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Methane Abatement in Brazil's Oil and Gas Sector

This fact sheet presents findings for Brazil from a broader study assessing the costs and financial implications of methane abatement measures across nine countries in Africa and Latin America. The study aims to support regulators in designing appropriate incentives and policies to guide and prioritize the deployment of abatement technologies.

Estimates of abatement potential and mitigation costs are developed at the country level, accounting for real-world constraints including existing policy frameworks, ease of deployment, and prevailing industry practices. Four key abatement measures were analyzed: leak detection and repair (LDAR) programs, installation of vapor recovery units (VRU) for storage tanks, replacement of natural gas-driven pneumatic equipment with electric or air-driven alternatives, and improved flaring practices. Additional technologies, operational practices, and regulatory approaches can further drive methane reductions but are beyond the scope of this study. The full report, published in June 2026, is available via the QR code.

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Key figures

Estimated annual emissions[1]

1,073 kt methane

(32.0 Mt CO_2e)

Emissions analyzed[2]

383 kt methane

(36% of estimated emissions)

Technical abatement possible from analyzed technologies

19%

of estimated emissions

Low-cost abatement potential from analyzed technologies[3]

19%

of estimated emissions

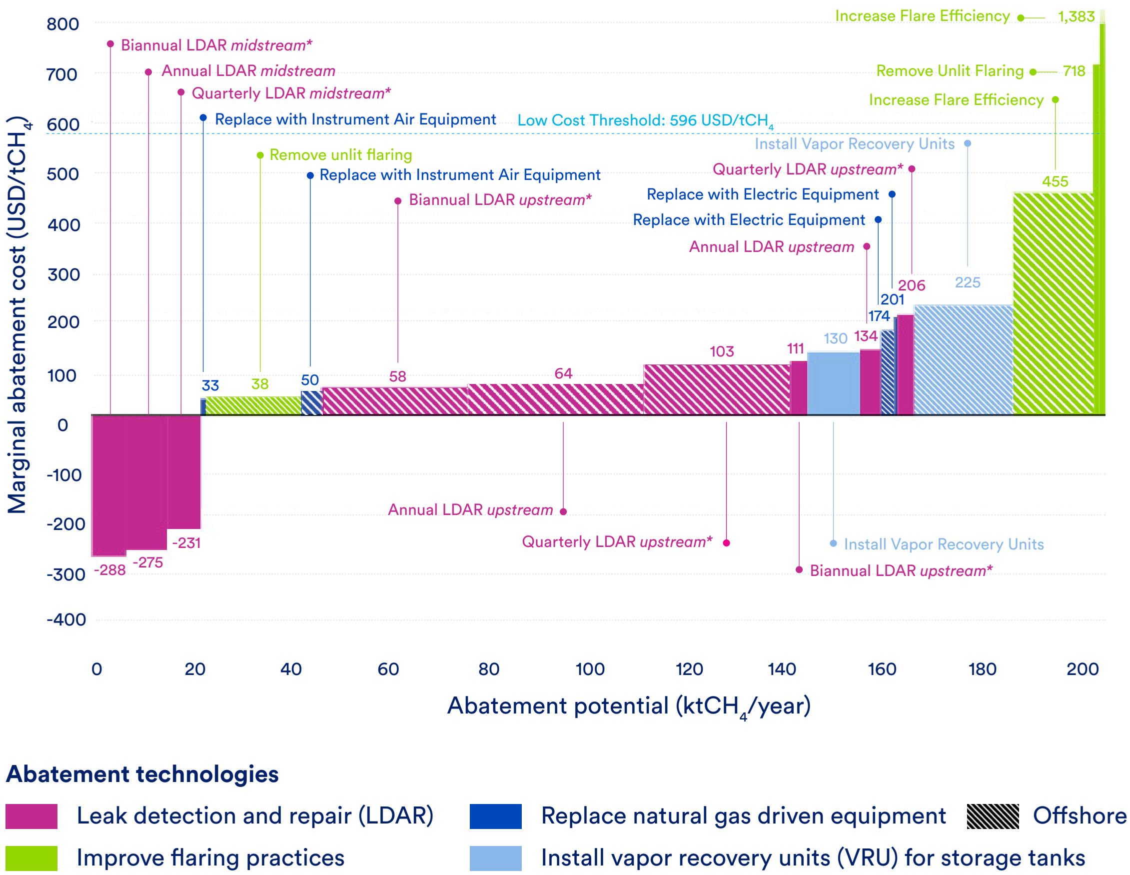
Current policies and practices

Brazil does not yet have a dedicated methane regulatory framework for the oil and gas sector. Methane control is addressed indirectly through petroleum and environmental regulations[4,5,6], with a strong focus on flaring and venting restrictions. These include limits on total gas losses (generally around 3% of gas production), inclusion of flared gas in royalty calculations, and restrictions on routine flaring under certain circumstances. In parallel, **dedicated methane regulations are under preparation, with a new framework expected to be adopted by the end of 2026**[7]**.**

Brazil's gas market is undergoing gradual liberalization, with reforms[8] promoting third-party access and new investments. Gas production is largely associated with offshore oil, but around 54% of volumes are reinjected[9] for reservoir pressure maintenance, and due to limited transport infrastructure and gas composition constraints requiring additional processing. **Persistent infrastructure gaps, including limited pipeline coverage and processing capacity, continue to constrain gas monetization**, particularly in remote and offshore areas. As a result, domestic demand exceeds supply, leading to continued reliance on imports.

Methane mitigation in Brazil is constrained by several economic and technical barriers, including high upfront costs, limited access to financing, and a small pool of local service providers. Offshore constraints and **infrastructure gaps** can restrict the ability to capture and commercialize gas, while limited technical capacity and low awareness further hinder uptake among some operators. However, several low-cost abatement opportunities exist, and operators are required to **allocate a share of their revenues to research, development and innovation**[10], which could support research and pilot-scale demonstration of methane emissions reduction technologies.

Brazil Marginal Abatement Cost Curve for Selected Mitigation Options



**Biannual costs reflect costs of increasing from annual to biannual. Quarterly costs reflect costs of increasing from biannual to quarterly*
Based on emissions data from International Energy Agency (2025) Methane Tracker Database - IEA; as modified by Carbon Limits/CATF

Analysis

Mitigation economics largely depends on whether recovered methane can be monetized: when gas can be sold, marginal abatement costs fall, and when it is flared or reinjected, costs rise. This dynamic explains why some measures, such as the implementation of LDAR programs in the midstream segment, show negative abatement costs, as recovered gas generates net savings. These savings depend on assumptions regarding gas marketability and prices. In this analysis, it is assumed that 100% of recovered gas in the midstream segment can be marketed at a price of 10 USD/MMBtu, while 72% of onshore upstream recovered gas and 26% of offshore upstream recovered gas can be marketed at a price of 2 USD/MMBtu. Under these assumptions, most mitigation measures assessed fall below the low-cost threshold of 596 USD/t CH_4 (20 USD/t CO_2e).

Within this cost range, the improvement of annual LDAR programs in the offshore upstream segment delivers the largest single abatement potential, with approximately 36 kt of methane emissions reductions per year at a low marginal abatement cost of around 64 USD/t CH_4. The installation of VRUs and the replacement of pneumatic equipment with electric or air-driven alternatives systems also remain below the low-cost threshold. Higher marginal costs are associated with the elimination of unlit flaring and the implementation of improved flaring systems. Given that flaring volumes are already relatively low due to site-level limits, the resulting emissions reductions are modest relative to the capital investment required.

Overall, deploying the full portfolio of considered abatement measures could result in 205 kt of methane emissions reductions per year at a net cost of around USD 20 million/year. *If all recovered upstream gas were assumed to be saleable at 2 USD/MMBtu, total abatement costs could decline to around USD 12 million/year.*

Summary of analyzed mitigation technologies in Brazil

For further details, please refer to the mitigation technology fact sheets for each abatement technology.

Leak detection and repair (LDAR)

Implementation of Leak detection and repair programs at quarterly inspection frequency

Ease of deployment	Current practices	Abatement potential	Marginal abatement cost
Intermediate	Medium adoption	128 kt CH_4 abatable	22 USD/tCH_4

- Brazil does not have regulatory requirements mandating LDAR programs, and practices vary across operators. Some companies conduct periodic campaigns (e.g. annual or multi-year) using internal teams and external contractors, supported by ground-based surveys and drones. In some cases, these efforts are complemented by continuous monitoring systems. While many leaks are addressed promptly, others are deferred and prioritized during planned shutdowns.
- Deployment remains constrained by cost and capacity. A limited number of local service providers reduces competition and drives up prices, compared to mature markets. Offshore campaigns are especially complex and time-consuming, with logistics and permitting requirements increasing costs and limiting survey frequency.

Improve flaring practices

Improvement of flaring practices through increased flare efficiency and elimination of unlit flaring

Ease of deployment	Current practices	Abatement potential	Marginal abatement cost
Intermediate	Medium adoption	38 kt CH_4 abatable	349 USD/tCH_4

- Brazil does not impose strict performance, monitoring, or repair requirements for flaring systems. Regulation is limited to controlling flaring and gas losses under petroleum legislation[11], with gas losses capped and flaring primarily allowed for safety-related or exceptional operational conditions.
- Operationally, several facilities rely on cameras and temperature sensors to continuously monitor flare status and ensure ignition is maintained, with regular maintenance supporting high destruction efficiency.

Install vapor recovery units for storage tanks

Installation of vapor recovery units (VRUs) on storage tanks

Ease of deployment	Current practices	Abatement potential	Marginal abatement cost
Intermediate	Low adoption	31 kt CH_4 abatable	192 USD/tCH_4

- There is currently no regulation mandating the installation of vapor recovery units (VRUs) in Brazil. As a result, VRU deployment remains operator-driven and uneven. Some operators have started implementing vapor recovery systems in newer facilities to capture tank vapors, while others are still assessing their feasibility.
- However, deployment is not widespread: many older offshore installations continue to vent due to space, weight, and safety constraints that complicate retrofitting. Deployment also remains sensitive to high installation costs, and uncertain economic returns, as infrastructure gaps can limit the ability to transport or commercialize recovered gas.

Replace natural gas driven equipment

Replacement of natural gas-driven pumps and controllers with electric or air-driven alternatives

Ease of deployment	Current practices	Abatement potential	Marginal abatement cost
Easy	High adoption	8 kt CH_4 abatable	100 USD/tCH_4

- Brazil does not impose specific regulatory requirements targeting methane emissions from natural gas-driven pneumatic equipment, leaving technology choices to operators. In practice, such equipment is not widely used in the Brazilian oil and gas sector, with most assets already relying on electric or instrument-air alternatives.

Legend
Ease of deployment: indicator of how easily an abatement measure can be deployed at scale, considering regulatory, logistical, and infrastructure constraints.
Current practices: indicator of the level of existing deployment of an abatement measure in the country.

Policy recommendations

Brazil is currently working on updates to its existing flaring regulation and is planning to propose a dedicated methane regulation. At the same time, several mitigation measures assessed in this study show substantial abatement potential at low or negative cost. **Thus, in the near term, priorities could focus on ensuring that the methane regulation expected by end of 2026[7] includes targeted measures addressing the most cost-effective mitigation opportunities while the revised flaring regulation incorporates requirements for flare efficiency and the prevention of unlit flares.** In particular, introducing minimum LDAR requirements in the methane regulation would provide a high-impact entry point, complemented by provisions covering additional measures such as vapor recovery units, replacement of natural gas-driven equipment, and others. Consideration could be given to phased implementation for more capital-intensive measures at existing facilities. Strong implementation and enforcement will then be essential to translate these provisions into measurable emissions reductions.

Over the medium term, Brazil could focus on **strengthening measurement, monitoring, reporting and verification systems** to improve emissions data and support effective compliance. **Targeted financial instruments** (such as concessional financing, expanded credit lines, and support for access to international climate finance) could help address remaining economic barriers, particularly for offshore assets. **Developing capacity strengthening initiatives** across the value chain could further support technology deployment and innovation.

In the longer term, addressing structural constraints will be essential. **Continued development of gas gathering, processing, and transport infrastructure** would improve gas monetization opportunities and strengthen the economics of methane mitigation.

Methodology

This study estimates methane abatement potential and costs using a bottom-up marginal abatement cost curve (MACC) approach. The analysis covers four emission sources in the oil and gas sector (flaring, fugitive equipment leaks, tanks, and natural gas-driven pneumatic equipment) and evaluates a set of abatement measures for each source.

Abatement potential and costs were refined through seventeen interviews with stakeholders operating in Brazil, including government representatives, oil and gas companies, and technology and service providers. These interviews were complemented by a comprehensive literature review and informed assumptions on technology deployment, applicability, performance, implementation costs, and operational practices, ensuring the analysis reflects local conditions. Where recovered gas can be sold, revenues are deducted using local gas prices where available, or international benchmark prices adjusted to netback values. Country-specific MACCs were then developed using local discount rates to reflect national investment conditions and financial risks.

While this study focuses primarily on abatement costs, methane mitigation is driven by a broader set of benefits, including improved operational safety and asset integrity, enhanced local air quality, immediate climate gains due to methane's high short-term warming potential, reduced social costs of methane emissions, improved operational excellence or international regulatory compliance.

Scan the QR code at the start of this document for a full description of the methodology and key assumptions. Disclaimer: The figures presented in this fact sheet are based on national-level estimated data and analytical assumptions from 2025. Actual emissions, abatement potential, and costs may vary due to data limitations, site specific conditions, operational constraints, and cost structures. This document is intended for informational purposes only and should not be relied upon as the sole basis for investment, operational, or policy decisions. Regulators are invited to reach out to CATF for further discussions on understanding the assumptions underlying the cost curves and for guidance on the adoption and implementation of methane regulation.

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1 Based on data from International Energy Agency (2025) *Methane Tracker Database* - IEA; as modified by Carbon Limits and CATF. For further details, please refer to the methodology report.
2 Emissions analyzed refer to the share of total methane emissions impacted by the abatement measures studied.
3 Low cost refers to a cost less than 596 USD/tCH_4 (20 USD/tCO_2e using GWP 100)
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5 Brazilian National Agency of Petroleum, Natural Gas and Biofuels (ANP). (2020). *Resolution No 806 of 2020 from ANP*. Available at: https://atosoficiais.com.br/anp/resolucao-n-806-2020
6 Brazilian Institute of the Environnement and Renewable Natural Resources (IBAMA). (2010). *IBAMA Normative Instruction No 12 of 2010*. Available at: https://www.mprs.mp.br/media/areas/gapp/arquivos/inst_norm_2_ibama_2010.pdf
7 Brazilian National Agency of Petroleum, Natural Gas and Biofuels (ANP). (2025). *ANP will conduct a prior consultation on a study concerning methane emissions*. Available at: https://www.gov.br/anp/pt-br/canais_atendimento/imprensa/noticias-comunicados/anp-fara-consulta-previa-sobre-estudo-relativo-a-emissoes-de-metano
8 Federative Republic of Brazil. (2021). *Law No. 14.134*. Available at: https://www.planalto.gov.br/ccivil_03/_ato2019-2022/2021/lei/l14134.htm
9 Brazilian National Agency for Petroleum, Natural Gas and Biofuels (ANP). (2026). *Oil and gas production*. Available at https://app.powerbi.com/view?r=eyJrljoiNzVmNzI1MzQtNTY1NC00ZGVhLTk5N2ItNzBkMDNhY-2IxZTIxIiwidCI6IjQ0OTlmNGZmLTI0YTYtNGI0Mi1iN2VmLTEyNGFmY2FkYzkxMyJ9
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11 Brazilian National Agency of Petroleum, Natural Gas and Biofuels (ANP). (2020). *Resolution No 806 of 2020 from ANP*. Available at: https://atosoficiais.com.br/anp/resolucao-n-806-2020