Opportunities to bolster domestic energy, improve exports and reduce emissions by monetising flaring in Libya

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Mark Davis, CEO Capterio

EXECUTIVE SUMMARY

Libya's gas flaring rose to a recent record high of over 7 BCM in 2025 – 7 times the volume exported via the Greenstream pipeline to Italy. At a time when Europe is actively seeking secure gas supplies and represents a premium market, this scale of waste is economically and strategically untenable. Recovered gas could either be exported or redeployed domestically to stabilise unreliable, economy-constraining power generation or to support higher-value uses such as fertiliser production. While monetising flared gas is already a national priority, accelerating its delivery will therefore unlock substantial economic value, strengthen regional energy security, and deliver immediate environmental benefits through sharp reductions in methane and CO_2 emissions. Achieving this prize will be complex and capital-intensive, but it will also require strong pan-industry coordination, innovative thinking on policy and gas pricing, coupled with decisive leadership and effective top-down oversight.

- Libya's oil exports reached 1.4 million barrels per day in 2025, the highest level since 2012, supported by improved stability and field rehabilitation
- However, gas exports reached a 22-year low at 1 BCM in 2025, driven by operational challenges, unreliable infrastructure and soaring domestic demand of some 12 BCM[1]. Faster renewables deployment could free up gas for export.
- Meanwhile, gas flaring in 2025 reached its highest figure in well over a decade at 7.3 BCM, with another 2 BCM likely released as uncombusted methane. National revenues could be improved by $2-3[2] billion per year if flares, vents and leaks were captured and the gas was exported to Europe
- Progress on the government's ambitions to eliminate gas flaring by 2030 is a national priority that will bring gas to domestic markets (for power or petrochemicals) or for export. Many multinational companies with similar zero-flaring commitments hold non-operated positions in high-flaring assets
- A range of significant flare capture projects have been delivered in recent years (reducing some field flaring by 1 BCM). Opportunities linked to better use of the Coastal Pipeline system and or current fertiliser plants could be gamechangers
- Capterio's gas-flaring intelligence platform, FlareIntel, quantifies every flare from its heat signature observed by satellite. In regions where flaring is rarely metered, it provides uniquely timely, independent, and objective data, often revealing volumes that are significantly under-reported (if reported at all)
- Capterio collaborates with companies and governments to turn credible, independent flare data into real-world action. We support the identification and screening of operational improvements and investment opportunities that capture flared gas, strengthen energy security, create economic value, and deliver immediate emissions reductions.

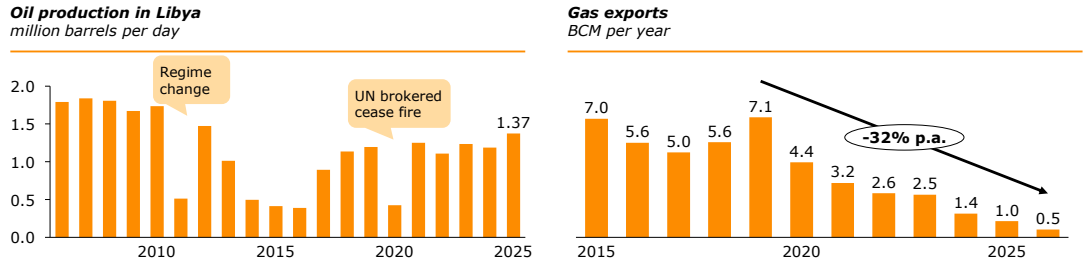
[1] https://www.gecf.org/About-Us/Membership/GECF-Country-Details/ArticleID/10/Libya-State-of-Libya. Gross gas production was reported by GECF as 29 BCM in 2024, with 13 marketed, of which 1 is exported.
[2] Assuming a gas sales price of $6-10 per mmbtu

INTRODUCTION: LIBYA A TALE OF TWO HYDROCARBONS

According to the Energy Institute, Libya is the world's 16th largest oil-producing nation. It is also a major gas producer and a member of both OPEC and the Gas Exporting Countries Forum. Located close to the European markets, Libya is a country of geostrategic opportunity and importance. After more than a decade of political fragmentation and operational disruption, there are growing signs of a cautious renaissance: oil production has stabilised at levels not seen since before 2012, international companies are re-engaging, and the government has launched its first upstream licensing round in nearly two decades.

Libya's energy system today has two separate stories. The robust growth in oil production is not matched by gas, which has remained structurally fragile. Chronic power shortages, ageing infrastructure, and prioritisation of domestic demand have constrained gas availability, driving both flaring and export volatility.

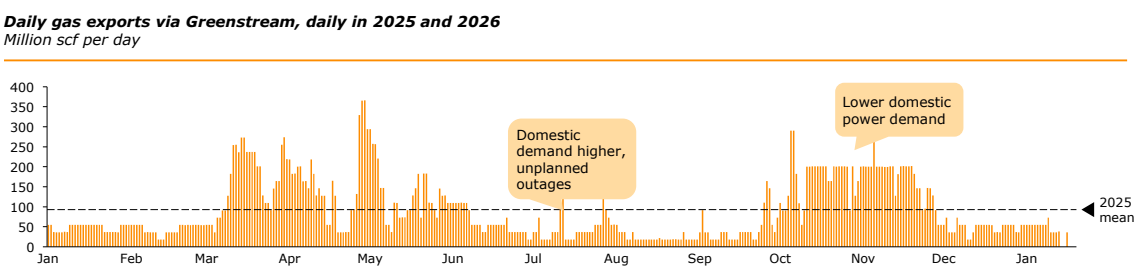
Whilst Libya's oil production increased in 2025, gas exports continued to decline



Source: Energy Institute Statistical Review of World Energy; GECF

Gas exports via the Greenstream pipeline to Italy reached a record low of 1 BCM per year (i.e. less than 10% utilisation) in 2025. The two large gas fields (Bahr Essalam in the offshore and Wafa onshore) have seen significant production declines[3,4] and had their own issues with operational upset flaring. Understandably, gas was prioritised for growing domestic power generation during the peak demand summer months.

Pipeline gas exports from Libya have fallen dramatically, in part driven by operational challenges



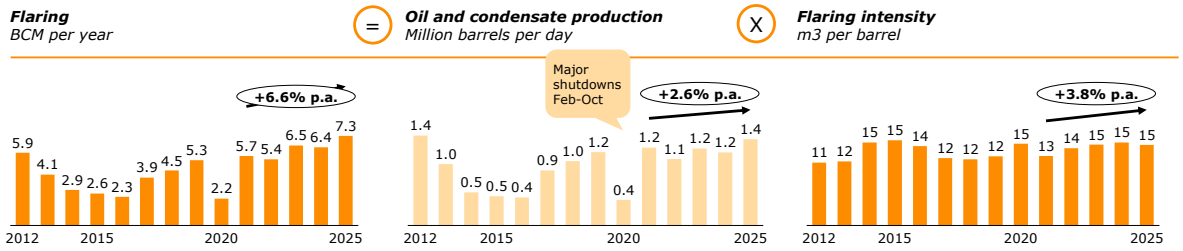
Source: Greenstream; Capterio analysis

[3] ENI, Libya's largest gas producer reports a 40% reduction in gas production from Libya in H2 2025 vs H2 2024 https://www.eni.com/content/dam/enicom/documents/eng/reports/2025/1-half-2025/Interim-consolidated-report-as-of-June-30-2025.pdf

[4] https://noc.ly/en/noc-chairman-talks-key-issues-with-parliamentary-energy-committee-members/

Meanwhile, flared gas has risen to a record (recent) high of 7.3 BCM (7 times higher than exports and 60% of domestic use), representing a potential revenue upside of $2.6 billion per year (at a notional export price of $10 per mmbtu). Most of the increase is due to higher oil production, partly offset by improvements in Libya's underlying "flaring intensity" (a key operational performance metric).

Gas flaring in 2025 was a record recent high, driven by a large increase in oil production



Source: Capterio FlareIntel; Energy Institute

To put this in perspective, Libya's ranks #8 globally on gas flaring[5] (after Iran, Iraq, Russia, Venezuela, Algeria and Mexico). It also ranks #3 on a "flaring intensity" basis (after Venezuela and Algeria). At ~15 m^3 per barrel, Libya's flaring intensity is three times the global average and 70 times that of Norway.

In addition to the flaring figure, the IEA's methane tracker[6] suggests that an additional 2 BCM may be released from incomplete combustion, venting and leaking, bringing the total to 9 BCM. Plumes of uncombusted methane are frequently observed at Libya's oil and gas operations using satellites[7], and the figure below shows recent visual images from one of the largest flaring locations.

Examples of flaring at one of the largest assets

Source: Google; ESA

To bring another example, the figure below shows flaring at the central processing facility at NC-186 in the western Ghadames basin in January 2025. The flaring here (for which rates appear to be unchanged over many years, according to satellite data), has become much less polluting as the operator has installed vapour recovery units that captured condensates which were as high as 27 mole% back in 2010. Further developments are underway to capture additional gas to provide power to the nearby El Feel field.

[5] Note that Libya's figures, as reported by the GECF, are generally within 12% of the figures reported here (except for 2022, when Libya's reported figure is 53% of the figure we cite)
[6] https://www.iea.org/reports/global-methane-tracker-2025
[7] E.g. as reported by IMEO or Carbon Mapper

Gas flaring at Akakus' operations at block NC186 in the Ghadames basin
January 2025

Source: Akakus facebook page (January 2025); Capterio FlareIntel

CONTEXT OF LIBYA'S GAS FLARING OPPORTUNITY

Libya is seeing somewhat of a renaissance with a renewed focus on exploration on attracting international investment. In 2025, Libya launched its first licensing round, offering 22 blocks for 18 years, and aims to increase its oil production from 1.4 to 2.0 million barrels per day by 2030. To incentivise bidders, the fiscal terms have been much improved (under the EPSA V framework). The new strategy seems to be working – Libya has signed MOUs and/or contracts with bp, Shell and ExxonMobil, and has attracted attention from TotalEnergies, Chevron, and others. Recent exploration successes by Agoco, OMV, Sirte Oil and Sonatrach attest to the opportunity[8].

Yet Libya's ambitions to expand gas production – particularly offshore – are constrained by unresolved geopolitical tensions in the eastern Mediterranean and persistent internal political fragmentation. Competing external interests and divided control over financial and hydrocarbon institutions have weakened effective sovereignty, making long-term gas development and export security uncertain. Since new gas projects risk turning resources into liabilities, the case for prioritising near-term gas monetisation and flare reduction is strengthened.

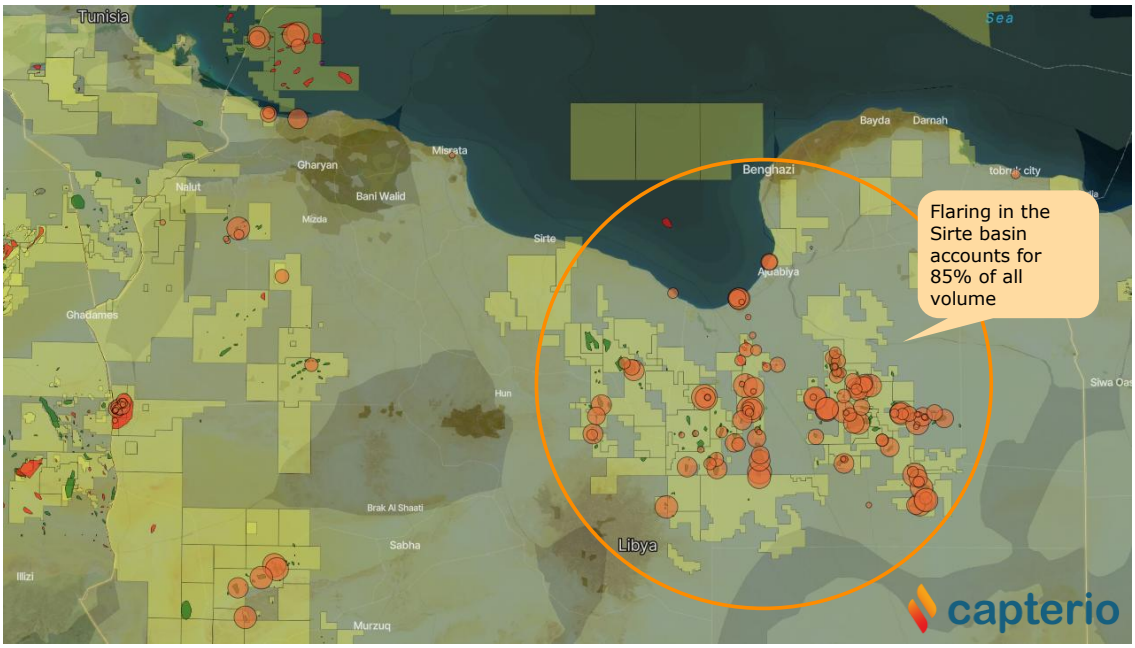
Of the total gross gas production of 29 BCM, according to data reported by Libya to the GECF, in 2024, 46% is marketed (13 BCM, of which 1 is exported), whilst 22% is flared (6.4 BCM), 9% is reinjected, and 23% is "other losses" (presumably power generation for operations). Of the gas used domestically, 9.4 BCM (81%) is used for power. Gas exported via Greenstream is sold under long-term contracts at prices broadly aligned with Italian gas market fundamentals, historically oil-indexed but increasingly gas-linked, recently in the range of $6-10 per MMBtu. Capturing flared gas is inevitably a potentially exciting opportunity for Libya.

To help drive a sharp analytical understanding of the opportunities, Capterio's FlareIntel platform tracks every flare worldwide, for every asset, in every country, every day. We process satellite data (using a proprietary algorithm) that measures the heat anomaly associated with flare combustion across a range of infrared wavelengths to compute flaring rates at every flare cluster multiple times per day. Our quantitative data is combined with visual imagery and rich basemaps (that

[8] https://libyareview.com/60937/libya-reports-6-new-oil-gas-discoveries-in-2025/

include blocks, fields, pipelines, and powerlines) to identify all flaring locations worldwide. FlareIntel data highlights that 85% of the flared volume lies in the Sirte Basin in eastern Libya – whereas the gas export to Italy is from the Greenstream pipeline, and the largest power demands – are in the west.

Overview of gas flaring in Libya in 2025



Source: Capterio FlareIntel

Within the high-flaring Sirte basin, the fields with flares are operated by joint ventures which include Agoco, Harouge, Mellitah, Sarir, Sirte Oil, Wafa and Zueitina – all of which have participation from Libya's National Oil Company (NOC)[9]. International partners in the Sirte basin include ConocoPhillips, Eni, Occidental, OMV, Suncor, TotalEnergies and Wintershall – all of which bring commitment, capability, and capital to help Libyan partners deliver their lower-flaring ambitions.

Outside the Sirte basin, the fields are operated by Akakus, Mabruk and Mafusah, with NOC and international partners Equinor, OMV, Repsol and TotalEnergies. Agoco and Sirte Oil are wholly owned by Libya's NOC.

Most of the international partners have endorsed the World Bank's *Zero Routine Flaring by 2030* initiative and are signatories to the *Oil and Gas Decarbonisation Charter*, which pursues similar objectives; Libya's NOC has also signed up to both. However, in Libya these international companies formally hold non-operated equity interests exclusively (since the assets are technically operated by the joint ventures stated above, notwithstanding the fact that some describe themselves as "operators" on their websites). As a result, their formal reporting and disclosure obligations under frameworks such as OGCI, OGDC[10], OGMP and the World Bank's Zero Routine Flaring initiative are unfortunately considered by most to be limited.

[9] https://noc.ly/en/companies-subsidiaries/
[10] https://www.ogdc.org/

Policy measures and NOC's ambition

At present, Libya governs gas flaring through general principles rather than prescriptive legal limits. The Petroleum Law and standard contractual frameworks (e.g. EPSA IV) rely on concepts of "good oilfield practice" and joint management mechanisms for oversight, rather than explicit prohibitions, penalties, or performance standards of the kind seen in jurisdictions such as Algeria. Responsibility for flaring oversight is distributed across multiple institutions—including the Ministry of Oil & Gas, the National Oil Corporation (NOC), and the Environmental Authority—providing a nominal foundation for coordinated governance. In practice, however, this arrangement means that NOC effectively regulates its own gas management, creating an inherent conflict of interest.

Under existing PSCs, most associated gas is state-owned and administered by NOC, with joint-venture partners required to deliver it at zero cost. Combined with extremely low regulated gas and electricity tariffs and the absence of flaring penalties, this structure provides producers with little economic incentive to invest in gas capture or utilisation. Libya's residential electricity tariff, at around US$0.008/kWh[11], is far below both cost-recovery levels and prices in all other countries in the region except Iran. This reflects a large state subsidy and contributes to one of the highest per-capita electricity consumption levels in the region.

Meaningful progress is therefore likely to require policy and subsidy reform, including a clearer commercial framework for NOC to offtake gas at viable prices. One option could be a "marginal field"–style fiscal policy explicitly ring-fenced for gas capture projects, coupled with gradual subsidy removal. While such reforms may be politically challenging in the context of Libya's divided governance, they are ultimately necessary to unlock sustained reductions in flaring.

The urgent economic imperative

Capterio's 2022 paper "*North Africa can reduce Europe's dependence on Russian gas*" highlighted the geostrategic opportunity to capture Libya's flared gas to diversify the EU's supply. Simultaneously, between 2022 and 2025, Libya's National Oil Corporation formalised its national gas flaring strategy under the "Mubadara 2030" initiative. This initiative sets out Libya's ambition to minimise and ultimately eliminate routine gas flaring across all fields and facilities by 2030 as part of broader climate, environmental, and energy-security objectives and is focussed around five core pillars: data management, policy development, project execution, regulation, and funding and finance.

We believe that flare capture is now an even higher priority, because:

[11] https://www.imf.org/-/media/files/publications/selected-issues-papers/2025/english/sipea2025094-source-pdf.pdf

- NOC's former Chairman, Farhat Bengdara, announced in late 2022 an expectation to dramatically reduce routine flaring by 2030 to reduce emissions, protect the environment, and help meet the EU's gas demand. The new Chairman, Masoud Suleiman Musa, has reiterated his support for flare reduction initiatives[12]

- Libya is seeking opportunities to improve the reliability of its domestic supply and power grid and/or improve feedstock for its petrochemicals/fertiliser plants, potentially reducing reliance on burning liquid fuels (allowing greater export opportunities). With growing domestic demand, serious gas shortages in the coming years could challenge Libya's economy further. Of course, accelerating the deployment of renewables could play a key role in reducing demand for gas – enabling greater exports and decarbonising domestic supply

- Reducing flaring will improve health. Multiple reports from eastern Libyan towns (e.g. Jikharra, Awjila and Jalu) note increasing cases of respiratory illnesses, eye inflammation and cancer that are potentially linked to flaring[13]

- The EU is actively seeking to reduce its imports of Russian gas, whilst also developing options to strengthen its own energy security by reducing reliance on spot-linked US LNG (thereby potentially strengthening its ability to deploy its methane import standard). Italy's importer SNAM has a clear incentive to maximise reliable flows via the Greenstream pipeline

- The EU is starting to develop its increasingly stringent methane import standard. Under the EU Methane Regulation, persistent flaring and venting risk becoming a de facto non-tariff barrier to future Libyan gas imports.

As such, addressing gas flaring (and its sister sources, venting and leaking) is not only an urgent national priority, but also a commercial opportunity that also intersects with minimising policy risk.

HOW CAPTERIO'S FLAREINTEL ACCELERATES OPPORTUNITY DELIVERY

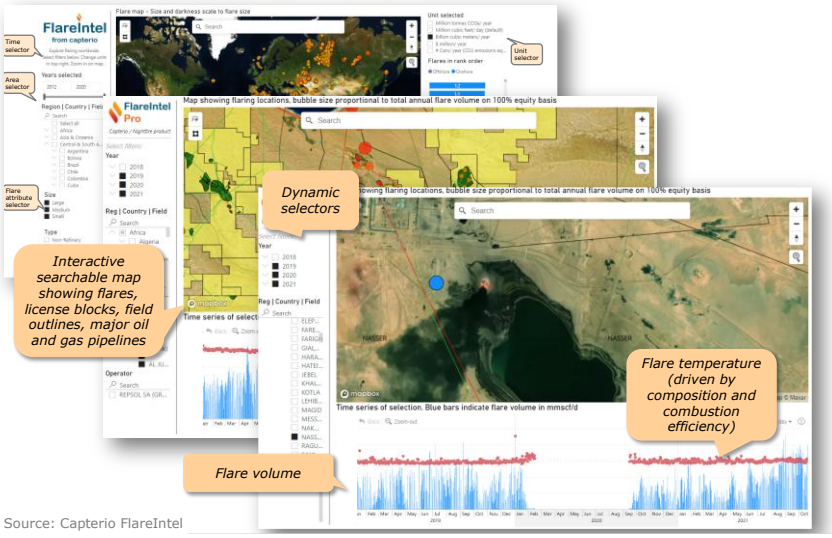
Data in Capterio's FlareIntel is proving instrumental in helping companies and countries monetise flared gas, thereby creating value, improving energy security, and reducing emissions. To date, we have helped our clients to reduce emissions by the equivalent of removing 4 million cars from the road.

Our data platform associates every flare with its underlying field/asset to establish the operator and equity partners. We combine daily flared volumes with rich basemaps (which include license blocks, field outlines, pipelines, powerlines, power

[12] https://noc.ly/en/oil-companies-outline-2025-activities-and-future-strategies/
[13] Saifaddeen Sallam; Ali Taher Abdollah (2025) Some Environmental Impacts of Natural Gas Flaring in Libya and Potential Solutions. International Journal of Innovative Science and Research Technology, 10(3), 1037-1042. https://doi.org/10.38124/ijisrt/25mar961

plants, refineries, LPG terminals and more) to (a) improve visibility of flaring, (b) drive operational performance (reducing "upset flaring") and to (c) identify and prioritise specific investment opportunities.

Capterio tracks every flare for every asset, for every company in every country, every day



Source: Capterio FlareIntel

Key features

- Data from satellites, for every asset, every day
- Independent, credible and calibrated data
- Every flare, every asset, every company and every country worldwide
- Customisable for customers' needs and delivered securely on a PC, phone or tablet
- Data can be consumed directly into your operational dashboards through an API

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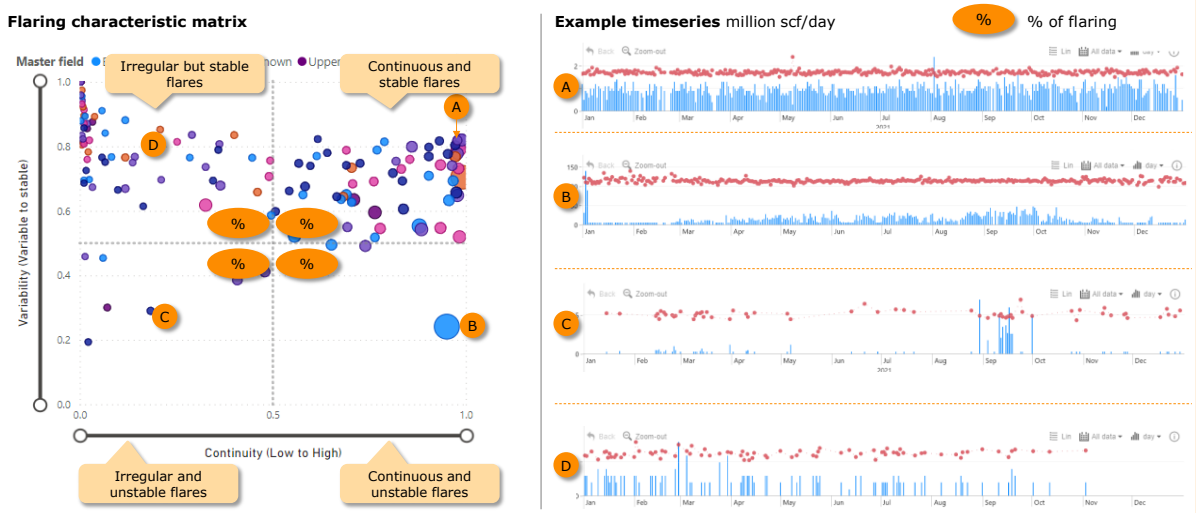
In our experience, gas flaring is often not metered, often underreported – and sometimes absent – and often delayed, depriving decision-makers of the critical information needed to size up potential opportunities. Our paper "*The Investor Advantage from using better data*" explores some of these issues.

In contrast, our satellite data are credible, calibrated and independent. We therefore provide rich insights into on-the-ground operations and enable Joint Venture partners, asset leaders, production managers and company CEOs to guide their interventions. Indeed, one client (in this region) only discovered that their non-operated flaring was ten times higher than they had reported in their daily reports when our data highlighted a major discrepancy (which was subsequently shown to be accurate in the process).

Since not all flares are equal, high-frequency data can be instrumental in targeting solutions. The chart below illustrates one way to segment the flaring into action-oriented boxes in a two-by-two matrix of "continuity" versus "stability". Our screening process then evaluates every flare across three dimensions: scale (how large the flare is), character (its stability/variability vs. continuity), and infrastructure (its proximity to pipelines, powerlines, or other demand sinks). Naturally, this is only possible when high-frequency (daily) data (as little insight comes from annual data) is combined with rich, interactive metadata maps that include all key infrastructure.

Our analytics can help to differentiate flares by their characteristics, leading to the identification of the most attractive opportunities



Source: Capterio FlareIntel Pro

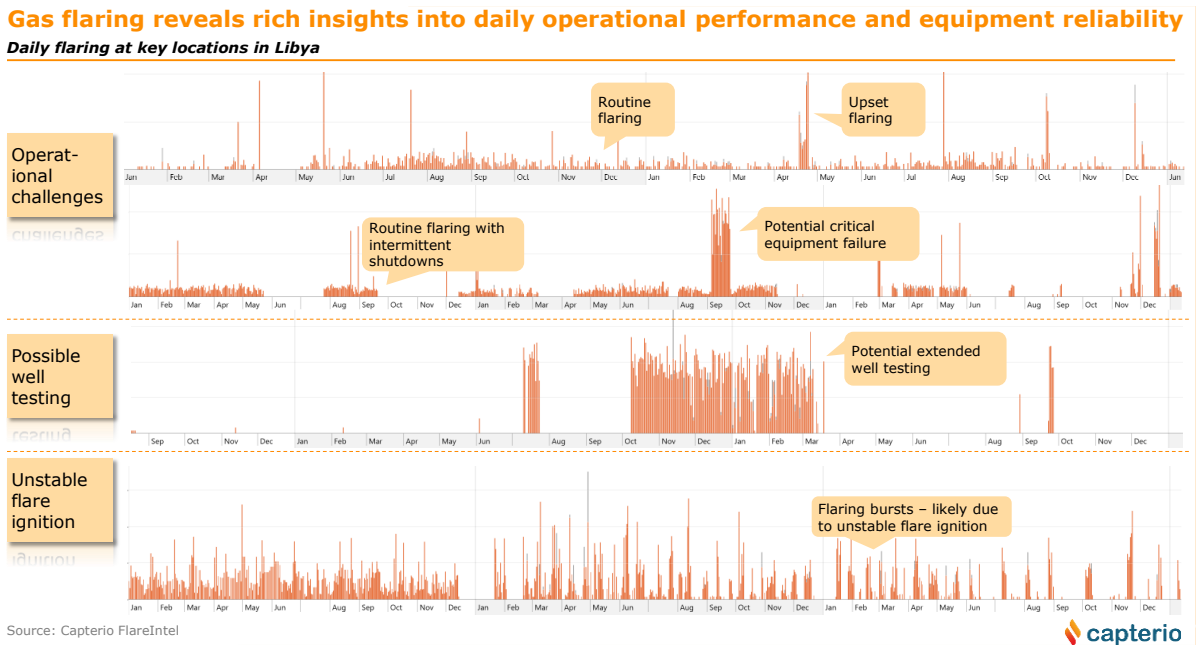
The figures below illustrates two types of flaring solutions:

A Operational improvement opportunities

Significant reductions in (mostly "upset") flaring can be achieved through improvements in operational practices, sometimes without major capital investments[14].

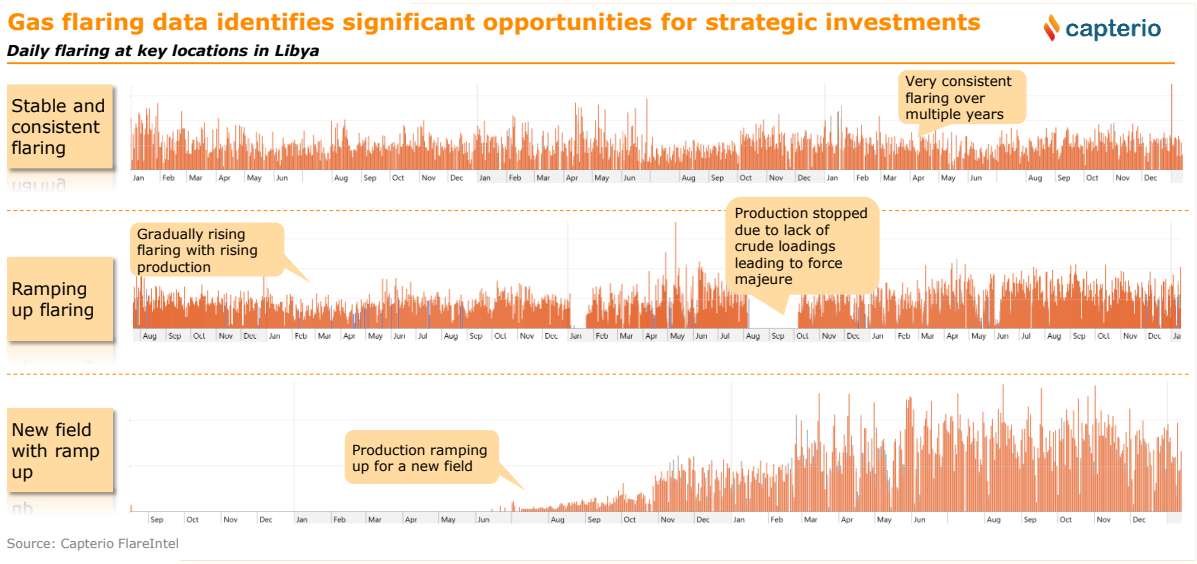
The three examples below (as highlighted by Energy Capital & Power in various articles) illustrate: (top) an example of "upset" flaring at a major gas field and a potential example of failure of critical equipment (likely a gas compressor), (middle) a likely extended well test (for which solutions are potentially available) and (bottom) and example of a flare which is likely to be suffering repeated ignition failures (probably due to the wind). In the latter case, the flare could be shifting from flaring 2 million scf/day (with emissions of 100,000 tonnes of CO2e per year) to venting 1.6 tonnes per hour (equivalent to 14 million tonnes of CO2e per year). A simple fix on flaring reliability here would be material. Also, we note that routine flaring on a non-trivial scale (around 5 million scf/day, potentially $20 million in revenue upside) occurs at some of the largest gas fields, suggesting potential performance improvement opportunities.

[14] https://noc.ly/en/noc-achieved-a-gas-flaring-reduction-of-over-100-million-cubic-feet-daily/



B Structural investments

In other situations, there may be opportunities for significant structural investments to materially reduce mostly "routine" flaring, generate additional revenues and/or save costs. Profiles from FlareIntel show: (top) a stable and consistent flare, (middle) a flaring that is gradually ramping up as associated oil production increases, and (bottom) the start of a newly-discovered field.



The flaring solution space

A range of flare monetisation solutions are likely applicable (many of which have, in fact, already been delivered in Libya[15]), including:

- Gas transport into nearby (existing, or new) gas pipeline infrastructure (potentially by debottlenecking their working capacity through equipment upgrades)
- Gas to power local operations (at the oil field, or in the vicinity), therefore also reducing diesel/HFO consumption
- Gas for the local/regional power grid
- Gas for reinjection (for EOR, disposal or storage) or other options
- Gas to be converted into CNG or LNG using proven solutions that operate on the 1 to 5 million scf/day range and have been deployed in similar situations
- Gas to fertiliser, ammonia or urea
- Gas to cryptocurrency mining, computing, or other "exotic" uses.

Potential gamechanging flare solutions for Libya

Far from being stranded, the data shows that much of the flared volumes are near existing pipelines. The largest volumes are near the 30-inch plus (c. 6-10 BCM) gas pipeline from Defa to Marsa El Brega (which also has a western spur from the Raguba field). Libya also has its western pipeline (near the border of Algeria, from the Al Wafa field), and another from Abu Attifel leading west to Intisar before going north to Zuwaitin. In addition, the Coastal Pipeline system connects east to west via three segments, with capacity in the 4-6 BCM[16] per year range.

So whilst most of the flaring is in the eastern Sirte basin, a game-changing option would be to capture the gas and send it north via the Defa-El Brega pipeline, and then, to the Greenstream export pipeline in the west – using the Coastal Pipeline system as the physical link. With targeted maintenance, debottlenecking (especially of the El Homas to El Brega segment) and additional compression, capacity could potentially be added to this 900 km corridor.

Another opportunity relates to power generation. In 2023, Libya used 33.7 TWh of electricity[17], of which 26% from burning liquid fuels. Yet, if this 9 TWh of liquid-fuelled power could be supplied from gas (it would require only 2 BCM of the 9 BCM that is currently flared, vented or leaked), then 15 million more barrels of liquids

[15] See also "A Flare gas recovery unit for refineries in Libya: Innovative technologies are a step towards a sustainable environment (zero flare in 2030)" by Mohamed S. Altraiki, Abduslam Sharif, Jumaa F. Alnaas, Muammar O. Kratim

[16] https://documents1.worldbank.org/curated/en/817671527059474577/pdf/01-Task-B-Fuel-Availability-Report-Final-Version-R1-clean.pdf

[17] https://www.iea.org/countries/libya/electricity

could be exported (generating export revenues of $750 million[18]) was generated from gas, plus emissions would be lower.

Alternatively, Libya's fertiliser complex at Marsa El Brega – operated by LNFC – has game-changing potential. The plant, which produces ammonia and urea, remains chronically under-utilised due to unreliable gas supply, making it a prime candidate for monetising recovered flare gas. The current plant capacity (850,000 tonnes of urea and 120,000 tonnes of ammonia per year[19], consuming ~1 BCM per year) could be upgraded, transforming a chronic flaring problem into a high-value export.

For domestic inspiration, it is right to recognise that Libya has, as recently as 2025, completed several flare gas capture projects (which in aggregate are said to have reduced flaring by 1 BCM in 2025[20], although these gains were offset by increases at Raguba, Nasser and Defa fields. These projects include the replacement of a low-pressure line, directing flared gas into the main gas network, rehabilitating a long-idle gas separation system to use gas for enhanced oil recovery, commissioning and/or maintenance of gas compressors (e.g. at the Defa field) and sending gas to a nearby field to generate electricity (thereby reducing diesel burn).

Future proposed projects include capturing flaring from the Messlah field to provide power to the Great Man-Made River Project (some 30 km away[21]) and new equipment to recover associated gas from the Bouri gas field into the Greenstream pipeline.

Equally, for international inspiration, Capterio's paper with Columbia University: "*Igniting Action to Reduce Gas Flaring: Real Opportunities, Real Projects, Real Results*" showcases more successful flare reduction projects that use a range of technologies in countries as diverse as Algeria, Argentina, Angola, Egypt, Iraq and Kurdistan. Examples from nearby Egypt also demonstrate potential – the chart below shows examples ranging from 1 to 15 million scf/day recovering gas for power generation and for the regional gas grid.

[18] Assuming a $50 per barrel realised price
[19] https://www.mees.com/2019/6/21/news-in-brief/libyan-fertilizer-plant-set-to-restart/828d64e0-942e-11e9-8994-f7f9338b892d?utm_source=chatgpt.com
[20] https://newsbase.com/story/libya-cuts-gas-flaring-by-100mn-cubic-feet-per-day-through-five-major-projects-418673?
[21] https://energycapitalpower.com/top-5-gas-flaring-reduction-projects-to-watch-in-libya/

Successful flare gas projects in other countries have leveraged ranges of technologies

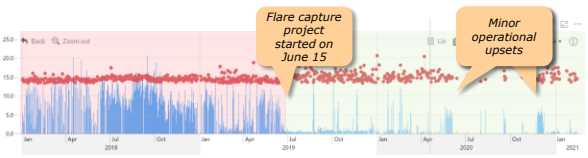
Daily flare volume (blue bars, in million scf/day) and flare temperature (red dots)

Before capture *After capture*

Gas to pipe projects

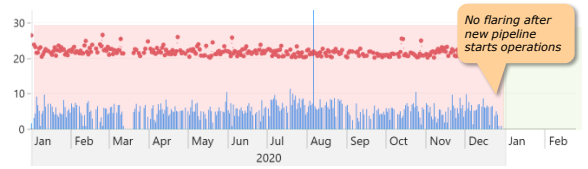
1 Naftogaz 15 million scf/day recovery to a nearby pipeline

Gas recovery a nearby existing gas pipeline



2 United Oil and Gas 5 million scf/day via a new pipeline

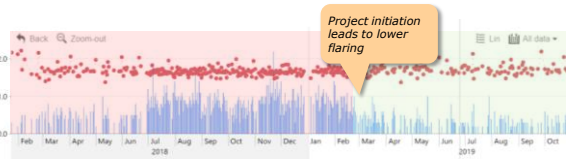
A new pipeline transports gas 20 km to an existing processing facility



Gas to power projects

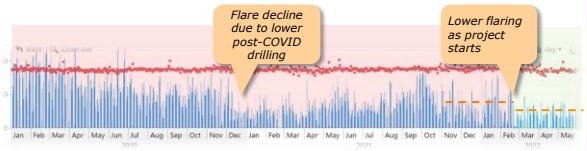
3 Pharos Energy 1 million scf/day diesel displacement

Gas recovery for power generation, displacing diesel



4 Apache 3 million scf/day diesel displacement

Gas recovery for power generation, displacing diesel



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Note: charts show the daily flaring volume (blue bars) and daily flaring temperature (red dots – a reflection of gas composition and/or combustion efficiency)
Source: Capterio, see also Capterio paper "celebrating successful flare capture projects"

CONCLUSIONS: A NEAR-TERM, EXECUTABLE OPPORTUNITY

Libya's gas flaring challenge is no longer a peripheral environmental issue; it is one of the most immediate and actionable levers available to strengthen domestic energy security, stabilise gas exports, and reduce emissions at scale. As oil production recovers and Europe places growing emphasis on both supply diversification and methane performance, the value of captured associated gas is rising — economically, strategically, and politically.

A significant share of Libya's flaring occurs in assets where international companies hold non-operated equity stakes – creating responsibility, opportunity and leverage to accelerate solutions. Significant volumes of flared gas are also proximal to potential solutions – if barriers and bottlenecks are creatively unlocked.

Therefore, with credible data, proven technologies, and clear national intent through initiatives such as Mubadara 2030, Libya has an exciting opportunity to convert wasted energy into reliable power, resilient exports, and durable value. As we highlight in our article "*Reframing responsibility*", solving flaring in Libya will be a collective effort requiring strong collaboration between oil companies (national and international), service companies, the regulator/government, financing institutions and civil society.

For NOC, non-operated partners, service companies and international financiers, this represents one of the fastest routes to monetisable gas in North Africa. The question is no longer whether flare reduction is desirable or feasible, but how quickly it can be executed.