas sector, despite its having the largest potential for mitigation, exceeding even the combined potential of agriculture and waste.⁶⁹ Estimates by IEA, UNEP and CCAC (2023) put the annual global need for this subsector at US\$ 9.4 billion,

Figure 8
Emissions spending needs by 2030 per region (US\$ billions)



Source: IEA data; Author's analysis

Figure 9
Emissions spending needs by 2030 in Africa (US\$ billions)

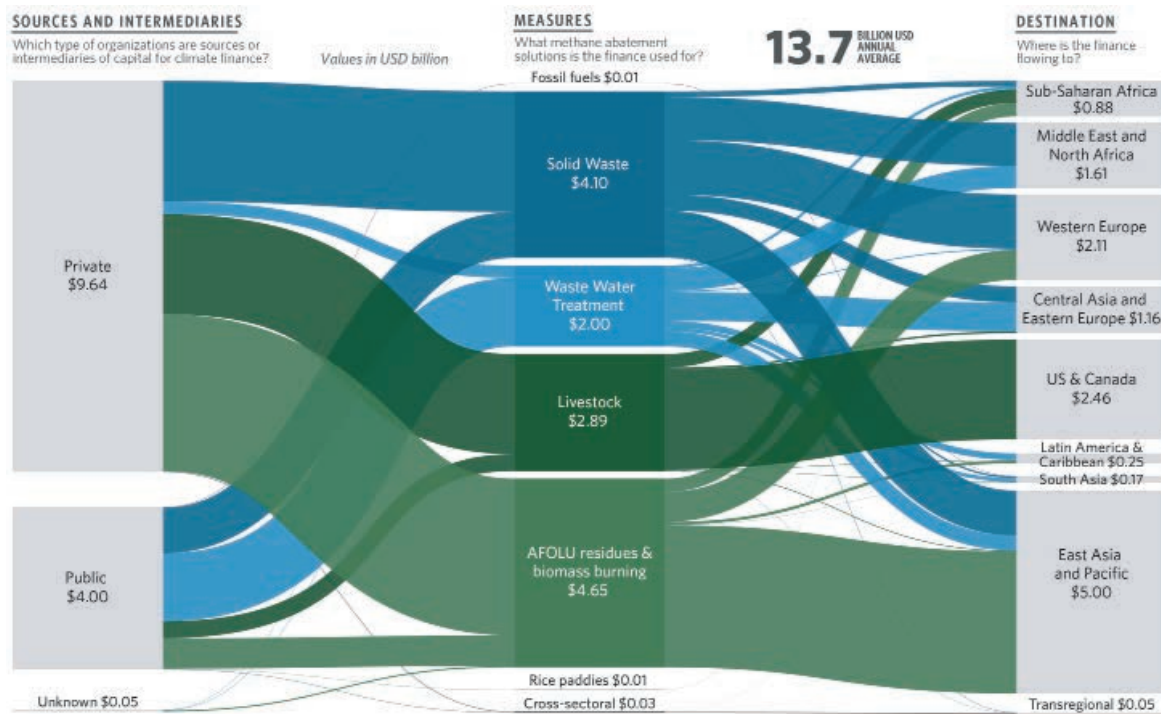


Source: IEA data; Author's analysis

totalling US\$ 75 billion by 2030.⁷⁰ This sum represents a mere 2% of the industry's net income for 2022, highlighting a stark disconnect between the scale of the problem and the current level of financial commitment.

According to a recent report by the IEA, over US\$ 75 billion in spending is required by 2030 to achieve the needed reductions in global methane emissions (figure 8). In Nigeria, US\$ 1.5 billion will be needed between 2023 and 2030 to reduce methane emissions in the country's oil and gas operations⁷¹ (see figures 8 and 9). According to the report, oil and gas majors operating in the country have a responsibility to contribute US\$ 300 million to meet the target. Also, NNPC Limited and other investors in Nigeria's oil and gas sector have the capacity to contribute US\$ 700 million and US\$ 500 million, respectively, during the same period.⁷²

Figure 10
Methane financing architecture



Source: Climate Policy Initiative, 2023

Stakeholder engagement

Introduction

The effective mitigation of methane emissions in Nigeria's oil and gas sector requires a comprehensive, multi-stakeholder approach involving government agencies, private organisations, international partners and local communities. Recognising the need for collaboration, APRI – Africa Policy Research Institute, in partnership with the Department of Climate Change, Federal Ministry of Environment, Nigeria, facilitated an extensive stakeholder engagement process. This initiative aimed to map the existing methane landscape, assess policy effectiveness, identify key challenges and explore opportunities for enhanced methane reduction efforts.

The stakeholder engagement process provided a platform for robust discussions on regulatory frameworks, technological innovations, financing mechanisms and implementation strategies. Insights were drawn from diverse perspectives, including federal and state government agencies, industry players, CSOs and academia. These interactions helped refine the project's initial findings, ensuring that the recommendations align with national priorities and global best practices.

A highlight of the engagement was a national validation workshop where government representatives reaffirmed their commitment to methane reduction, with NOSDRA announcing periodic quarterly reviews of oil company plans to end routine gas flaring by 2030. Additionally, stakeholders emphasised the importance of data transparency, regulatory coherence and innovative financial incentives to drive methane mitigation efforts. The engagement with Niger

Delta University (NDU) further underscored the critical role academic institutions can play in bridging knowledge gaps, conducting research and advocating for effective methane mitigation strategies. However, their moderate level of awareness highlights the need for stronger engagement and capacity-building within academia to contribute meaningfully to this domain.

Methodology

To ensure a comprehensive and inclusive stakeholder engagement process, a mixed-methods approach incorporating both qualitative and quantitative data collection techniques was employed. This facilitated in-depth insights into methane mitigation policies, industry practices and community-level challenges.

- **Interviews:** Semi-structured interviews were conducted with key stakeholders, including government officials, industry representatives, environmental experts and academic institutions such as NDU. These interviews provided critical insights into policy implementation, technological adoption and financing mechanisms. Additionally, enforcement challenges and industry perspectives on methane reduction efforts were explored.
- **Workshop:** A hybrid national validation workshop engaged 155 participants from various sectors and fostered dialogue on best practices and refining recommendations. The workshop provided a unique opportunity for direct stakeholder interaction, allowing for the exchange of perspectives on regulatory improvements, technological advancements and collaborative solutions.
- **Focus group discussions (FGDs):** Targeted FGDs were held to capture community experiences with methane emissions and mitigation efforts. These discussions provided qualitative insights into the socio-economic and environmental impacts of methane pollution, highlighting the concerns and priorities of host communities in oil-producing regions.
- **E-questionnaires:** To supplement the interviews and FGDs, e-questionnaires were disseminated, especially to international stakeholders and those unable to attend in-person engagements. This approach ensured broader participation and a more diverse dataset, enriching the overall analysis.
- **Data analysis:** A combination of qualitative and quantitative analysis techniques was applied to evaluate the data collected from stakeholder engagements. Thematic analysis was used to identify recurring patterns and key themes from interviews, FGDs and workshop discussions. Additionally, statistical methods were employed to analyse questionnaire responses, providing empirical insights into stakeholder perspectives on methane mitigation policies and implementation challenges.

The insights gathered from this stakeholder engagement process form the foundation for actionable policy recommendations that aim to enhance methane mitigation efforts in Nigeria's oil and gas sector.

Key insights from the national stakeholder validation workshop

APRI – Africa Policy Research Institute, in close collaboration with the Department of Climate Change, Federal Ministry of Environment, Nigeria, organised a stakeholder engagement event in the context of the Methane Mitigation and Reduction Project (MMRP) in Nigeria's oil and gas sector.

The workshop introduced the project to relevant stakeholders and gathered feedback on the initial findings of APRI's exercise to map the methane landscape's mitigation and reduction policies, implementation strategies and the state of financing and stakeholders involved in these efforts. After initial inputs and a presentation of the summary of the key findings, the participants discussed and assessed the status, gaps, challenges and opportunities related to effective and sustained methane mitigation and reduction efforts, and identified areas where more data are needed to inform and support methane action policy and implementation strategies, specifically in the oil and gas sector.

An insightful policy pronouncement was made at the event:

Within the oil and gas sector, practical steps are being taken to address methane emissions. Collaborative efforts of government institutions have led to the development of methane guidelines. In addition, the Federal Ministry of Environment through the National Oil Spill Detection and Response Agency (NOSDRA) will be commencing the periodic quarterly review of the plans of international and Indigenous oil companies to ensure they stay on course to end routine gas flaring by latest 2030.

– Dr. Iziaq Adekunle Salako

Figure 11
National stakeholders' validation workshop



Source: Author

The following are the key insights from the one-day national stakeholder validation workshop.

- **Data tracking and reporting:** A representative from NOSDRA emphasised the value of satellite technology for emissions tracking. This further stressed the importance of establishing an independent data source to ensure the robustness of emissions reporting and highlights the need for a comprehensive approach to data collection and verification.
- **Policy development:** A representative from the Nigerian Nuclear Regulatory Authority (NNRA) advocated for a more analytical approach to policy design, incorporating tools like SWOT (strengths, weaknesses, opportunities, threats) and PEST (political, economic, social, technological) analyses. This suggests a comprehensive, data-driven approach to policy development for effective methane mitigation.
- **Midstream and downstream considerations:** A representative from the NMDPRA highlighted the ongoing efforts to develop guidelines for tracking and mitigating emissions in the midstream and downstream sectors of the oil and gas sector. They further emphasised the need for innovative technologies, capacity-building across relevant agencies and increased public awareness. This highlights the importance of a comprehensive approach that addresses all segments of the oil and gas value chain.
- **Leveraging existing initiatives:** A representative from the Federal Ministry of Petroleum Resources suggested exploring the possibility of adapting SMET (the Satellite Methane Emissions Tracker) to better reflect current climate realities. They also emphasised the value of leveraging NOSDRA's initiatives. Additionally, they noted the ministry's collaboration with the NCCC to advance methane emissions mitigation efforts. This underscores the importance of collaboration and utilising existing resources for maximum impact.
- **Data disaggregation and utilisation:** A representative from the Federal Ministry of Agriculture and Food Security stressed the need to disaggregate data and translate it into actionable insights. This suggests a focus on ensuring data is presented in a way that is readily usable by policymakers and stakeholders.
- **Community protection:** A representative from NUPENG (Nigeria Union of Petroleum and Natural Gas Workers) advocated for the report to include practical solutions on how host communities can protect their environment from the impacts of methane emissions. This highlights the importance of incorporating the perspectives and needs of local communities into methane mitigation strategies.
- **Subnational engagement:** A representative from the Nigeria Governors' Forum proposed an inclusive and robust engagement to include relevant agencies and stakeholders at the subnational level, particularly in oil-producing regions in the methane mitigation effort. This suggests the importance of a multi-level governance approach that incorporates the critical role of subnational actors in achieving national methane reduction targets.

Key insights from the stakeholder consultation

The stakeholder consultation provided detailed insights into the perspectives of three key stakeholder groups – government agencies, the international community and private organisations – who play a crucial role in addressing methane emissions in Nigeria's oil and gas sector. The findings highlight notable differences in awareness, perceived impacts, challenges and suggestions for improving mitigation efforts. The following stakeholders were engaged:

- **Government ministries, departments and agencies (MDAs):** The study engaged key government stakeholders, including NOSDRA, the Department of Climate Change within the Federal Ministry of Environment, NMDPRA and the Department of Petroleum and Pollution in Bayelsa State. Discussions centred on exploring the challenges and opportunities within Nigeria's policy and regulatory landscape for methane mitigation and reduction efforts.
- **Private organisations:** The study engaged Carbon-Limit Nigeria and the Stakeholder Democracy Network (SDN Nigeria).
- **International organisations:** The study engaged the Natural Resource Governance Institute (NRGI), Oxford Policy Management (OPM), the Clean Air Task Force (CATF) and the Africa Centre for Energy Policy (ACEP). These interactions explored the perspectives and roles of the international community in supporting methane mitigation and reduction efforts in Nigeria.

Academic institution: Niger Delta University, although not originally planned for engagement, was successfully incorporated into the study and provided valuable academic perspectives and insights.

Key insights from government agencies

Government agencies, particularly NOSDRA, Bayelsa State Government representatives and the NMDPRA, exhibit varying levels of awareness and engagement with methane emissions in Nigeria's oil and gas sector.

National Oil Spill Detection and Response Agency (NOSDRA)

NOSDRA demonstrates a very high level of awareness of methane emissions and their environmental and economic impacts. The agency identifies multiple benefits of methane reduction, including reduced environmental harm, enhanced public health, increased revenue from captured gas, improved operational efficiency and a stronger sectoral reputation. NOSDRA has taken proactive steps, such as developing the Nigerian Gas Flare Tracker and the Satellite-based Methane Emission Tracker (SMET), to monitor and mitigate emissions. Key challenges include regulatory and policy gaps, inconsistent enforcement and limited technical and financial resources. NOSDRA emphasises the need for increased collaboration and funding to address these barriers and improve transparency and accountability measures.

Nigerian Midstream and Downstream Petroleum Regulatory Authority (NMDPRA)

NMDPRA demonstrates a very high level of awareness and a deep understanding of the environmental and economic impacts of methane emissions. The agency identifies several benefits of methane mitigation, including reduced environmental harm, improved operational efficiency, enhanced public health and increased revenue from captured gas. NMDPRA is currently

engaged in mitigation efforts, notably through the development of **greenhouse gas (GHG) management regulations and guidelines for the midstream and downstream petroleum industry**. However, their representative expressed indifference about the initiative's effectiveness due to industry operators' lack of transparency regarding GHG management strategies.

Key methane-emitting activities, as identified by NMDPRA, include midstream gas processing and distribution, venting, gas flaring, fugitive emissions and petroleum product distribution and storage. Technologies and practices like optical gas imaging (OGI) cameras, retrofitting of equipment (e.g. vapour control units, zero bleed devices) and improved detection methods have proven effective for methane reduction.

NMDPRA stresses the importance of collaboration between stakeholders, particularly the involvement of international organisations and NGOs, in successful methane mitigation efforts. To enhance outcomes, the agency recommends addressing knowledge gaps through capacity-building initiatives for regulators and operators, with a focus on adopting evolving technologies.

Department of Petroleum and Pollution, Federal Ministry of Environment, Bayelsa State

In contrast, the Bayelsa State Government exhibits high awareness of methane emissions but lacks active involvement or familiarity with ongoing mitigation initiatives. Representatives recognise reduced environmental impact as a primary benefit of methane reduction but report no active measures to tackle emissions. Challenges include insufficient technical capacity and limited inclusion in national mitigation efforts. Suggested improvements focus on fostering partnerships and increasing local involvement in methane reduction strategies.

Common challenges and recommendations

Across these agencies, shared challenges include regulatory gaps, inconsistent enforcement and insufficient resources for monitoring and mitigation. Recommendations emphasise the need for methane-specific regulations, increased funding, stakeholder collaboration and capacity-building programmes to equip regulators and operators with the skills and technologies required for effective methane mitigation.

Key insights from private organisations

Private organisations play a critical role in advancing methane mitigation in Nigeria's oil and gas sector. The insights from Carbon-Limit Nigeria (CLN) and the Stakeholder Democracy Network (SDN Nigeria) highlight the challenges, opportunities and key recommendations to enhance methane reduction strategies. These findings underscore the importance of bridging technical gaps, incentivising compliance and fostering collaboration among stakeholders.

Challenges identified by CLN

- **Operator reluctance:** CLN emphasises that a major barrier is the lack of understanding among operators regarding the economic and environmental benefits of methane mitigation. Operators' fears of profit erosion further deter engagement with methane reduction initiatives.

- Technological costs: The high cost of deploying advanced methane measurement and mitigation technologies creates a significant barrier, limiting the adoption of effective solutions.
- Sectoral coordination deficits: CLN identifies a lack of integration and collaboration across the oil and gas sector. The siloed operations among stakeholders result in fragmented efforts, reducing the overall effectiveness of mitigation strategies.

Opportunities highlighted by CLN

- Carbon credits as incentives: Introducing mechanisms like carbon credit programmes could incentivise oil and gas operators to adopt methane reduction measures. By tying economic gains to emission reductions, operators may view methane mitigation as a viable business opportunity.

Recommendations by CLN

- Enhanced monitoring and verification: CLN advocates for using both emission factor estimation and direct measurement technologies to ensure accurate tracking of methane emissions.
- Collaboration and information sharing: A key priority is fostering closer collaboration among stakeholders, including regulators, operators and technology providers. This includes sector-wide coordination to standardise approaches and share best practices.
- Capacity-building: The development of sectoral understanding about methane's financial and environmental impacts, alongside affordable technology adoption strategies, is crucial to overcoming existing barriers.

Awareness and engagement by SDN Nigeria

- SDN Nigeria exhibits a high level of awareness of methane emissions and their impacts, actively participating in methane mitigation through advocacy, capacity-building and technological innovation.
- Ongoing efforts include supporting the development of a satellite-based methane tracking tool in collaboration with NOSDRA and training programmes aimed at strengthening monitoring, reporting and verification (MRV) processes among stakeholders.

Challenges identified by SDN Nigeria

- Insufficient technical oversight: A primary barrier to effective mitigation is the lack of robust technical and regulatory frameworks, which hampers the effective implementation and enforcement of methane reduction initiatives.
- Moderate impact of current efforts: Despite ongoing activities, SDN Nigeria acknowledges that the impact of existing methane mitigation efforts remains limited, requiring additional resources and coordination to achieve tangible results.

Opportunities and improvement mechanisms highlighted by SDN Nigeria

- Advancing technical knowledge: SDN highlights the importance of improving technical expertise in methane mitigation. This includes adopting globally recognised best practices tailored to the Nigerian oil and gas sector.
- Multi-stakeholder collaboration: SDN underscores the need for a collaborative approach involving private organisations, regulators, international actors and host communities. Such collaboration can help bridge knowledge gaps, improve enforcement and foster innovation.

Key contributions by SDN Nigeria

- Advocacy and tracking tools: By introducing tools like satellite-based methane tracking and building the capacity of regulators, SDN contributes to improving transparency and accountability in methane emissions monitoring.
- Policy influence: Through partnerships with NOSDRA and other stakeholders, SDN advocates for policy reform and regulatory enhancements that address the systemic gaps in oversight and enforcement.

Comparative insights

Both CLN and SDN bring complementary strengths and perspectives to methane mitigation:

- CLN focuses on the economic and operational dimensions, emphasising incentives like carbon credits and addressing operator concerns about costs and profitability.
- SDN Nigeria emphasises regulatory and technical capacity, aiming to create a more robust institutional framework for methane mitigation through advocacy, training and tracking technologies.

Recommendations for private sector engagement in methane mitigation

- **Integrating economic incentives:** Carbon credits and other market-based mechanisms should be introduced to align operators' financial interests with environmental goals.
- **Strengthening technical capacity:** Collaborative efforts to build technical expertise, as emphasised by SDN, are crucial for deploying effective MRV systems and fostering trust among stakeholders.
- **Promoting sectoral collaboration:** Establishing a coordinated platform for information sharing and joint action can bridge the operational silos highlighted by CLN.
- **Scaling technological innovation:** Partnerships to reduce the cost of methane detection and mitigation technologies can accelerate adoption, particularly in resource-constrained contexts.
- **Fostering community and policy synergy:** Leveraging the insights from host communities and integrating their needs into mitigation strategies can enhance local buy-in and policy relevance.

Key insights from the international community

The international organisations engaged – Oxford Policy Management (OPM), the Africa Centre for Energy Policy (ACEP, and the Clean Air Taskforce (CATF) – exhibited a high level of awareness of methane emissions in Nigeria's oil and gas sector. Their insights underscore critical challenges, opportunities and strategies for effective methane mitigation and reduction.

Current initiatives

While these international organisations have supported significant methane reduction initiatives in Nigeria, their evaluations reveal mixed effectiveness.

- **OPM** highlighted the ineffectiveness of current methane mitigation efforts due to inadequate regulatory frameworks, suboptimal MRV processes and the lack of comprehensive programmatic approaches.
- **ACEP** considered Nigeria's efforts more effective, citing progress in gas flare tracking and regulatory developments, but stressed the need for improved institutional coordination to sustain and scale these achievements.
- **CATF** deemed the government's initiatives largely ineffective due to minimal compliance with existing regulations, further emphasising the need for a robust regulatory framework across the oil and gas value chain.

Key challenges

Key challenges hindering methane mitigation in Nigeria are rooted in systemic issues:

- **Data management:** OPM identified the lack of transparent, accurate and readily available data across facilities as a baseline issue. Current MRV systems, reliant on disclosures and periodic inspections, require enhancement through satellite technology.
- **Institutional coordination:** Both OPM and ACEP noted significant regulatory incoherence between agencies like NOSDRA and NUPRC. ACEP emphasised institutional coordination as a critical gap, undermining the alignment of priorities and targets across stakeholders.
- **Regulatory compliance:** CATF raised concerns about widespread non-compliance with existing methane regulations, a factor exacerbating emissions and diminishing the impact of mitigation strategies.

Opportunities

The international community identified substantial opportunities for methane mitigation in Nigeria:

- **Technological advancements:** All three organisations emphasised leveraging MRV-enhancing technologies, such as satellite-based monitoring and leak detection systems, to optimise methane management.

- Incentivisation models: OPM highlighted the potential of regulatory incentives, such as carbon pricing and opportunity cost frameworks, as seen in Canada and Kazakhstan, to drive compliance and innovation among operators.
- Gas commercialisation: ACEP advocated for effective methane management as a pathway to gas commercialisation, offering economic and environmental benefits.

Global best practices: Lessons for Nigeria

The international organisations drew on global experiences to recommend tailored strategies for Nigeria:

- Regulatory innovations: OPM cited robust public-private partnership models in Norway and methane abatement policies in the US as effective approaches.
- Leak detection and repair (LDAR): CATF emphasised LDAR programmes as critical tools for reducing emissions and improving operational efficiency.
- Incentivised action: Countries like Canada and Kazakhstan demonstrated the value of economic incentives in driving compliance and fostering innovation.

Recommendations

To enhance methane mitigation in Nigeria, international organisations proposed a range of recommendations:

- **Collaboration and coordination:** CATF and ACEP stressed the importance of collaborative efforts among stakeholders, including government agencies, academia, civil society and private sector actors, to avoid duplication and streamline efforts.
- **Investment in MRV technology:** All organisations advocated for significant investments in satellite and ground-based technologies to improve the accuracy and reliability of methane monitoring.
- **Incentives and funding:** OPM and CATF underscored the need for structured funding mechanisms and financial incentives to motivate operators to adopt emission-reduction technologies and practices.
- **Capacity-building:** Technology transfer, peer-to-peer learning and technical assistance were highlighted as essential to bridging the knowledge and resource gaps in Nigeria's methane mitigation efforts.

Impact of international support

The contributions of international organisations have had a measurable, though limited, impact.

- Outputs achieved: Initiatives such as technical assistance on methane regulations (CATF), improved gas flare tracking (ACEP) and enhanced MRV tools (OPM) represent valuable contributions.
- Outcomes still lacking: The absence of a cohesive strategy, as well as systemic challenges, have hindered the achievement of long-term reductions in methane emissions.

Academic institution – Niger Delta University

The engagement with Niger Delta University (NDU) highlights the critical role academic institutions can play in bridging knowledge gaps and advocating for effective methane mitigation strategies in Nigeria's oil and gas sector. However, NDU's moderate level of awareness reflects the need for stronger engagement and capacity-building within academia.

Awareness and advocacy

NDU demonstrated a moderate awareness of methane emissions and their implications for the oil and gas sector. While the university recognises the environmental benefits of methane reduction, this limited awareness suggests a need to deepen academic involvement in methane-related research, policy advocacy and capacity development.

Key benefits

The university underscored the importance of methane mitigation for reducing environmental harm, particularly in the Niger Delta region, where the ecological impact of oil and gas activities is most pronounced. This perspective aligns with broader global and national goals of mitigating climate change and reducing pollution-related health risks.

Key challenges

NDU identified two critical challenges undermining methane mitigation efforts:

- **Policy implementation and enforcement:** The university highlighted gaps in the enforcement and monitoring of existing policies, which compromise the effectiveness of methane reduction initiatives. These gaps reflect broader systemic issues within Nigeria's regulatory framework.
- **Inadequate funding:** The lack of adequate financial resources to support methane mitigation projects, including research and monitoring activities, was emphasised as a major constraint. This funding shortfall affects not only policy implementation but also the ability of academic institutions to contribute effectively to knowledge generation and advocacy.

Opportunities for academic contributions

Despite these challenges, academic institutions like NDU have the potential to play a transformative role in methane mitigation efforts:

- **Research and innovation:** With increased awareness and funding, NDU could leverage its expertise to develop locally tailored solutions for methane monitoring and reduction.
- **Policy support:** By providing evidence-based recommendations, the university could support the design and enforcement of robust policies.
- **Capacity-building:** As an academic institution, NDU is well-positioned to train future policymakers, researchers and industry professionals in methane mitigation strategies.

Recommendations

To enhance the role of academic institutions in methane mitigation, the following strategies are recommended:

- **Increased funding:** Governments and international organisations should provide targeted funding for methane-related research and capacity-building initiatives within academic institutions.
- **Policy collaboration:** Academic institutions should be integrated into policy development and implementation processes, ensuring their research informs decision-making.
- **Awareness campaigns:** Efforts should be made to raise awareness about methane emissions among academia and local communities, enabling a broader understanding of the emissions' environmental and socio-economic impacts.

Field study

Introduction

The field study built on insights derived from the MMRP's Deliverable 1: the Framing Paper, and Deliverable 2: the Methane Mitigation and Reduction in Nigeria's Oil and Gas Sector Mapping Report. The fieldwork aimed to deepen the understanding of the operational challenges, stakeholder involvement, financing mechanisms and technological practices impacting methane mitigation in this sector. Given Nigeria's extensive oil and gas activities, methane emissions present a significant environmental and health challenge for surrounding communities. The report covered site visits, stakeholder interviews and data collection methods, and reflected on the obstacles encountered and strategies for future improvements.

The primary objectives of this field study were to:

- Analyse and validate the implementation and progress of methane mitigation and reduction policies in the oil and gas sector.
- Validate information gathered in the MMRP Mapping Report, including stakeholder roles and financing mechanisms for mitigation strategies.
- Analyse the effectiveness of deployed methane mitigation and reduction technologies.
- Identify operational challenges and best practices in methane mitigation and reduction.
- Assess the social and health impacts of methane emissions on host communities.
- Evaluate stakeholder capacity and needs for implementing mitigation strategies.
- Gather qualitative data to inform the development of recommendations for future methane mitigation efforts.

Field methodology

Data collection tools

- **Semi-structured interviews:** Standardised interview guides were developed for host communities, addressing policy implementation, challenges, opportunities, financing mechanisms and roles in methane mitigation.
- **Pilots:** Before conducting the interviews, pilot sessions were held to refine the questionnaires and assess feasibility and practicality. This process helped identify issues and improve the overall quality of the data collection instruments.
- **Site visits:** Site visits were conducted to oil and gas production facilities (with necessary permissions) in Bayelsa, Rivers and Cross River States. These visits allowed for the direct observation of methane mitigation technologies and practices.
- **Focus group discussions (FGDs):** Discussions with local communities living near oil and gas facilities were held to understand their experiences with methane emissions and their involvement in mitigation efforts.

Sampling strategy: selection criteria for site visits

The study adopted a multi-criteria approach to the selection of states for site visits. This strategy ensured logical and comprehensive coverage of locations relevant to methane mitigation and reduction practices:

- **Environmental vulnerability:** States were ranked according to their environmental vulnerability, considering proximity to oil and gas facilities, wind patterns, vulnerable ecosystems and history of oil spills and gas leaks.
- **Concentration of oil and gas activities:** States with high oil and gas production volumes were prioritised to ensure that the visited facilities represented industry-wide practices.
- **Presence of oil refineries:** States with oil refineries were included to broaden the scope of the study to cover methane emissions from refining processes as well as production.

Based on these criteria, Lagos, Anambra, Bayelsa and Port Harcourt States were initially selected for the site visits, as these states met the environmental, production and host community diversity requirements. However, due to **access restrictions** primarily related to bureaucratic hurdles and logistical challenges, the study could not proceed as originally planned in **Anambra and Lagos States**. To compensate for this, **Cross River State** was incorporated into the study. This adjustment ensured that the study maintained geographic diversity and the necessary representation of host communities in oil-producing regions, particularly those with significant environmental vulnerability and active oil and gas activities.

As a result, Bayelsa, Rivers and Cross River States were included in the field study, with an increased focus on host communities in these states to make up for the absence of data from Anambra and Lagos. This modification allowed the study to continue without compromising the scope and depth of its analysis.

Overview of Bayelsa, Rivers and Cross River States

This overview provides a detailed examination of Bayelsa, Rivers and Cross River States in Nigeria, focusing on their geographic, economic, socio-economic and political landscapes. Additionally, the impact of oil and gas activities in these regions will be discussed.

Bayelsa State

Bayelsa State is in the south-south region of Nigeria, primarily within the Niger Delta. It was created in 1996 from Rivers State and covers an area of approximately 10,773 square kilometres. The state is characterised by a riverine landscape with numerous creeks and mangrove swamps, making road infrastructure development challenging. The capital city is Yenagoa, which is prone to flooding due to its low-lying topography. Bayelsa shares borders with Rivers State to the east and Delta State to the north, while the Atlantic Ocean lies to its south.⁷³

The economy of Bayelsa is heavily reliant on the petroleum industry. It is home to the Oloibiri Oilfield, where oil was first discovered in Nigeria in 1956. The state is responsible for producing 30-40% of Nigeria's oil output and possesses the largest gas reservoir in the country, estimated at 18 TSCF. Despite this wealth in natural resources, Bayelsa faces significant challenges such as poverty and environmental degradation caused by oil spills and pollution.⁷⁴

Bayelsa has a population of approximately 2.5 million people, predominantly from the Ijaw ethnic group. The state has a rich cultural heritage but suffers from high unemployment rates and limited access to basic services due to its economic reliance on oil. Many residents engage in subsistence fishing and farming as alternative livelihoods. There are ongoing issues related to security and violence linked to conflicts over resource control and environmental degradation. The political environment in Bayelsa has been marked by instability and conflict, often driven by competition for control over oil resources. The state government has made efforts to promote Ijaw culture but faces challenges from local militias and criminal groups that have emerged in response to economic marginalisation.⁷⁵

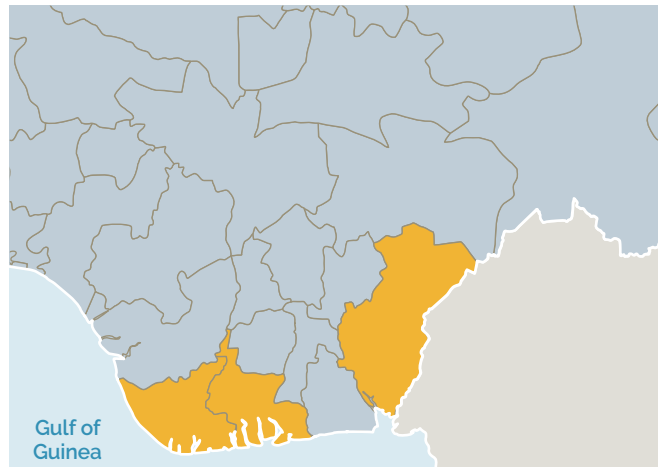
Figure 12

Field visits states

A: African inset Nigeria and field study states



B: Map of southern Nigeria showing field study states



Field study states State boundaries Water Neighbouring african country

Source: Author

Rivers State

Rivers State, established in 1967, is also located in the Niger Delta region. It covers an area of around 11,077 square kilometres and features a network of rivers that contribute to its rich biodiversity.⁷⁶ The state capital is Port Harcourt, which serves as a major industrial hub. The state's economy is predominantly driven by its extensive oil reserves: It produces over 60% of Nigeria's crude oil output.⁷⁷ The state hosts two major oil refineries and several industrial estates that support sectors including agriculture and manufacturing. In 2021, Rivers State ranked second nationwide with a GDP of US\$ 51.529 billion.⁷⁸

With a diverse population that includes ethnic groups such as the Ikwerre and Ogoni people, Rivers State faces socio-economic challenges such as poverty and unemployment, despite its wealth from oil resources. The fishing industry plays a vital role in local livelihoods, although environmental issues related to oil extraction have affected fish populations. The state has experienced political turbulence characterised by electoral violence and conflicts among interest groups vying for control over resources. The state's governance has been challenged by corruption scandals and public discontent regarding service delivery.⁷⁹

Cross River State

Cross River State is located in southeastern Nigeria, bordered by Cameroon to the east. It covers an area of approximately 20,156 square kilometres. The state features diverse ecosystems ranging from coastal areas to mountainous regions, including parts of the Cross River National Park. The economy of Cross River is more diversified compared to Bayelsa and Rivers States. While agriculture plays a significant role – producing crops like cocoa, rubber and palm oil – the state also has potential for tourism due to its natural beauty and cultural heritage. Oil production exists but is not as dominant as in the other two states.⁸⁰

Cross River has a population that includes ethnic groups such as the Efik and Ejagham people. The state faces challenges related to poverty alleviation and infrastructure development but benefits from its tourism potential through attractions like Calabar Carnival. Cross River's political environment has been relatively stable compared to Bayelsa and Rivers States. However, it still grapples with issues such as corruption and governance challenges. Political leadership has focused on promoting tourism and sustainable development initiatives to enhance economic growth.

Oil and gas activities across the states

Due to their rich deposits within the Niger Delta region, oil exploration significantly influences the economies of Bayelsa⁸¹ and Rivers States.⁸² However, this wealth comes with adverse effects, including environmental degradation from spills and gas flaring that impact local communities' health and livelihoods. In contrast, Cross River's lesser focus on oil allows for a more diversified economic approach that includes tourism alongside agriculture.

In summary, while all three states are part of Nigeria's rich Niger Delta region and thus share significant natural resources, they exhibit distinct geographic features, economic structures dominated by oil (in Bayelsa and Rivers), varied socio-economic challenges and differing political dynamics influenced by their resource wealth or lack thereof.

Methodology summary

A mixed-method approach was employed, including semi-structured interviews, focus group discussions and direct site observations in Bayelsa, Rivers, and Cross River States (see Table 7). Participants were drawn from diverse community groups such as local leaders, women, youth and fishermen. Data collection tools were pre-tested and refined for clarity and relevance. All data were anonymised and analysed using thematic techniques.

Table 7

Summary of field study data collection methodology on methane mitigation and reductions efforts across Bayelsa, Cross River and Rivers states

Parameter	States		
	Bayelsa	Rivers	Cross River
Number of interviews conducted	7	10	12
% aware of methane emissions	90%	90%	75%
Tools used for data collection	Survey and FGDs	Survey and FGDs	Surveys, key informant interviews
Data collection parameters			
Participants (gender, age, occupation)	Male and female, various age groups, community leaders, youth groups	Male and female, various age groups, oil industry workers	Male and female, various age groups, fishermen, farmers
Locations	Oil production areas and coastal communities	Oil production areas	Rural and city inhabitants
Duration of site visits	1 day	1 day	day

Note: interviewees' ages ranged from 18 to 72

Key findings from host communities in Bayelsa, Rivers and Cross River States

The findings from host communities in Bayelsa, Rivers and Cross River States provide a nuanced understanding of the awareness, impacts and challenges associated with methane emissions in Nigeria's oil and gas sector. These insights highlight regional differences in knowledge, engagement and recommendations, offering a foundation for tailored policy and intervention strategies. Overall, however, the study's findings reveal the catastrophic effects of unmitigated methane emissions as portrayed by the host communities' extensive testimonies and the overwhelming evidence of the impacts of these emissions.

Table 8

Summary awareness and perceived impacts of methane emissions across Bayelsa, Rivers and Cross River States

State	Level of awareness	Impacts			Remarks
		Environmental	Health	Economic	
Bayelsa	High	Oil spills, gas flare, degraded farmlands, water and air pollution	Respiratory, skin diseases and reproductive mutation ⁸³	Decline in farming and fishing, loss of livelihood and economic benefits ⁸⁴	High awareness due to direct exposure and oil spill history
Rivers	High	Oil spills, water pollution, gas flares, black soot, air quality issues, degraded farmlands	Respiratory issues, skin irritation	Reduced productivity in fishing/farming, livelihood loss	Communities knowledgeable but excluded from planning
Cross River	Moderate	Decline in fish/snail production, water and air pollution, nature loss	Reproductive and vision problems (noted by women)	Income loss due to degradation of natural resources	Fewer oil operations. Gaps in awareness among women and youth

Note: according to a community leader interview 'Shell makes more profit per barrel here than almost anywhere else, and it costs them less to produce too. That's why they've stayed so long - Nigeria gives them the best returns with the least expense'. This was further expatiated in Shell's general annual report.⁸⁵

Perceived impacts of methane emissions

Across all states, communities reported severe and consistent environmental, health and economic impacts.

- Environmental degradation: Pollution of farmlands, rivers and air quality was universally noted, with specific references to poor agricultural yields, reduced fishery outputs and snail farming challenges in Cross River.
- Health impacts: Communities in Bayelsa and Rivers frequently cited respiratory issues, skin conditions and water contamination. Women in Cross River noted reproductive health challenges and vision problems, underscoring a gendered dimension of methane-related health impacts.
- Economic impacts: Reduced agricultural productivity and destruction of natural resources directly impact community livelihoods, particularly in Bayelsa and Rivers States, where subsistence farming and fishing are prevalent.

Community participation in mitigation efforts

- Limited involvement in Rivers State: Despite their high awareness, communities in Rivers reported no participation in methane-related meetings or initiatives (see Figure 13). The lack of engagement highlights a significant disconnect between policymakers, oil and gas operators, and the affected communities. This disengagement exacerbates mistrust and reduces opportunities for collaborative mitigation efforts.
- Active advocacy in Bayelsa State: Bayelsa communities have been relatively proactive, participating in meetings and spearheading initiatives like protests, advocacy letters and direct communication with oil companies (Figures 14a and 14b). These actions illustrate a strong willingness to address methane issues but also expose systemic barriers to achieving meaningful outcomes, such as insufficient responses from government agencies and oil operators.
- Emerging efforts in Cross River State: Cross River communities have participated in meetings and implemented rudimentary initiatives such as emergency call lines and flame detection devices (Figure 15). However, challenges in operationalising these tools, such as the inefficacy of emergency hotlines, hinder their effectiveness.

Figure 13

Field study engagement (interview/FGD) with Rivers State stakeholders



Source: Author

Figure 14

Field study engagement (interview/FGD) with Bayelsa State stakeholders



Source: Author

Figure 15

Field study engagement with Cross River State stakeholders



Source: Author

Perceived benefits of mitigation

The perceived benefits of methane mitigation are consistent across states, with an emphasis on reduced environmental harm, improved public health and economic opportunities from captured methane. Communities in Rivers particularly highlighted the need for channelling captured gas into local economic development, while Bayelsa emphasised the importance of public health improvements as a critical outcome.

Recommendations for enhanced mitigation efforts

- Collaboration and stakeholder engagement: Communities across all states strongly advocate for collaborative partnerships involving government agencies, NGOs, international organisations and oil companies. They stress the need for inclusive decision-making and planning processes, particularly in Bayelsa, where community involvement is seen as vital to the success of mitigation initiatives.
- Capacity-building and education: A recurring recommendation is the training of community members to build technical expertise in methane mitigation and adaptation strategies. Bayelsa communities emphasised peer-to-peer exposure and youth-targeted empowerment programmes to ensure sustainable community participation.
- Technology deployment and local solutions: Communities in all states underscored the importance of deploying methane-capture technologies that align with local needs. Bayelsa proposed converting flared gas into economically viable resources, while Cross River called for improved tools for detecting emissions and reducing operational risks.
- Youth and women empowerment: Recognising the disproportionate impact of methane emissions on these livelihoods, communities in Bayelsa and Cross River stressed the need for policies that specifically support youth and women through training, compensation and skills acquisition programmes.
- Health infrastructure and risk assessments: A critical gap identified was the lack of health infrastructure and annual environmental and risk assessments in host communities. Communities advocated for proactive measures to address the long-term health and environmental consequences of methane emissions.

SECTION THREE

Analysis and discussion

Assessment of local policy coherence with country needs

On paper, existing Nigerian policies appear to be coherent with international commitments for methane mitigation and reduction. The strategic effort of NOSDRA in developing nationally acceptable, transformational data tools (such as e.g. the Satellite-based Methane Emission Tracker [SMET]) is aimed at detecting, measuring and quantifying methane emissions for regulatory action.⁸⁶ The NUPRC Guidelines for Management of Fugitive Methane and Greenhouse Gases Emissions in the Upstream Oil and Gas Operations in Nigeria (NUPRC Guide 0024-2022) are aligned with the Global Methane Pledge.⁸⁷ The 2050 Long-Term Vision for Nigeria (LTV-2050)⁸⁸ and the Energy Transition Plan (ETP)⁸⁹ also emphasise the importance of methane mitigation and achieving net-zero emissions. The SLCP National Action Plan (SLCP NAP) is aimed at achieving a 61% reduction in methane and other SLCP emissions by 2030. Finally, the NDC update sets a goal of reducing emissions by 60% from 2010 levels by 2030. Notably, both the SLCP NAP and NDC are consistent with the commitment made to the Global Methane Alliance, which targets a reduction of 60-70% in methane emissions by 2030.

However, inconsistencies and incoherencies exist, such as financial constraints to driving smart, effective and efficient enforcement mechanisms with adequate technological infrastructure. In addition, gaps in regulatory enforcement hamper methane mitigation and reduction. Although the PIA provides a framework for methane reduction, compliance remains weak in the industry.

Table 9

Assessment of national policies with international commitments and pledges

National policies/action plans	Alignment with international commitments and pledges					
	UNFCCC	OGMP	CCAC	GMI	GMA	GFMR
Nationally Determined Contributions	✓	✓	✓	✓	✓	✓
Nigeria's 2050 Long-Term Vision (LTV-2050) ⁹⁰	✓			✓		
Nigeria's Climate Change Policy (NCCP)	✓		✓	✓		✓
Short-Lived Climate Pollutants National Action Plan (SLCP NAP)	✓	✓	✓	✓	✓	✓
Nigeria's Energy Transition Plan	✓		✓			✓
National Oil Spill Contingency Plan (NOSCP)	✓					✓

National policies/action plans	Alignment with international commitments and pledges					
	UNFCCC	OGMP	CCAC	GMI	GMA	GFMR
Guidelines for Management of Fugitive Methane and Greenhouse Gases Emissions in the Upstream Oil and Gas Operations in Nigeria (NUPRC Guide 00242022)	✓			✓	✓	✓

Note: Alignment of policies was derived from national policy documents with specific sections and content that emphasised the need and target to address methane emissions generally or in specific sectors. The SLCP NAP is an important document for this analysis vis-a-vis UNFCCC's mission and other global initiatives.

Note: UNFCCC – United Nations Framework Convention on Climate Change; OGMP – Oil and Gas Methane Partnership; CCAC – Climate and Clean Air Coalition; GMI – Global Methane Initiative; GMA – Global Methane Assessment; GFMR – Global Flaring and Methane Reduction Partnership.

Note: ✓ indicates an alignment between national policies/action plans with international commitments and pledges.

Key issues

- **Policy proliferation but limited impact:** Despite decades of regulation, Nigeria's efforts on gas flaring and methane mitigation have yielded limited results due to fragmented governance and weak enforcement.
- **Conflicting deadlines:** Key agencies operate with divergent targets – e.g. the Ministry of Petroleum sets 2025 as the deadline for ending gas flaring, while the Ministry of Environment's Long-Term Vision (LTV-2050) targets 2030 – creating confusion and undermining accountability.
- **Overlapping mandates and fragmented enforcement:** Multiple agencies have competing or unclear roles in methane regulation, leading to regulatory overlaps, uncoordinated enforcement and diluted effectiveness.
- **Lack of a unified legal framework:** Absence of a single, authoritative methane regulation creates gaps in responsibility, allowing emissions penalties to go uncollected and weakening compliance.
- **Data reliability issues:** Emissions data remain inconsistent and often under-reported. This undermines Nigeria's credibility in meeting its climate commitments and reduces investor and community trust.
- **Technology adoption without governance reform:** While tools like NOSDRA's Gas Flare Tracker and Methane Emission Tracker improve transparency, they cannot compensate for weak institutional coordination or enforcement capacity.



Areas for improvement

While on paper Nigeria's policies are generally coherent with its international commitments and national objectives, there are some areas where the country could improve its efforts to reduce methane emissions. These include:

- A unified methane mitigation framework with legally binding timelines.
- Robust MRV (Monitoring, Reporting, Verification) systems to enhance transparency and accountability.
- Cross-agency taskforces to harmonise penalties, incentives and project approvals.
- Increasing the ambition of its methane reduction targets.
- Developing and implementing comprehensive methane reduction strategies for the oil and gas sector.
- Strengthening monitoring and reporting of methane emissions.
- Investing in R&D of methane mitigation technologies. For example, British Columbia (BC) aims to reduce methane emissions from natural gas production by 45% by 2025. They have implemented regulations and established the BC Oil and Gas Methane Emissions Research Collaborative to meet or exceed federal and provincial targets. This multi-stakeholder initiative fosters innovation and ensures new technologies effectively address methane emissions.⁹¹
- Mapping out definite strategies for financing methane actions.
- Raising awareness of the importance of methane reduction among policymakers, industry stakeholders and the public.

Using a SWOT (strengths, weaknesses, opportunities, threats) analysis lens and case studies concept, methane mitigation and reduction could be improved by understudying Canada, Norway, Australia and the United Arab Emirates. This report evaluates Canadian and Nigerian super regulatory structures and technology adoption. Insights from these case studies and a SWOT analysis could be used to build a case for adopting satellite technologies within the regulatory landscape that NOSDRA promotes through its Tracking for Accountability and Policy Enforcement Project agenda (see Figure 16). The strategy is to integrate gas flare and methane emissions by tracking initiatives into multi-regulatory environments and approaches, including self-reporting and voluntary disclosures.

Figure 16
Comparative analysis of Nigeria and Canada

	 Nigeria	 Canada
Regulatory framework	Multiple: NUPRC, NOSDRA, NMPDRA, NCCCS	Single: Environment and Climate Change Canada
Super regulatory structure	Petroleum Industry Act (2021); National Climate Change Act (2021); Gas Flaring, Venting, and Methane Emission (Prevention of Waste and Pollution Regulation, 2018 and 2023)	CEPA (1999); Methane Reduction Regulations (2018, 2023)
Technology <ul style="list-style-type: none"> Leak detection and repair (LDAR) Satellite monitoring Data analytics (AI & ML) 	<ul style="list-style-type: none"> Limited satellite tracking ✓ ✓ LDAR Programme (evolving) Data analytics (AI & ML) ✗ ✗ 	<ul style="list-style-type: none"> GHG Sar satellites ✓ LDAR programme ✓ ✓ AI analytics ✓

Assessment of stakeholders' consultation with government agencies

The findings from the stakeholders' consultation reveal a complex landscape of awareness, engagement and action regarding methane emissions among key government agencies in Nigeria's oil and gas sector. This analysis will explore the implications of these findings, highlighting the strengths and weaknesses of each agency's approach to methane mitigation.

Awareness and understanding

- **High awareness levels:** Both NOSDRA and NMDPRA demonstrate a very high level of awareness regarding methane emissions. Their understanding encompasses not only the environmental impacts but also the economic benefits associated with methane reduction. This awareness is crucial for driving policy changes and implementing effective mitigation strategies.
- **Contrast with Bayelsa State Government:** In contrast, while the Bayelsa State Government exhibits high awareness, it lacks active engagement in mitigation efforts. This discrepancy indicates a potential gap in translating awareness into action, which is essential for effective environmental governance. The Bayelsa State representatives recognise the benefits of reducing methane emissions but have not initiated any active measures, suggesting a need for enhanced capacity and involvement in national initiatives.

Engagement and action

- **Proactive measures by NOSDRA:** NOSDRA's proactive steps, such as developing a satellite methane tracker, exemplify effective engagement in monitoring and mitigating emissions. Their identification of multiple benefits from methane reduction – ranging from environmental protection to improved operational efficiency – demonstrates a comprehensive understanding of the issue. However, challenges such as regulatory gaps and limited resources hinder their ability to implement solutions.

- **NMDPRA's regulatory framework:** NMDPRA's development of greenhouse gas (GHG) management regulations indicates a structured approach to addressing methane emissions within the midstream and downstream sectors. Despite this framework, concerns about industry operators' transparency regarding GHG management strategies highlight a critical barrier to effective implementation. The agency's call for collaboration with international organisations and NGOs underscores the importance of multi-stakeholder engagement in achieving successful outcomes.

Challenges identified

Regulatory and policy gaps: Both NOSDRA and NMDPRA identify significant regulatory and policy gaps that impede effective methane management. Inconsistent enforcement of existing regulations exacerbates these challenges, suggesting that stronger regulatory frameworks and improved enforcement mechanisms are necessary to ensure compliance among industry operators.

Technical capacity issues: The Bayelsa State Government's lack of technical capacity represents a significant barrier to active participation in methane reduction initiatives. This limitation not only affects local engagement but also highlights the need for capacity-building programmes aimed at equipping local stakeholders with the necessary skills and knowledge to contribute effectively to mitigation efforts.

Assessment of stakeholders' consultation with private sector actors

The insights gathered from Carbon-Limit Nigeria (CLN) and the Stakeholder Democracy Network Nigeria (SDN) highlight the critical role that private organisations play in advancing methane mitigation strategies within Nigeria's oil and gas sector. This analysis delves into the challenges, opportunities and recommendations identified by these organisations, emphasising the need for a cohesive approach to effectively address methane emissions.

Challenges identified

- **Operator reluctance:** A significant barrier to methane mitigation is the reluctance of operators to engage with reduction initiatives due to a lack of understanding of the economic and environmental benefits. This fear of profit erosion is a substantial hurdle, as operators may prioritise short-term financial gains over long-term sustainability. Addressing this mindset is essential for fostering a culture of compliance and proactive engagement in mitigation efforts.
- **Technological costs:** The high costs associated with deploying advanced methane measurement and mitigation technologies further complicate the landscape. Many operators, particularly smaller firms, may find these costs prohibitive, limiting their ability to adopt effective solutions. This highlights the need for innovative financing mechanisms or partnerships that can alleviate financial burdens while promoting technology adoption.
- **Sectoral coordination deficits:** The lack of integration and collaboration across the oil and gas sector results in fragmented efforts that diminish the overall effectiveness of methane mitigation strategies. This siloed approach hinders knowledge sharing and best practice dissemination, underscoring the necessity for coordinated actions among stakeholders.

- **Lack of robust regulatory frameworks:** Despite its proactive stance, the SDN identifies insufficient technical oversight as a primary barrier to effective methane mitigation. The absence of robust regulatory frameworks hampers implementation efforts, indicating a need for systemic reforms that strengthen oversight mechanisms.

Opportunities identified

- **Carbon credits as incentives:** The introduction of carbon credit programmes presents a promising opportunity to incentivise oil and gas operators to adopt methane reduction measures. By linking economic benefits directly to emission reductions, operators may begin to view methane mitigation not merely as a regulatory requirement but as a viable business opportunity. This shift in perspective could boost engagement across the sector.
- **Advancing technical knowledge:** Improving technical expertise in methane mitigation through training programmes can help bridge knowledge gaps within the sector. Adopting globally recognised best practices tailored to local contexts will enhance the effectiveness of mitigation efforts.
- **Multistakeholder collaboration:** The SDN emphasises the importance of involving diverse stakeholders – including private organisations, regulators, international actors and host communities – in collaborative approaches to methane mitigation. Such partnerships can foster innovation while improving enforcement mechanisms.

Assessment of stakeholders' consultation with the international community

The insights from Oxford Policy Management (OPM), the Africa Centre for Energy Policy (ACEP) and the Clean Air Taskforce (CATF) reveal a nuanced understanding of the challenges and opportunities surrounding methane emissions in Nigeria's oil and gas sector. The following analysis will explore the current initiatives, key challenges, opportunities for improvement and recommendations provided by these international organisations, emphasising their implications for effective methane mitigation.

Current initiatives and effectiveness

- **Mixed effectiveness of initiatives:** The evaluations from the international organisations indicate a varied perception of the effectiveness of current methane mitigation efforts in Nigeria. OPM's assessment points to significant shortcomings, such as inadequate regulatory frameworks and suboptimal monitoring, reporting and verification (MRV) processes. In contrast, the ACEP acknowledges some progress in gas flare tracking and regulatory developments but stresses the necessity for improved institutional coordination to sustain these advancements. The CATF's perspective aligns with OPM's, highlighting minimal compliance with existing regulations as a critical barrier to effective mitigation.

Key challenges

- **Data management:** OPM identifies the lack of transparent and accessible data as a foundational issue impacting methane mitigation efforts. Current MRV systems are insufficiently robust, relying heavily on periodic inspections rather than continuous monitoring technologies. This gap underscores the need for enhanced data management practices that incorporate advanced technologies such as satellite monitoring.
- **Institutional coordination:** Both OPM and the ACEP emphasise the lack of coherence among regulatory agencies such as NOSDRA and NUPRC. This fragmentation hinders alignment of priorities and targets across stakeholders, suggesting that improved coordination is essential for effective methane management.
- **Regulatory compliance:** The CATF raises concerns about widespread non-compliance with existing regulations, which exacerbates emissions and undermines mitigation strategies. This highlights a systemic issue where regulatory frameworks are not adequately enforced or adhered to by operators.

Opportunities for improvement

- **Technological advancements:** All three organisations identify the potential to leverage advanced MRV technologies as a significant opportunity. Implementing satellite-based monitoring systems and leak detection technologies can enhance methane management capabilities, providing real-time data that can inform regulatory compliance and operational improvements.
- **Incentivisation models:** OPM suggests that regulatory incentives, such as carbon pricing mechanisms used in countries like Canada and Kazakhstan, could drive compliance and innovation among operators. By aligning economic incentives with environmental goals, operators may be more motivated to engage in methane reduction initiatives.
- **Gas commercialisation:** The ACEP advocates for effective methane management as a pathway to gas commercialisation, which could yield both economic benefits and environmental improvements. This dual focus on economic viability alongside environmental responsibility is crucial for garnering broader support from industry stakeholders.

Assessment of field study findings with host communities

The findings from host communities in Bayelsa, Rivers and Cross River States provide critical insights into the awareness, impacts and challenges associated with methane emissions in Nigeria's oil and gas sector. These insights reveal significant regional differences in knowledge and engagement levels, highlighting the need for tailored policy and intervention strategies.

Awareness and understanding of methane emissions

- **High awareness in Bayelsa and Rivers States:** Communities in Rivers and Bayelsa exhibit a very high level of awareness regarding methane emissions and their associated environmental and economic implications. This heightened awareness is likely a result of direct exposure to oil and

gas operations, which have led to visible environmental degradation and health issues. The recognition of the economic potential of capturing methane further indicates a pragmatic understanding of its value as a resource, suggesting that these communities are aware not only of the risks but also the opportunities presented by effective methane management.

'We see the flames every day, we breathe the smoke – we know it's not just gas burning; it's our health and our future going with it', said a community youth leader in Aleto Eleme, Rivers.

'If they capture the gas, we can even use it here, for cooking or power. Why let it waste and destroy us?' asked a woman leader in Koroama, Bayelsa State.

- **Moderate awareness in Cross River State:** In contrast, Cross River shows moderate awareness levels, despite communities being familiar with the impacts of methane emissions. This discrepancy may be attributed to the relatively low intensity of oil and gas operations in this region, coupled with potential gaps in information dissemination and community engagement efforts. The variance in awareness levels underscores the importance of targeted education initiatives to enhance understanding across all regions.

Perceived impacts of methane emissions

The communities across all three states reported severe environmental, health and economic impacts due to methane emissions:

- **Environmental degradation:** Pollution affecting farmlands, rivers and air quality was a common concern. Poor agricultural yields, reduced fishery outputs and challenges in snail farming were specifically noted in Cross River, highlighting the interconnectedness of environmental health and local economies.

'The river we depend on is no longer safe – the oil has poisoned the water and killed our fish. Our ponds are drying up, and our fish farming is suffering', lamented the Village Chief in Koroama, Bayelsa State.

'Our farmlands are gone. The oil has soaked deep into the soil – there's barely any land left to plant, and even when we try, the crops don't grow well', reported a farmer from Aleto Eleme in Rivers State.

- **Health impacts:** Communities in Rivers and Bayelsa frequently cited respiratory issues, skin conditions and water contamination as significant health concerns. Notably, women in Cross River reported reproductive health challenges and vision problems, indicating a gendered dimension to the health impacts associated with methane emissions.

'We've been having serious eye problems, and many women now experience irregular periods. It all started after the pollution in our area got worse', said a female resident from Boki in Cross River State.

'We are always at the clinic – children coughing, adults with constant skin rashes. The air smells bad, and the water we drink is no longer safe', shared a mother from a community in Eteo Eleme, Rivers State.

- **Economic impacts:** The reduction in agricultural productivity and destruction of natural resources directly threaten community livelihoods, particularly in Bayelsa and Rivers States where subsistence farming and fishing are prevalent. This economic vulnerability emphasises the urgent need for effective mitigation strategies that can support local economies.

Community participation in mitigation efforts

- **Limited involvement in Rivers State:** Despite their high awareness, communities in Rivers reported minimal participation in methane-related meetings or initiatives. This lack of engagement highlights a significant disconnect between policymakers, oil and gas operators and affected communities. Such disengagement exacerbates mistrust among stakeholders, diminishing opportunities for collaborative mitigation efforts.

'They come and take what they want. Nobody calls us to the table. We are only remembered when there's [a] protest', said a traditional leader in Eteo Eleme, Rivers State.

- **Active advocacy in Bayelsa State:** In contrast, Bayelsa State communities have demonstrated proactive engagement by participating in meetings and initiating actions such as protests and advocacy letters directed at oil companies. While these efforts illustrate a strong willingness to address methane issues, they also reveal systemic barriers that hinder meaningful outcomes – most notably insufficient responses from government agencies and oil operators.

'We wrote to the oil company three times – nothing changed. We even protested, but they just sent police', recounted a community rights advocate in Aleto Eleme, Rivers State.

- **Emerging efforts in Cross River State:** Communities in Cross River State have begun participating in meetings and implementing rudimentary initiatives like emergency call lines for reporting issues related to methane emissions. However, challenges such as ineffective operationalisation of these tools limit their potential impact.

Perceived benefits of mitigation

Across all states, communities consistently identified several perceived benefits from effective methane mitigation:

- **Reduced environmental harm:** A primary benefit highlighted was the potential for improved environmental conditions through reduced emissions.
- **Improved public health:** Communities recognised that mitigating methane emissions could lead to better health outcomes.
- **Economic opportunities:** There is a strong emphasis on channelling captured gas into local economic development initiatives, particularly noted by Rivers State communities.

Assessment of the financing landscape

The financing landscape for methane mitigation in Nigeria's oil and gas sector reveals a significant gap between the required investment and current funding flows. Addressing this gap is critical to achieving both national and global methane reduction targets. The analysis considers global trends, sectoral distribution and Nigeria-specific financial requirements to underscore challenges and opportunities in mobilising adequate finance.

Global financing trends and their implication for Nigeria

Global methane mitigation finance remains far below the estimated annual need of US\$ 48 billion by 2030.⁹² Although funding increased modestly from US\$ 11.6 billion in 2019/20 to US\$ 13.7 billion in 2021/22, this growth is insufficient to meet the escalating demands projected for the coming decades.⁹³ The largest share of methane financing globally stems from private sources such as commercial financial institutions and corporations, accounting for US\$ 9.6 billion in 2021/22.⁹⁴ In the same period, public finance, primarily from multilateral and bilateral development financial institutions (DFIs), experienced a decline, particularly due to reduced contributions from China.⁹⁵

These global trends highlight the need for Nigeria to diversify its financing sources. Given the dominance of private finance in global methane mitigation efforts, Nigeria must enhance private sector engagement, particularly by leveraging commercial and corporate investments. Additionally, the decline in public DFI contributions underscores the urgency for Nigeria to establish stronger partnerships with international institutions to secure more stable public funding streams.

Sectoral distribution of methane finance and the implication for Nigeria

Globally, methane reduction funding is concentrated in waste management and agriculture, forestry and other land use (AFOLU) sectors, while the fossil fuel sector – responsible for 37% of human-caused methane emissions – receives disproportionately low investment. In 2021/22, the fossil fuel sector attracted a mere US\$ 10.6 million, despite needing at least US\$ 11.2 billion annually by 2030.^{96 97} This disparity is especially stark in the oil and gas subsector, which holds the highest mitigation potential. The International Energy Agency (IEA), the UN Environmental Programme (UNEP) and the Climate and Clean Air Coalition (CCAC) estimate the annual global need for the oil and gas subsector at US\$ 9.4 billion, totalling US\$ 75 billion by 2030. Despite the relatively low financial requirement – equivalent to just 2% of the industry's net income in 2022 – the sector continues to lag in attracting investment.

To achieve methane reduction targets, Nigeria's oil and gas operations require US\$ 1.5 billion in investment between 2023 and 2030 (Table 10).⁹⁸ This includes US\$ 300 million from oil and gas majors, US\$ 700 million from NNPC Limited, and US\$ 500 million from other investors. The country's reliance on fossil fuel revenues makes the sector's underinvestment particularly concerning. Mobilising adequate resources will require aligning national strategies with global financing trends and prioritising the oil and gas subsector within national methane mitigation efforts.

Table 10

Overview of oil and gas methane abatement financial investment landscape

Assessment of financing landscape	
<p>US\$ 48 billion <i>Estimated annual global need for methane mitigation by 2030</i></p>	<p>US\$ 9.6 billion <i>Privately sourced global methane finance in 2021/22</i></p>
<p>US\$ 10.6 million <i>Fossil fuel sector investment in 2021/22</i></p>	<p>US\$ 9.4 billion <i>Annual global need for oil and gas methane finance</i></p>
<p>US\$ 1.5 billion <i>Investment required for methane reduction in Nigeria's oil and gas sector, 2023–2030</i></p>	

Key challenges

- **Funding gaps:** Nigeria faces significant financing shortfalls, with only US\$ 1.5 billion identified for methane reduction over seven years, far below the global benchmarks for similar contexts.
- **Private sector engagement:** The limited participation of oil and gas majors in methane reduction financing reflects broader challenges in aligning corporate priorities with climate goals.
- **Public financing volatility:** Declines in global public finance from DFIs signal a potential risk for Nigeria's reliance on multilateral and bilateral aid.
- **Sectoral imbalance:** The fossil fuel sector's underrepresentation in financing poses a direct challenge to reducing emissions in Nigeria's primary economic sector.

Opportunities

- **Corporate responsibility:** The requirement for oil and gas majors to contribute US\$ 300 million aligns with global trends of increasing private sector participation. Leveraging corporate social responsibility initiatives can enhance financial flows.
- **Public-private partnerships (PPPs):** Coordinating PPPs to mobilise the US\$ 700 million from NNPC and US\$ 500 million from other investors can drive targeted investments.
- **Global alignment:** Positioning Nigeria as a leader in methane mitigation within the oil and gas sector could attract international funding, particularly from climate focused DFIs and philanthropic organisations.
- **Technology adoption:** The integration of proven methane reduction technologies (e.g. vapour recovery units) can improve operational efficiency, reducing costs and attracting investment.

Comparative analysis: Methane mitigation in Nigeria vs. other countries

Considering international and regional experiences, this section evaluates Nigeria's methane mitigation strategies and identifies lessons to be learnt and models for success.

Regional comparisons (Africa)

Angola

While facing similar challenges to Nigeria with data transparency and regulatory enforcement, Angola has demonstrated significant progress in gas commercialisation and flaring reduction. The Angola LNG project, a PPP model for the World Bank-led Global Gas Flaring Reduction partnership, exemplifies this success. This initiative has positioned Angola as the first new LNG supplier in the global market since 2010. By capturing gas that would have been flared, Angola LNG is estimated to have reduced gas flaring by 75%, leading to a significant decrease in CO₂ emissions.⁹⁹ This project not only provides cleaner energy domestically and internationally but also contributes to Angola's economic development. The success of Angola LNG provides a compelling example for Nigeria to emulate, showcasing the potential for monetising captured methane and significantly reducing harmful environmental impacts through strategic PPPs and investment in gas commercialisation infrastructure.

Egypt

Eni, a major global energy company, is actively collaborating with the Egyptian Natural Gas Holding Company (EGAS) on field activities and training programmes designed to reduce flaring and improve methane emissions measurement, mitigation and reporting. This effort includes initiatives focused on leak detection and repair (LDAR) programmes, which have proven highly successful in reducing fugitive methane emissions. In fact, Eni has achieved a remarkable 95% reduction in fugitive methane emissions from its upstream operations since 2014, largely due to the implementation of LDAR campaigns. This success is further evidenced by a 17% reduction from 2022 to 2023 alone.¹⁰⁰ Nigeria could leverage the expertise and experience Eni has gained through its partnership with Egypt to develop and enforce its own LDAR regulations, potentially incorporating these best practices into the NUPRC guidelines. This knowledge transfer, including insights into Eni's successful LDAR strategies and their commitment to achieving a methane emission intensity below 0.2% by 2025,¹⁰¹ could significantly accelerate Nigeria's progress in reducing methane emissions and improving environmental performance in the oil and gas sector.

Global comparisons

United States of America

The US, through the Environmental Protection Agency (EPA), has taken significant steps to reduce methane emissions in the oil and gas sector. Driven by the Inflation Reduction Act, the EPA has implemented a new rule that not only mandates practices like LDAR and the use of advanced monitoring technologies but also establishes a waste emissions charge on large emitters exceeding specific performance levels. This approach incentivises companies to reduce methane releases and conserve valuable natural gas resources. The EPA projects that this rule will result in substantial

methane emissions reductions, equivalent to removing nearly eight million gas-powered cars from the roads for a year.¹⁰² While the US regulatory framework may be more stringent, Nigeria can learn from its comprehensive approach, particularly the use of economic incentives and clear performance standards, to strengthen its own regulations and enforcement mechanisms for methane emissions reduction.

Norway

Norway has achieved significant success in reducing methane emissions through a combination of strong regulations, industry collaboration and investment in technology. The Norwegian model emphasises transparency and data sharing, which could be valuable for Nigeria to improve its monitoring, reporting and verification (MRV) systems. In addition, Norway has successfully engaged multiple stakeholders through public-private partnerships (PPPs) that enhance collaboration and resource sharing. The Norwegian model emphasises inclusive decision-making processes involving local communities, industry stakeholders and government agencies. These have proven effective in implementing successful methane reduction strategies.¹⁰³

Canada

Canada has adopted a multifaceted approach to methane emissions reduction, demonstrating the potential of combining economic incentives with technological innovation. The core of this strategy is the Greenhouse Gas Pollution Pricing Act, which includes a carbon pollution pricing system with a regulatory charge on fuel and a trading system for industry. This system incentivises emissions reductions and technological advancements while maintaining industry competitiveness. Furthermore, Canada has established a US\$ 750 million Emissions Reduction Fund to support oil and gas companies investing in green solutions and reducing GHGs. These commitments exemplify a comprehensive approach to achieving climate goals.¹⁰⁴ Nigeria could draw valuable lessons from Canada's model by incorporating similar economic incentives and targeted funding for technological innovation in its methane mitigation strategy.

Critical lessons for Nigeria

- **Strong regulatory frameworks and enforcement:** Experiences from the US and Norway demonstrate the importance of clear, enforceable regulations with robust monitoring and reporting requirements. Nigeria can strengthen its regulations by incorporating elements like mandatory LDAR programmes, advanced monitoring technologies and clear performance standards, coupled with effective enforcement mechanisms.
- **Industry collaboration:** Norway's success highlights the value of engaging industry stakeholders in developing and implementing methane mitigation strategies. Nigeria can foster collaboration through PPPs, knowledge sharing platforms and incentivising voluntary participation in emissions reduction initiatives.
- **Technology adoption:** The US, Canada and Egypt provide examples of how advanced monitoring technologies and LDAR programmes can effectively reduce emissions. Nigeria should prioritise investment in and adoption of these technologies, potentially leveraging partnerships with international organisations and companies like Eni.

- **Economic incentives:** Carbon pricing mechanisms, as implemented in Canada and the US, can incentivise operators to invest in methane reduction. To drive compliance and innovation, Nigeria could explore similar mechanisms, such as a methane fee or an emissions trading scheme.
- **Capacity-building:** Investing in technical capacity-building, as seen in Egypt, is crucial for effective implementation of mitigation measures. Nigeria should prioritise training programmes and knowledge transfer initiatives to enhance expertise in methane mitigation within government agencies and the oil and gas sector.
- **Gas commercialisation:** Angola's experience with LNG demonstrates the potential for economic and environmental benefits through gas commercialisation. Nigeria can leverage its abundant gas resources by investing in infrastructure and creating a favourable policy environment for gas commercialisation projects.

Potential models for success

- **Integrated approach:** Combining elements from successful models, such as strong regulations (US), industry collaboration (Norway), technology adoption (US, Canada, Egypt) and economic incentives (Canada, US), can create a comprehensive and effective strategy.
- **Phased implementation:** Starting with pilot projects and gradually expanding successful initiatives can allow for learning and adaptation while building momentum for broader change.
- **Targeted interventions:** Focusing on specific emissions sources and high-emitting facilities can yield significant reductions while building capacity for more comprehensive action.
- **Multi-stakeholder engagement:** Involving government agencies, industry, international organisations and local communities in the development and implementation of mitigation strategies can ensure buy-in and foster collaboration.

Recommendations

The issuance of explicit gas flaring and methane emissions regulations by Nigeria's NUPRC and NMDPRA – the commercial and technical regulators, respectively – is a step in the right direction. It sets the regulatory landscape in the right context and documents the DOs and DON'Ts. This provides a myriad of opportunities and challenges within the oil and gas industry. Beyond regulations, NOSDRA, the sector's environmental regulator, has developed robust digital regulatory tools such as the Nigeria Gas Flare Tracker (fully operational) and a prototype Nigerian Methane Emission Tracker (undergoing development) as part of its Accountability, Data and Policy Enforcement (ADPE) initiative. This further emphasises Nigeria's commitment to the 2030 emissions reduction target in the SLCP National Action Plan, and sets the path to attaining the 2060 emissions reduction driven by the Department of Climate Change (DCC) at the Federal Ministry of Environment.

Addressing methane emissions in Nigeria's oil and gas sector requires a coordinated, strategic and action-oriented approach that integrates regulatory, financial, technological and operational interventions. This report highlights critical gaps in policy enforcement, technological adoption and financing, while identifying the clear socio-economic and environmental benefits of methane

mitigation, including gas commercialisation, health improvements and strengthened global partnerships. To translate these findings into concrete action, Nigeria must streamline its methane mitigation and reduction efforts through promoting institutional cooperation, competitiveness and capacity. This will align with the best international practices that thrive on robust regulatory frameworks and enhance collaboration among key stakeholders. The recommendations below provide a structured roadmap to guide implementation and ensure long-term sustainability.

Policy and regulatory recommendations

- **Strengthen methane regulations:** Update existing regulations, such as the NUPRC guidelines, to mandate leak detection and repair (LDAR) programmes, enforce specific timelines and impose penalties for non-compliance, drawing from US and Canadian models.
- **Enhance enforcement mechanisms:** Increase regulatory inspections, apply stricter penalties for violations and promote transparent reporting to ensure compliance. Encourage oil and gas stakeholders to adopt NOSDRA's Nigerian Gas Flare Tracker (NGFT) – the official Federal Government tool assigned to measure, monitor report and verify gas flare and methane emissions. The pronouncement of the NGFT as the Federal Government of Nigeria's monitoring framework will catalyse the drive towards a real-time emissions tracking platform.
- **Incentivise mitigation and invest in R&D:** Implement economic incentives, such as a methane fee or emissions trading scheme, to encourage operators to invest in methane reduction technologies and practices. Explore tax breaks or subsidies for companies that demonstrate significant emissions reductions. Increase investment in the R&D of methane mitigation technologies, potentially establishing research collaboratives like British Columbia's model to foster innovation and knowledge sharing.
- **Improve inter-agency coordination:** Establish a national methane governance framework, ensuring effective collaboration between NOSDRA, NUPRC, NMDPRA, NCC, the DCC of the Ministry of Environment and industry stakeholders for streamlined policy execution on regulatory enforcement.
- **Develop a national methane strategy:** Adopt a comprehensive strategy with clear targets, financing mechanisms and implementation timelines to align with Nigeria's broader climate action goals and global commitments.

Operational and industry recommendations

- **Adopt global best practices:** Oil and gas companies should adopt best practices for methane emissions reduction, including regular LDAR campaigns, equipment upgrades and vapour recovery units. They should prioritise the implementation of proven technologies and management practices.
- **Expand industry-community engagement:** Companies should actively engage with oil and gas host-communities, providing information and opportunities for participation in methane mitigation projects. This will help to address host-community concerns and ensure that benefits from methane mitigation initiatives are shared equitably.

- **Drive technological innovation:** Foster collaboration between industry, academia and international partners and companies such as Eni and Total Energies to accelerate the development and deployment of advanced methane mitigation technologies.
- **Mandatory corporate methane action plans:** Require oil and gas operators to publicly disclose methane reduction plans, with annual progress reports linked to regulatory compliance and financial incentives.

Financial and investment recommendations

- **Increase access to finance:** Establish dedicated green financing programmes, public-private partnerships (PPPs) and carbon market mechanisms to mobilise funding for methane reduction initiatives. Access to international climate funds and green bonds can be streamlined to ease the application processes with clear criteria.
- **Leverage global methane funds:** Nigeria should optimise its international climate finance opportunities. For example, the Global Flaring and Methane Reduction Partnership launched by the World Bank illustrates pathways for mobilising financial support through multi-donor trust funds as well as previous COP commitments. Such partnerships can support large-scale mitigation projects.
- **Develop carbon market frameworks:** Implement a results-based financing system where methane mitigation and reduction efforts are quantified, verified and monetised through carbon trading markets.
- **Targeted investment in infrastructure:** Prioritise flaring-to-energy projects, methane capture technologies and gas utilisation programmes, ensuring cost-effective mitigation with long-term revenue potential. This can be achieved through exploring specific funding initiatives focused on fossil fuel emissions that can help bridge existing financial gaps. Commitments made at COP28, including over US\$ 1 billion earmarked for methane mitigation since COP27, indicates a growing recognition of this issue at international forums.

Table 11
Prioritised recommendations

Short term	Medium term	Long term
<ul style="list-style-type: none"> • Strengthen methane regulation • Incentivise mitigation • Adopt global best practices • Increase access to finance 	<ul style="list-style-type: none"> • Enhance enforcement mechanisms • Improve inter-agency coordination • Expand industry-community engagement • Leverage global methane funds 	<ul style="list-style-type: none"> • Develop a national methane strategy • Drive technological innovation • Establish carbon market frameworks • Encourage targeted investment in infrastructure

Ranking recommendations into action points

Our analysis systematically ranked the methane mitigation and reduction project recommendations across policy and regulatory, operational and industry, and financial and investment categories, grouping them into short-term (1–2 years), medium-term (3–5 years) and long-term (5+ years) actions. This timeline is designed to help policymakers, industry leaders and stakeholders sequence implementation for impact and feasibility.

Short-term actions (1–2 years)

Ensure quick wins, grab low-hanging fruits and set the foundations.

Policy and regulatory

- Strengthen oil and gas sector methane regulations (e.g. mandate LDAR programmes and enforce penalties from top-to-bottom).
- Enhance enforcement mechanisms from the top down (e.g. increase inspections, promote the NGFT and Methane Tracker as the Federal Government's independent observatory platforms).

Operational and industry

- Adopt global best practices (e.g. regular LDAR, vapour recovery, equipment upgrades).
- Launch mandatory corporate methane action plans (e.g. public disclosures, annual progress based on regulatory standard reporting guidelines).

Financial and investment

- Initiate green financing programmes (e.g. ease access to climate funds, develop streamlined criteria).
- Engage international climate funds (e.g. leverage existing COP commitments).

Medium-term actions (3–5 years)

Build systems, strengthen institutions and expand partnerships.

Policy and regulatory

- Develop a national methane strategy using the oil and gas sector as a pilot. Set targets, timelines and financing mechanisms.
- Improve inter-agency coordination (e.g. establish a sectoral national methane governance structure based on the ADPE initiative).

Operational and industry

- Expand industry-community engagement (e.g. engage host communities in mitigation and reduction through citizens' evidence-based reporting and data gathering).
- Drive technological innovation (e.g. collaborate with academia, Eni, Total Energies and de-methanisation solution providers).

Financial and investment

- Leverage global methane funds (e.g. the World Bank's GFRP; build multi-donor partnerships including local donor initiatives from development finance institutions such as the Central Bank of Nigeria).
- Develop enabling investment platforms (e.g. PPPs for methane abatement pilots; a good case study is the Green Flare concept already operational in Nigeria – the first of its kind in Africa).

Long-term actions (5+ years)

Focus on structural transformation, market-based solutions and scale-up.

Policy and regulatory

- Implement or enforce economic instruments (e.g. methane fees, fines and emissions trading schemes).
- Institutionalise deep R&D funding mechanisms (e.g. a national methane emissions mitigation and reduction innovation fund).

Operational and industry

Full technological adoption and transition (e.g. scale advanced ground-based, airborne and satellite detection with AI and ML [machine learning] monitoring systems).

Financial and investment

- Establish robust carbon market frameworks that commodify, quantify, verify and monetise methane mitigation and reductions.
- Target major infrastructure investments such as flaring-to-energy, methane capture and Nigerian utilisation hubs.

Conclusion and main messages

Nigeria needs a national methane mitigation and reduction plan to supercharge the country's economy.

This report underscores the urgent need for Nigeria to adopt a strong, coordinated, national methane mitigation and reduction plan for the oil and gas sector. Methane mitigation is not only a critical climate action but also a strategic opportunity that can supercharge Nigeria's economy by unlocking new investments, driving job creation and positioning the country as a global leader in climate-smart energy solutions. Given that climate change is already costing Nigeria up to 5% of its GDP, prioritising methane mitigation is essential for economic resilience and long-term sustainability. By leveraging its climate leadership and economic progress, Nigeria can provide a well-structured methane reduction strategy that attracts global financing, advances towards the Sustainable development goals (SDGs) and translates climate commitments into measurable action.

Key messages

1. **Urgency and gaps in mitigation efforts:** Nigeria's methane mitigation efforts remain **fragmented and insufficient**, with **regulatory gaps, weak enforcement, limited technology adoption and inadequate financing** impeding progress. Addressing these challenges requires an **integrated, sector-wide** approach that aligns with international best practices and emerging global methane regulations.
2. **Beyond issuing regulations – a call for an integrated, robust regulatory framework:** While Nigeria has taken steps to regulate methane emissions, achieving policy coherence and effective implementation requires a fundamental re-engineering of its regulatory framework. Stronger institutional collaboration among **NOSDRA, NUPRC, NMDPRA and NCCC** is essential to ensure harmonised enforcement, streamlined compliance mechanisms and cross-sectoral synergy in methane reduction efforts.
3. **The economic and developmental benefits of methane mitigation and reduction:** Investing in methane mitigation offers far-reaching economic and social benefits that go beyond environmental sustainability. These include:
 - Improved environmental quality and public health outcomes.
 - Gas commercialisation – reducing waste while driving energy security and economic diversification.
 - A just and equitable energy transition that maximises socio-economic benefits.
 - Strengthened international partnerships and increased access to global methane reduction financing.
4. **Unlocking global financing for methane mitigation and reduction initiatives:** Nigeria must strategically position itself to leverage global funding mechanisms for methane mitigation, including:
 - International climate funds, such as the Global Methane Pledge Fund and Technical Assistance initiatives.
 - Results-based financing and carbon markets.
 - Public-private partnerships (PPPs) for methane capture, commodification and

commercialisation projects. An example of the commodification of methane emissions and de-methanisation is the first-ever flare gas digital infrastructure project.¹⁰⁵ Leveraging flare-gas-to-Bitcoin mining opportunities provided by Dawcon Energy, a partnership with the Green Flare Holdings, showcases a practical approach to how Nigeria can energise, commodify and mobilise its private sector-led energy transition and digital ecosystem.

- Innovative financing tools such as green bonds and blended finance models where the Central Bank of Nigeria (the country's apex bank) is actively involved in methane abatement development initiatives. Strengthening Nigeria's methane reduction strategy will increase the country's attractiveness to investors and global funding initiatives dedicated to methane abatement.

5.. Translating climate commitments into action: To bridge the gap between **policy commitments and on-the-ground implementation**, Nigeria must adopt an action-oriented methane mitigation plan. This requires:

- expanding technology deployment for leak detection and repair (LDAR) and methane capture.
- enhancing enforcement through the Nigerian Gas Flare and Methane Emissions trackers to provide transparent monitoring and accountability frameworks.
- strengthening research and capacity-building initiatives for long-term impact.

6. Sustained collaboration for a cleaner and more competitive energy sector: Nigeria's oil and gas sector **must evolve to align with global decarbonisation trends** while ensuring energy security and economic growth. Continued research, **multi-stakeholder engagement** and investment in methane reduction technologies will position Nigeria as a leader in **low-carbon energy innovation and sustainable economic development**.

The path forward

Nigeria's Methane Mitigation and Reduction Project (MMRP) is a strategic imperative that will define the country's economic resilience, global competitiveness and climate leadership in the years ahead. The decision to adopt a strong, integrated methane reduction framework will place Nigeria at an advantage, driving climate action while unlocking economic opportunities in the oil and gas sector. However, it is critical to build on the MMRP initiative with the Accountability, Data and Policy Enforcement Project. Now is the time for bold action – Nigeria must put these the policies into practice, attract global financing and secure a sustainable energy future for the country.

Appendices

Survey questionnaires or interview guides

Questionnaire for government agencies

Section 1: Stakeholder information/profile

Name of the respondent:

Name of organisation/institution:

Your position/role:

Years of involvement in the oil and gas sector:

Contact information (optional):

Section 2: Awareness and understanding of methane emissions

2.1 How would you rate your awareness of methane emissions in the oil and gas sector?

- Very low
- Low
- Moderate
- High
- Very high

2.2 To what extent are you familiar with the environmental and economic impacts of methane emissions from Nigeria's oil and gas sector?

- Very familiar
- Somewhat familiar
- Not familiar
- Unsure

2.3 In your opinion, which aspects of Nigeria's oil and gas sector would see the greatest benefit from methane mitigation and reduction efforts?

- Reduced environmental impact
- Improved operational efficiency
- Enhanced public health
- Increased revenue from captured gas
- Other (open ended)

2.4 Are you aware of any current efforts to mitigate and reduce methane emissions in Nigeria's oil and gas sector?

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2.5 How important do you consider it to address methane emissions from Nigeria's oil and gas sector?

- Not a priority
- Somewhat important
- Important
- Very important/critical

Section 3: Methane mitigation overview

3.1 Are you currently involved in any methane mitigation and reduction initiatives within the oil and gas sector? (If yes, please specify)

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.....

3.2 How would you assess the effectiveness of existing methane mitigation measures in Nigeria's oil and gas sector?

- Highly ineffective
- Ineffective
- Neutral
- Effective
- Highly effective

3.3 What are the major challenges faced in implementing methane mitigation projects in Nigeria's oil and gas sector?

.....

.....

Section 4: Regulatory framework and compliance

4.1 Are you aware of any methane regulatory frameworks at the state and national level?

Yes

No

Unsure

If yes, name some

4.2 Do you believe that the current regulatory framework adequately addresses methane emissions in the oil and gas sector?

Yes

No

Partially

I do not know

4.3 What improvements do you suggest for enhancing regulatory compliance regarding methane emissions?

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.....

4.4 Commercial and technical stakeholders (NUPRC and NMDPRA)

What are the primary activities related to methane emissions reduction/mitigation within your organisation?

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What technologies or practices have been implemented or considered for methane reduction?

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How do you assess the effectiveness of these measures in mitigating methane emissions?

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What are the major challenges faced in implementing methane reduction strategies?

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4.5 Environmental regulators (NOSDRA)

How does your organisation monitor methane emissions in the oil and gas sector?

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What regulatory measures are in place to enforce methane reduction initiatives?

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How do you collaborate with other stakeholders to address methane emissions?

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What improvements or additional measures do you suggest in enhancing methane mitigation efforts?

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What are the major challenges or barriers that your organisation faces in regulating and enforcing methane mitigation efforts in the oil and gas sector?

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4.6 Policymakers (Department of Climate Change, Federal Ministry of Environment, National Council on Climate Change)

Existing policies and regulations:

Are there currently any policies or regulations specifically targeting methane emissions in Nigeria's oil and gas sector?

Yes

No

If yes, please describe the main policies/regulations and the sectors or activities they cover.

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Implementation and monitoring:

How are existing methane mitigation policies and regulations enforced within the oil and gas sector?

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What mechanisms are in place to monitor compliance with these policies?

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Have you encountered any challenges in enforcing or monitoring existing methane mitigation policies? If so, please elaborate.

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4.7 Challenges and barriers:

What are the main challenges hindering more effective implementation of methane mitigation strategies in Nigeria's oil and gas sector? (Please select all that apply and elaborate on the most significant.)

- Technological limitations
- Financial constraints
- Lack of capacity or expertise
- Insufficient data or information
- Weak enforcement mechanisms
- Industry resistance
- Public perception/lack of awareness
- Other (please specify)

4.8 Opportunities and drivers:

What potential opportunities or drivers do you see for enhancing methane mitigation efforts in Nigeria? (Please select all that apply and elaborate on the most promising.)

- Technological advancements
- Cost-effectiveness of mitigation strategies
- Health and environmental benefits
- Revenue generation from captured gas
- International pressure/commitments
- Public pressure/demand for cleaner operations
- Alignment with national development goals
- Other (please specify)

4.9 Policy considerations:

Considering the identified challenges and opportunities, what specific policy strategies would you recommend to strengthen methane mitigation efforts in Nigeria's oil and gas sector?

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.....

Section 5: Collaboration and partnership

5.1 To what extent do you believe collaboration between stakeholders is essential for successful methane mitigation efforts?

- Not important
- Somewhat important
- Important
- Very important
- Extremely important

5.2 How can international organisations and NGOs contribute effectively to methane mitigation efforts in Nigeria's oil and gas sector?

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Section 6: Future strategies and recommendations (open-ended questions)

6.1 What future strategies do you recommend for enhancing methane mitigation and reduction efforts in Nigeria's oil and gas sector?

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6.2 Are there any additional comments or suggestions you would like to provide regarding methane emissions and mitigation efforts in Nigeria's oil and gas sector?

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.....

Questionnaire for host communities

Section 1: Stakeholder information/profile

Name of the respondent:.....

Name of organisation/institution:

Your position/role:

Years of involvement in the oil and gas sector:.....

Contact information (optional):

Section 2: Awareness and understanding of methane emissions

2.1 How would you rate your awareness of methane emissions in the oil and gas sector?

- Very low
- Low
- Moderate
- High
- Very high

2.2 To what extent are you familiar with the environmental and economic impacts of methane emissions from Nigeria's oil and gas sector?

- Very familiar
- Somewhat familiar
- Not familiar
- Unsure

2.3 In your opinion, which aspects of Nigeria's oil and gas sector would see the greatest benefit from methane mitigation and reduction efforts?

- Reduced environmental impact
- Improved operational efficiency
- Enhanced public health

- Increased revenue from captured gas
- Other (open ended)

2.4 Are you aware of any current efforts to mitigate and reduce methane emissions in Nigeria's oil and gas sector?

.....

2.5 How important do you consider it to address methane emissions from Nigeria's oil and gas sector?

- Not a priority
- Somewhat important
- Important
- Very important/critical

Section 3: Community engagement and impact assessment

3.1 Have you heard of methane emissions before?

- Yes
- No
- Unsure

3.2 In your opinion, are there any activities related to oil and gas production that might release methane gas into the environment?

- Yes
- No
- Unsure

3.3 Do you notice any sights, smells or sounds related to oil and gas production in your local environment?

- Yes
- No
- Unsure

3.4 Have you personally experienced any negative impact that you believe might be linked to methane emissions?

- Yes
- No
- Unsure

3.5 Can you describe the specific ways these emissions might have impacted you or your community? (open ended)

.....

.....

3.6 Have you ever participated in any meetings or discussions about methane emissions in your community?

- Yes
- No
- Unsure

3.7 Are there any existing community-led initiatives or concerns related to reducing methane emissions in your area?

- Yes
- No
- Unsure

3.8 How do you think your community could be more actively involved in discussions and actions related to methane mitigation? (open ended)

.....

.....

Section 4: Collaboration and partnership

4.1 To what extent do you believe collaboration between stakeholders is essential for successful methane mitigation efforts?

- Not important
- Somewhat important
- Important
- Very important
- Extremely important

4.2 How can international organisations and NGOs contribute effectively to methane mitigation efforts in Nigeria's oil and gas sector?

.....

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Section 5: Future strategies and recommendations (open-ended questions)

5.1 What future strategies do you recommend for enhancing methane mitigation and reduction efforts in Nigeria's oil and gas sector?

.....

.....

5.2 Are there any additional comments or suggestions you would like to provide regarding methane emissions and mitigation efforts in Nigeria's oil and gas sector?

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Questionnaire for international community

Section 1: Stakeholder information/profile

Name of the respondent:.....

Name of organisation/institution:

Your position/role:

Years of involvement in the oil and gas sector:.....

Contact information (optional):

Section 2: Awareness and understanding of methane emissions

2.1 How would you rate your awareness of methane emissions in the oil and gas sector?

- Very low
- Low
- Moderate
- High
- Very high

2.2 To what extent are you familiar with the environmental and economic impacts of methane emissions from Nigeria's oil and gas sector?

- Very familiar
- Somewhat familiar
- Not familiar
- Unsure

2.3 In your opinion, which aspects of Nigeria's oil and gas sector would see the greatest benefit from methane mitigation and reduction efforts?

- Reduced environmental impact
- Improved operational efficiency
- Enhanced public health

- Increased revenue from captured gas
- Other (open ended)

2.4 Are you aware of any current efforts to mitigate and reduce methane emissions in Nigeria's oil and gas sector?

.....

.....

2.5 How important do you consider it to address methane emissions from Nigeria's oil and gas sector?

- Not a priority
- Somewhat important
- Important
- Very important/critical

Section 3: Methane mitigation overview

3.1 Are you currently involved in any methane mitigation and reduction initiatives within the oil and gas sector? (If yes, please specify)

.....

3.2 How would you assess the effectiveness of existing methane mitigation measures in Nigeria's oil and gas sector?

- Highly ineffective
- Ineffective
- Neutral
- Effective
- Highly effective

3.3 What are the major challenges faced in implementing methane mitigation projects in Nigeria's oil and gas sector?

.....

.....

Section 4: Role of international community

4.1 Are there specific roles or actions taken by your organisation to support the reduction of methane emissions in Nigeria?

- Yes
- No
- Unsure

If yes, what role does your organisation play in supporting methane mitigation actions/ initiatives in Nigeria?

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4.2 How do you evaluate the impact of methane reduction initiatives?

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4.3 What best practices or lessons learned can be shared from international experiences?

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4.4 How can international organisations further support methane reduction efforts in Nigeria?

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4.5 Where do you see opportunities for improvement in reducing methane emissions from your operations?

.....

.....

Section 5: Collaboration and partnership

5.1 To what extent do you believe collaboration between stakeholders is essential for successful methane mitigation efforts?

- Not important
- Somewhat important
- Important
- Very important
- Extremely important

5.2 How can international organisations and NGOs contribute effectively to methane mitigation efforts in Nigeria's oil and gas sector?

.....

.....

Section 6: Future strategies and recommendations (open-ended questions)

6.1 What future strategies do you recommend for enhancing methane mitigation and reduction efforts in Nigeria's oil and gas sector?

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6.2 Are there any additional comments or suggestions you would like to provide regarding methane emissions and mitigation efforts in Nigeria's oil and gas sector?

.....

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Questionnaire for private actors

Section 1: Stakeholder information/profile

Name of the respondent:.....

Name of organisation/institution:

Your position/role:

Years of involvement in the oil and gas sector:.....

Contact information (optional):

Section 2: Awareness and understanding of methane emissions

2.1 How would you rate your awareness of methane emissions in the oil and gas sector?

- Very low
- Low
- Moderate
- High
- Very high

2.2 To what extent are you familiar with the environmental and economic impacts of methane emissions from Nigeria's oil and gas sector?

- Very familiar
- Somewhat familiar
- Not familiar
- Unsure

2.3 In your opinion, which aspects of Nigeria's oil and gas sector would see the greatest benefit from methane mitigation and reduction efforts?

- Reduced environmental impact
- Improved operational efficiency
- Enhanced public health

- Increased revenue from captured gas
- Other (open ended)

2.4 Are you aware of any current efforts to mitigate and reduce methane emissions in Nigeria's oil and gas sector?

.....

2.5 How important do you consider it to address methane emissions from Nigeria's oil and gas sector?

- Not a priority
- Somewhat important
- Important
- Very important/critical

Section 3: Methane mitigation overview

3.1 Are you currently involved in any methane mitigation and reduction initiatives within the oil and gas sector? (If yes, please specify)

.....

.....

3.2 How would you assess the effectiveness of existing methane mitigation measures in Nigeria's oil and gas sector?

- Highly ineffective
- Ineffective
- Neutral
- Effective
- Highly effective

3.3 What are the major challenges faced in implementing methane mitigation projects in Nigeria's oil and gas sector?

.....

.....

Section 4: Organisational activities

4.1 Are there specific actions taken by your organisation to reduce methane emissions?

- Yes
- No
- Unsure

If yes, what are the actions taken by your organisation to reduce methane emissions?

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.....

4.2 How do you measure and report methane emissions from your operations?

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.....

4.3 What are the barriers encountered in implementing methane reduction strategies?

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.....

4.4 Are there any collaborative efforts with other stakeholders to address methane emissions?

.....

.....

4.2 Where do you see opportunities for improvement in reducing methane emissions from your operations?

.....

.....

Section 5: Collaboration and partnership

5.1 To what extent do you believe collaboration between stakeholders is essential for successful methane mitigation efforts?

- Not important
- Somewhat important
- Important
- Very important
- Extremely important

5.2 How can international organisations and NGOs contribute effectively to methane mitigation efforts in Nigeria's oil and gas sector?

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Section 6: Future strategies and recommendations (open-ended questions)

6.1 What future strategies do you recommend for enhancing methane mitigation and reduction efforts in Nigeria's oil and gas sector?

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6.2 Are there any additional comments or suggestions you would like to provide regarding methane emissions and mitigation efforts in Nigeria's oil and gas sector?

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Endnotes

- 1 Worldometer. (2023, July). *Countries in the world by population (2024)*. <https://www.worldometers.info/world-population/population-by-country/>
- 2 CCAC Secretariat (2023, September 26). *Nigeria begins implementation of oil and gas methane reduction*. Climate and Clean Air Coalition. <https://www.ccacoalition.org/news/nigeria-begins-implementation-oil-and-gas-methane-reduction>
- 3 Electricity in Nigeria in 2023/2024 (n.d.). *Low carbon power*. https://lowcarbonpower.org/region/Nigeria?utm_source=chatgpt.com
- 4 The energy gap in Nigeria refers to the disparity between the demand for electricity and the available supply. Nigeria leveraging natural gas involves using its abundant gas resource to bridge that gap by increasing its use in targeted power generation. This approach aims to enhance energy security, reliability, commodification of natural gas and affordability while reducing dependence on other more costly or environmentally damaging fuels.
- 5 Williams, N., Raji, T., Ekoh, C. (2024, August 7). *Illuminating Nigeria: blurring the lines between the grid and off-grid electricity*. Georgetown Journal of International Affairs. https://gjia.georgetown.edu/2024/08/07/illuminating-nigeria-blurring-the-lines-between-the-grid-and-off-grid-electricity/?utm_source=chatgpt.com
- 6 International Energy Agency (IEA) (2023, July 3). *Nigeria renewable energy master plan*. <https://www.iea.org/policies/4974-nigeria-renewable-energy-master-plan>
- 7 OPEC (2024, November 10). *Natural gas data: OPEC gas reserves*. Annual statistical bulletin 2024. Retrieved December 8, 2024, from <https://publications.opec.org/asb/chapter/show/123/2160/2162>
- 8 National Bureau of Statistics (2023). *Foreign trade in goods statistics*. <https://nigerianstat.gov.ng/elibrary/read/1241419>
- 9 Central Bank of Nigeria (2022, July 31). *Annual statistical bulletin*. <https://www.cbn.gov.ng/documents/Statbulletin.asp>
- 10 National Bureau of Statistics (2023). *NBS 2023 Q3: Nigeria gross domestic product*. Q3 20 Nigerian gross domestic product report. <https://nigerianstat.gov.ng/elibrary/read/1241415#>
- 11 Policy for Legal Advocacy Centre (2024). *Laws of Nigeria*. <https://placng.org/lawsofnigeria/view2.php?sn=40>
- 12 Policy and Legal Advocacy Centre (1965, June 11). *Hydrocarbon refineries act*. Retrieved July 3, 2025, from <https://placng.org/lawsofnigeria/laws/H5.pdf>
- 13 9ja Legal (n.d). *Motor spirit returns act*.<http://9jalegal.com.ng/downloads/Laws/Federal%20laws/MOTOR%20SPIRIT%2%28RETURNS%29%20ACT.docx>
- 14 Neiti (1957, March 27). *NNPC act 1977*. <https://neiti.gov.ng/cms/wp-content/uploads/2022/08/NNPC-Act-1977.pdf>
- 15 Nigeria Bureau of Statistics (2022, May). *Nigerian gross domestic product report (Q1 2022)*. <https://nigerianstat.gov.ng/elibrary/read/1241175>
- 16 International Trade Administration (2023, June). *Nigeria – country commercial guide*. <https://www.trade.gov/country-commercial-guides/nigeria-oil-gas-and-mining-sectors>

- 17 Anaro, B., & Ifeakandu, A. (2022, July 4). *Nigeria lost \$1bn revenue to crude oil theft in Q1 2022*. Blueprint. <https://blueprint.ng/nigeria-lost-1bn-revenue-to-crude-oil-theft-in-q1-2022/>
- 18 Eboh, C. (2022, July 2). *Nigeria lost \$1 billion in Q1 revenue to crude oil theft*. Reuters. <https://www.reuters.com/world/africa/nigeria-lost-1-billion-q1-revenue-crude-oil-theft-2022-07-02/>
- 19 International Trade Administration (2023, June). *Nigeria – country commercial guide*. <https://www.trade.gov/country-commercial-guides/nigeria-oil-gas-and-mining-sectors>
- 20 Ghaddar, A., Harvey, R., Payne, J. (2024, February 15). *Exclusive: Nigeria's new Dangote refinery to export first fuel cargoes*. Reuters. <https://www.reuters.com/business/energy/nigerias-dangote-refinery-export-first-fuel-cargoes-2024-02-14/>
- 21 Climate Watch (2024). *Climate Watch Data*. https://www.climatewatchdata.org/countries/NGA?end_year=2020&start_year=1990
- 22 Mahmoud, M. I. (2024, March 20). *Methane mitigation and reduction in Nigeria's oil and gas sector*. Africa Policy Research Institute. <https://afripoli.org/methane-mitigation-and-reduction-in-nigerias-oil-and-gas-sector#>
- 23 Mahmoud, M. I. (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#>
- 24 Mahmoud, M. I. (2025, February 12). *The benefits of methane mitigation and reduction in Nigeria's oil and gas sector*. Africa Policy Research Institute. <https://afripoli.org/the-benefits-of-methane-mitigation-and-reduction-in-nigerias-oil-and-gas-sector#>
- 25 Ibid.
- 26 Ibid.
- 27 Aduloju, B. (2023, November 13). *OPEC: Nigeria retained position as Africa's largest oil producer in October*. The Cable. Retrieved November 21, 2024, from <https://www.thecable.ng/opec-nigeria-retained-position-as-africas-largest-oil-producer-in-october/>
- 28 Nigerian Upstream Petroleum Regulatory Commission (2024, July 25). *NIGERIA: leading crude oil producer in Africa*. Retrieved November 21, 2024, from [https://www.nuprc.gov.ng/nigeria-leading-crude-oil-producer-in-africa/#:~:text=Nigeria%20continues%20to%20dominate%20as,barrels%20per%20day%20\(mbpsd\)](https://www.nuprc.gov.ng/nigeria-leading-crude-oil-producer-in-africa/#:~:text=Nigeria%20continues%20to%20dominate%20as,barrels%20per%20day%20(mbpsd))
- 29 Department of Climate Change, Federal Ministry of Environment, Nigeria (2018, December). *Nigeria's national action plan to reduce short-lived climate pollutants*. <https://climatechange.gov.ng/wp-content/uploads/2020/09/nigeria-national-action-plan-nap-to-reduce-short-lived-climate-pollutants-slcps-.pdf>
- 30 Ibid.
- 31 International Energy Agency (IEA) (2023). *Global methane tracker 2023*. <https://www.iea.org/reports/global-methane-tracker-2023/overview>
- 32 Ibid.
- 33 Barnard, P., et al. (2021, October). *World scientists' warnings into action, local to global*. National Library of Medicine. <https://doi.org/10.1177/00368504211056290>
- 34 Cointe, B., & Guillemot, H. (2023, January 18). A history of the 1.5°C target. *Wiley Interdisciplinary Reviews: 14*(3). <https://doi.org/https://doi.org/10.1002/wcc.824>
- 35 VOCs (Volatile Organic Compounds) refer to organic chemicals that easily evaporate at room temperature. These VOCs can escape storage tanks along with methane gas, contributing to air pollution.

- 36 BTEX: These are a group of aromatic hydrocarbons commonly found in crude oil, gasoline and other petroleum products.
- 37 NO_x (Nitrogen oxides) refers to a group of gases formed during high-temperature combustion processes like gas flaring. Common NO_x pollutants include nitric oxide (NO) and nitrogen dioxide (NO₂). These gases contribute to environmental problems including smog formation, acid rain and respiratory problems.
- 38 PM_{2.5} (particulate matter 2.5): fine inhalable particles with a diameter of 2.5 micrometers or less. These particles are small enough to penetrate deep into the lungs and cause health problems including respiratory illnesses, cardiovascular diseases and lung cancer.
- 39 Jalali, S., et al. (2021, October 28). Long-term exposure to PM_{2.5} and cardiovascular disease incidence and mortality in an Eastern Mediterranean country: findings based on a 15-year cohort study. *Environmental Health*. <https://doi.org/10.1186/s12940-021-00797-w>
- 40 Ibid.
- 41 Reading, E., et al. (2022, November 10). *Societal benefits of methane mitigation*. Abt Associates. <https://www.abtglobal.com/insights/publications/white-paper/societal-benefits-of-methane-mitigation>
- 42 Ibid.
- 43 CCAC Secretariat (2023, January 12). *Nigeria cements methane guidelines, and its role as an African climate and clean air leader*. Climate and Clean Air Coalition. <https://www.ccacoalition.org/news/nigeria-cements-methane-guidelines-and-its-role-african-climate-and-clean-air-leader#:~:text=Methane%20is%20a%20key%20ingredient,would%20prevent%2060%2C000%20prematu>
- 44 Ibid.
- 45 Department of Climate Change, Federal Ministry of Environment, Nigeria. (2021, November). *2050 long-term vision for Nigeria (LTV-2050)*. https://unfccc.int/sites/default/files/resource/Nigeria_LTS1.pdf
- 46 Federal Ministry of Environment (2018, December). *National action plan to reduce short-lived climate pollutants (SLCPs)*. <https://climatechange.gov.ng/wp-content/uploads/2020/09/nigeria-s-national-action-plan-nap-to-reduce-short-lived-climate-pollutants-slcps-.pdf>
- 47 National Oil Spill Detection and Response Agency (NOSDRA) (2020). *National oil spill contingency plan*. <https://nosdra.gov.ng/wp-content/uploads/2021/03/NOSCP%202020.pdf>
- 48 Nigerian Upstream Petroleum Regulatory Commission (NUPRC) (2022, November 10). *NUPRC guidelines for management of fugitive methane and greenhouse gases emissions in the upstream oil and gas operations in Nigeria*. <https://www.nuprc.gov.ng/wp-content/uploads/2022/11/METHANE-GUIDELINES-FINAL-NOVEMBER-10-2022.pdf>
- 49 Ogunleye, J. (2019, September 9). *Putting Out the Fire: How Nigeria Has Quietly Cut Flaring By 70%*. Climate Policy in Action. <https://www.ccap.org/post/putting-out-the-fire-how-nigeria-has-quietly-cut-flaring-by-70>
- 50 Climate and Clean Air Coalition (n.d.). *Nigeria*. CCAC Partner. [https://www.ccacoalition.org/partners/nigeria#:~:text=Nigeria%20has%20been%20a%20Climate,\(SLCPs\)%20mitigation%20is%20critical](https://www.ccacoalition.org/partners/nigeria#:~:text=Nigeria%20has%20been%20a%20Climate,(SLCPs)%20mitigation%20is%20critical)
- 51 *Nigeria Gas Flare Commercialization Programme* (2024). <https://ngfcp.nuprc.gov.ng/#:~:text=The%20Federal%20Government%20of%20Nigeria's%20Commitment&text=In%20demonstration%20of%20its%20commitment,out%20target%20by%20year%202025>
- 52 The World Bank (2023, December 5). *Global flaring and methane reduction partnership (GFMR)*. <https://www.worldbank.org/en/programmes/gasflaringreduction/about>

- 53 CCAC Secretariat (2020, January 10). *Nigeria and Cote D'Ivoire join Global Methane Alliance, a critical move in fighting global warming*. Climate and Clean Air Coalition. <https://www.ccacoalition.org/news/nigeria-and-cote-divoire-join-global-methane-alliance-critical-move-fighting-global-warming>
- 54 Global Methane Initiative (2024). *Nigeria methane emissions summary*. <https://www.globalmethane.org/partners/detail.aspx?>
- 55 Oil and Gas Methane Partnership (2024). *Member Companies*. <https://ogmpartnership.com/our-member-companies/>
- 56 Oil and Gas Methane Partnership (2024). *A solution to the methane challenge*. <https://ogmpartnership.com/a-solution-to-the-methane-challenge/>
- 57 Oil and Gas Methane Partnership (2024, April 30). *List of OGMP 2.0 member companies*. https://ogmpartnership.com/wp-content/uploads/2024/04/List_of_OGMP2.0_Member_Companies_30.04-1-5.pdf
- 58 Federal Republic of Nigeria. (2021). *Adaptation communication to the United Nations framework convention on climate change*. United Nations Framework Convention on Climate Change. <https://unfccc.int/sites/default/files/resource/Nigeria-Adaptation-Communication-UNFCCC-2.pdf>
- 59 Federal Ministry of Environment. (2022, June 2). *Nigeria's nationally determined contributions (NDCs) (Updated submission)*. United Nations Climate Change. <https://unfccc.int/documents/497790>
- 60 United Nations Climate Change (2021, November 2). *World leaders kick start accelerated climate action at COP26*. <https://unfccc.int/news/world-leaders-kick-start-accelerated-climate-action-at-cop26>
- 61 Oxford College of Marketing (2018, April 23). *What Is Mendelow's Matrix and how is it useful?* <https://blog.oxfordcollegeofmarketing.com/2018/04/23/what-is-mendelows-matrix-and-how-is-it-useful/>
- 62 Singh, H. (2022, April 24). *The Salience Model for stakeholder classification*. Deep Fried Brain. <https://www.deepfriedbrainproject.com/2017/09/salience-model-for-stakeholder-classification.html>
- 63 Fernandes, P., et al. (2023). *Landscape of methane abatement finance 2023*. Climate Policy Initiative. <https://www.climatepolicyinitiative.org/wp-content/uploads/2023/11/Landscape-of-Methane-Abatement-Finance.pdf>
- 64 Ibid.
- 65 Ibid.
- 66 Ibid.
- 67 United Nations Environment Programme/Climate and Clean Air Coalition (2022, November 4). *Global methane assessment 2030: baseline report*. United Nations Environment Programme. <https://www.unep.org/resources/report/global-methane-assessment-2030-baseline-report>
- 68 Fernandes, P., et al. (2023). *Landscape of methane abatement finance 2023*. Climate Policy Initiative. <https://www.climatepolicyinitiative.org/wp-content/uploads/2023/11/Landscape-of-Methane-Abatement-Finance.pdf>
- 69 DeFabrizio, S., et al. (2021, September 23). *Curbing methane emissions: how five industries can counter a major climate threat*. McKinsey & Company. <https://www.mckinsey.com/capabilities/sustainability/our-insights/curbing-methane-emissions-how-five-industries-can-counter-a-major-climate-threat#/>
- 70 International Energy Agency (IEA), United Nations Environment Programme (UNEP) and UNEP-Convened Climate and Clean Air Coa. (n.d.). *The Imperative of Cutting Methane from Fossil Fuels: An assessment of the benefits for the climate and health*. International Energy Agency (IEA). [https://www.ccacoalition.org/sites/default/files/resources/files/The imperative of cutting methane from fossil fuels.pdf](https://www.ccacoalition.org/sites/default/files/resources/files/The%20imperative%20of%20cutting%20methane%20from%20fossil%20fuels.pdf)

- 71 International Energy Agency (IEA) (2023, June). *Financing reductions in oil and gas methane emissions: a world energy outlook special report on the oil and gas industry and COP28*. <https://iea.blob.core.windows.net/assets/ff747fc8-a8d9-4eda-9bc9-0e2b628cb019/Financingreductionsinoilandgasmethaneemissions.pdf>
- 72 Ibrahim, A. (2023, July 17). *Nigeria needs \$1.4bn to reduce methane emissions by 2030*. Business Day. [https://businessday.ng/energy/article/nigeria-needs-1-4bn-to-reduce-methane-emissions-by-2030/#:-:text=Nigeria%20will%20need%20up%20to,Agency%20\(IEA\)%20has%20shown.](https://businessday.ng/energy/article/nigeria-needs-1-4bn-to-reduce-methane-emissions-by-2030/#:-:text=Nigeria%20will%20need%20up%20to,Agency%20(IEA)%20has%20shown.)
- 73 Bayelsa Watch (n.d.). *About Bayelsa State*. <https://bayelsawatch.com/about-bayelsa-state/>
- 74 The Bayelsa State Oil and Environmental Commission (2023, May). *An environmental genocide: counting the human and environmental cost of oil in Bayelsa, Nigeria*. <https://report.bayelsacommission.org/chapters/setting-the-scene-oil-in-nigeria-and-bayelsa-state>
- 75 Ibid.
- 76 Niger Delta Budget Monitoring Group (n.d.). *Overview of Rivers State*. <https://www.nigerdeltabudget.org/overview-of-rivers-state/>
- 77 Wikipedia (2025, February). *Rivers State*. https://en.wikipedia.org/wiki/Rivers_State#cite_note-niger_delta-31
- 78 Ibid.
- 79 Niger Delta Budget Monitoring Group (n.d.). *Overview of Rivers State*. <https://www.nigerdeltabudget.org/overview-of-rivers-state/>
- 80 Cross River State Government (2022). *Cross River State: economic profile and investment opportunities*. Retrieved from <http://www.crossriverstate.gov.ng/economic-profile>
- 81 Bassey, N., & Nwankwo, C. (2021). Oil spills and their impact on the livelihoods of the people in Bayelsa State. *Environmental Science & Policy*, 114, 1-10. <https://doi.org/10.1016/j.envsci.2020.08.005>
- 82 Ogunleye, O., & Olatunji, A. (2020). Socio-economic impacts of oil exploration on local communities in Rivers State. *Journal of Sustainable Development in Africa*, 22(2), 75-90
- 83 Bruederle, A. & Hodler, R. (2019). *Effect of oil spills on infant mortality in Nigeria*. Proceedings of the National Academy of Sciences of the United States of America, pp. 116, 5467-5471.
- 84 Royal Dutch Shell Plc. (2019). *Energy for a better future. Annual report and accounts for the year ended December 2019*. Available at <https://reports.shell.com/...>
- 85 Ibid.
- 86 TVC News Nigeria (2022). *NOSDRA to develop satellite tracking tool* [Video]. YouTube. <https://www.youtube.com/watch?v=3wq3WmxMJ1I>
- 87 Nigerian Upstream Petroleum Regulatory Commission (NUPRC) (2023, July 12). *Gas flaring regulation*. Federal Republic of Nigeria. <https://www.nuprc.gov.ng/wp-content/uploads/2023/07/GAS-FLARING-REGULATIONS.pdf>
- 88 Department of Climate Change (2021, November). *2050 long-term vision for Nigeria (LTV-2050)*. Federal Ministry of Environment, Nigeria. https://unfccc.int/sites/default/files/resource/Nigeria_LTS1.pdf
- 89 Nigeria Energy Transition Plan (2022). *Nigeria's pathway to achieve carbon neutrality by 2060*. <https://energytransition.gov.ng/>
- 90 Department of Climate Change (2021, November). *2050 long-term vision for Nigeria (LTV-2050)*. Federal Ministry of Environment, Nigeria. https://unfccc.int/sites/default/files/resource/Nigeria_LTS1.pdf

- 91 British Columbia Energy Regulator (n.d.). *Collaboration on methane research establishes a two-year research plan (NR 2020-01)*. <https://www.bc-cr.ca/news/collaboration-on-methane-research-establishes-two-year-research-plan/>
- 92 Fernandes, P., et al. (2023). *Landscape of methane abatement finance 2023*. Climate Policy Initiative. <https://www.climatepolicyinitiative.org/wp-content/uploads/2023/11/Landscape-of-Methane-Abatement-Finance.pdf>
- 93 Ibid.
- 94 Ibid.
- 95 Ibid.
- 96 United Nations Environment Programme/Climate and Clean Air Coalition (2022, November 4). *Global methane assessment 2030: baseline report*. United Nations Environment Programme. <https://www.unep.org/resources/report/global-methane-assessment-2030-baseline-report>
- 97 Fernandes, P., et al. (2023). *Landscape of methane abatement finance 2023*. Climate Policy Initiative. <https://www.climatepolicyinitiative.org/wp-content/uploads/2023/11/Landscape-of-Methane-Abatement-Finance.pdf>
- 98 International Energy Agency (IEA) (2023, June). *Financing reductions in oil and gas methane emissions: a world energy outlook special report on the oil and gas industry and COP28*. <https://iea.blob.core.windows.net/assets/ff747fc8-a8d9-4eda-9bc9-0e2b628cb019/Financingreductionsinoilandgasmethaneemissions.pdf>
- 99 World Bank Group (2013, September). *Angola's major natural gas project to cut emissions from flaring*. The World Bank. <https://www.worldbank.org/en/news/feature/2013/09/20/angola-major-natural-gas-project-to-cut-emissions-from-flaring>
- 100 Eni (2023). *Reducing emissions linked to oil & gas production, contributing to the net zero target*. <https://www.eni.com/content/dam/enicom/documents/eng/sustainability/2023/sustainability-performance/eni-for-2023-sustainability-performance-eng.pdf>
- 101 Ibid.
- 102 United States Environmental Protection Agency (2024, November 12). *EPA finalises rule to reduce wasteful methane emissions and drive innovation in the oil and gas sector*. <https://www.epa.gov/newsreleases/epa-finalizes-rule-reduce-wasteful-methane-emissions-and-drive-innovation-oil-and-gas>
- 103 Leuraers, J. (n.d.). *Methane emission regulation and management in Norway*. Equinor ASA. https://www.google.com/url?sa=t&source=web&rct=j&copi=89978449&url=https://www.energycommunity.org/dam/jcr:d79d95bb-3298-481a-88e0-3f7d3e2dd001/MM5_13-09_2021_Equinor.pdf&ved=2ahUKEwjNi6ioprKOAxVVQzABHbyBCqUQFnoECBgQAQ&usg=AOvVaw01w8yYchnP4St7Ps57GbVV
- 104 Government of Canada (2024, July). *Reducing methane emissions*. <https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/reducing-methane-emissions.html>
- 105 BusinessDay (2025, May 28). *Nigeria launches first ever flare gas digital infrastructure project*. Retrieved May 28, 2025, from <https://businessday.ng/pro/article/nigeria-launches-first-ever-flare-gas-digital-infrastructure-project/>



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The Department of Climate Change (DCC) is one of the departments in the Federal Ministry of Environment (Nigeria). It serves as a vehicle for driving national climate action efforts in Nigeria.