CLEAN AIR TASK FORCE

CARBON LIMITS

Methane Abatement in the Oil and Gas Sector: Improve Flaring Practices

This fact sheet presents findings for the improvement of flaring practices through increased flare destruction efficiency and elimination of unlit flaring from a broader study assessing the costs and financial implications of four methane abatement measures across nine countries in Africa and Latin America. 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. The study aims to support regulators in designing appropriate incentives and policies to guide and prioritize the deployment of abatement technologies.

The full report, published in June 2026, is available via the QR code.

SCAN TO READ FULL REPORT

Overview

Improving flare practices refers to measures that reduce methane emissions from flaring by ensuring that gas sent to a flare is consistently and effectively burned. Field measurements show the prevalence of unlit flares and that average methane destruction at flares can be lower than commonly assumed[1,2], while well-designed, well-operated, and well-maintained flares can achieve destruction efficiencies exceeding 99%. This abatement option focuses exclusively on improving the performance and reliability of existing flaring systems. It does not include new gas capture, utilization, reinjection, or any other measures aimed at reducing flared volumes. Instead, it targets two distinct but complementary actions:

1. **Removing unlit flaring** by ensuring that flares remain continuously lit. This includes the installation of reliable pilot and auto-ignition systems, supported by continuous or frequent monitoring (e.g. flame or temperature detectors, cameras) and appropriate operational response procedures.
2. **Increasing flare destruction efficiency** for lit flares, through retrofit or replacement of flare systems and associated equipment, including assist systems (air/steam), improved gas routing and pressure management to ensure stable combustion conditions, enhanced automation and control to detect and correct abnormal operation, and stronger operational and maintenance (O&M) practices to sustain high combustion performance over time.

1 Genevieve Plant et al. (2022). *Inefficient and unlit natural gas flares both emit large quantities of methane.* Available at: https://www.science.org/doi/10.1126/science.abq0385

2 Environmental Defense Fund (EDF) (2020). *Helicopter Surveys Indicate Malfunctioning Flares in the Permian Basin are Releasing at Least 300,000 Metric Tons of Unburned Methane a Year.* Available at: https://www.edf.org/media/helicopter-surveys-indicate-malfunctioning-flares-permian-basin-are-releasing-least-300000

Costs range

The table below presents per-equipment costs associated with the two mitigation options considered for improving flaring practices.

$/equipment	Capital Costs	Operating costs
Removing unlit flaring	$0 - $500,000	<5% of CAPEX
Increasing flare destruction efficiency	$500,000 - $1,000,000	<5% of CAPEX

Cost estimates are indicative and may vary significantly depending on site conditions, local market conditions, labor and logistics costs, regulatory requirements, import fees, supply chain availability, and project-specific factors (e.g., scale, location, and existing infrastructure).

Current policies and practices

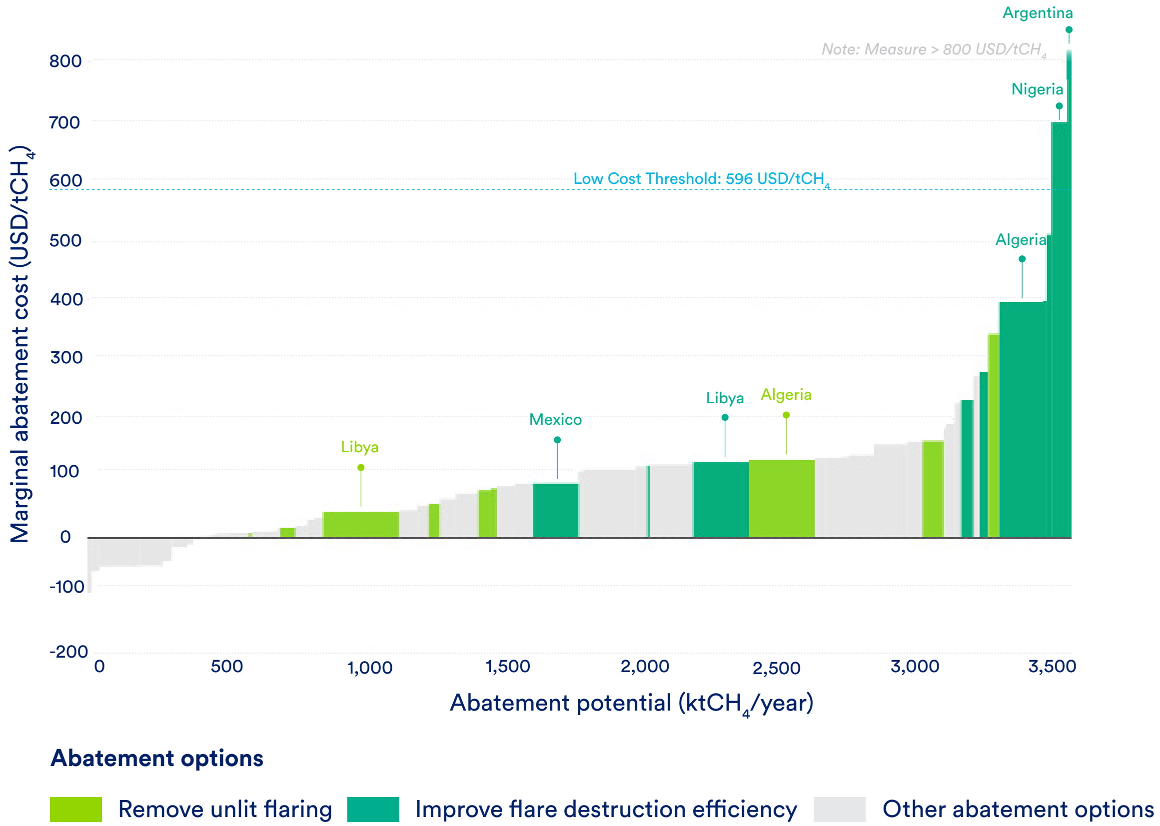
The table below presents the current status of regulatory frameworks and mitigation practices related to improving flaring performance.

	Algeria	Angola	Argentina	Brazil	Egypt	Ghana	Libya	Mexico	Nigeria
Regulation in place	N	N	N	N	N	Y	N	Y	Y
Current practices	L	L	L	M	L	L	L	L	L

Regulation	Y – Yes (National)	P – Partial (Subnational)	N – No
Practices	H – High adoption	M – Medium adoption	L – Low adoption

For further details, please refer to the individual country fact sheets.

Marginal Abatement Cost Curve for Selected Mitigation Options



Note: In this MACC, abatement options are disaggregated by country and abatement options. Marginal abatement costs are aggregated at the country–technology level using a weighted average based on abatement potential, combining different segments (e.g. upstream, midstream) and locations (e.g. onshore, offshore).

Based on emissions data from International Energy Agency (2025) Methane Tracker Database - IEA; as modified by Carbon Limits/CATF

Analysis

Flaring-related mitigation measures consistently have positive abatement costs, as the gas continues to be flared and does not generate additional revenue, unlike capture-based options such as vapor recovery units. The priority action is to eliminate unlit flaring, which represents a relatively low-cost and readily achievable opportunity across all assessed countries. Once unlit flaring is addressed, efforts can shift to improving flare destruction efficiency, which is typically relatively higher cost. Nevertheless, in this analysis, most flaring-related measures fall below the low-cost threshold of 596 USD/tCH_4 (20 USD/tCO_2e), even in the absence of revenue generation. Countries such as Libya and Algeria account for a large share of the global emissions-reduction potential at relatively low cost, driven by high flaring volumes per site that improve cost efficiency. In contrast, Argentina and Nigeria face higher costs and lower abatement potential due to lower flaring volumes per site, which reduces the cost-efficiency of equipment deployment.

Overall, abatement costs are not proportional to emission reductions, as improvements in flare performance involve fixed per-flare costs that apply regardless of the volume of gas flared. Cost variations are also influenced by local cost structures, import costs, and prevailing industry practices.

Challenges and barriers to wider deployment

- **Regulatory focus on venting and flaring volumes.** Regulations often prioritize reducing venting and routine flaring through limits or penalties on flared volumes (e.g., Ghana, Mexico and Nigeria). As a result, operator investment tends to focus on measures that reduce gas sent to flares (such as utilization, reinjection, or monetization). Upgrades to flare performance itself remain limited, reflecting both the absence of specific regulatory requirements and the lack of direct revenue incentives. While this focus is warranted, particularly in countries with high levels of flaring, it is essential that upgrades to flare systems are not overlooked, particularly in cases where gas utilization infrastructure will take several years to build and to ensure that remaining [non-routine] flaring does not lead to unnecessary emissions.
- **High operation and maintenance requirements.** Maintaining effective flare performance requires regular inspection, maintenance, and ongoing adjustment to changing flow conditions. Operating expenses include repeated mobilization of trained personnel, sometimes to remote sites, resulting in ongoing operating costs.
- **Limited cost-efficiency of flare efficiency upgrades at low volumes.** Improving flaring destruction efficiency typically involves equipment upgrades with largely fixed capital costs per flare, as well as ongoing operating and maintenance costs, regardless of the volumes flared. Where flaring is low or intermittent, this results in poor cost-efficiency and high abatement costs per ton.

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.