Global Voice of Gas

BY THE INTERNATIONAL GAS UNION

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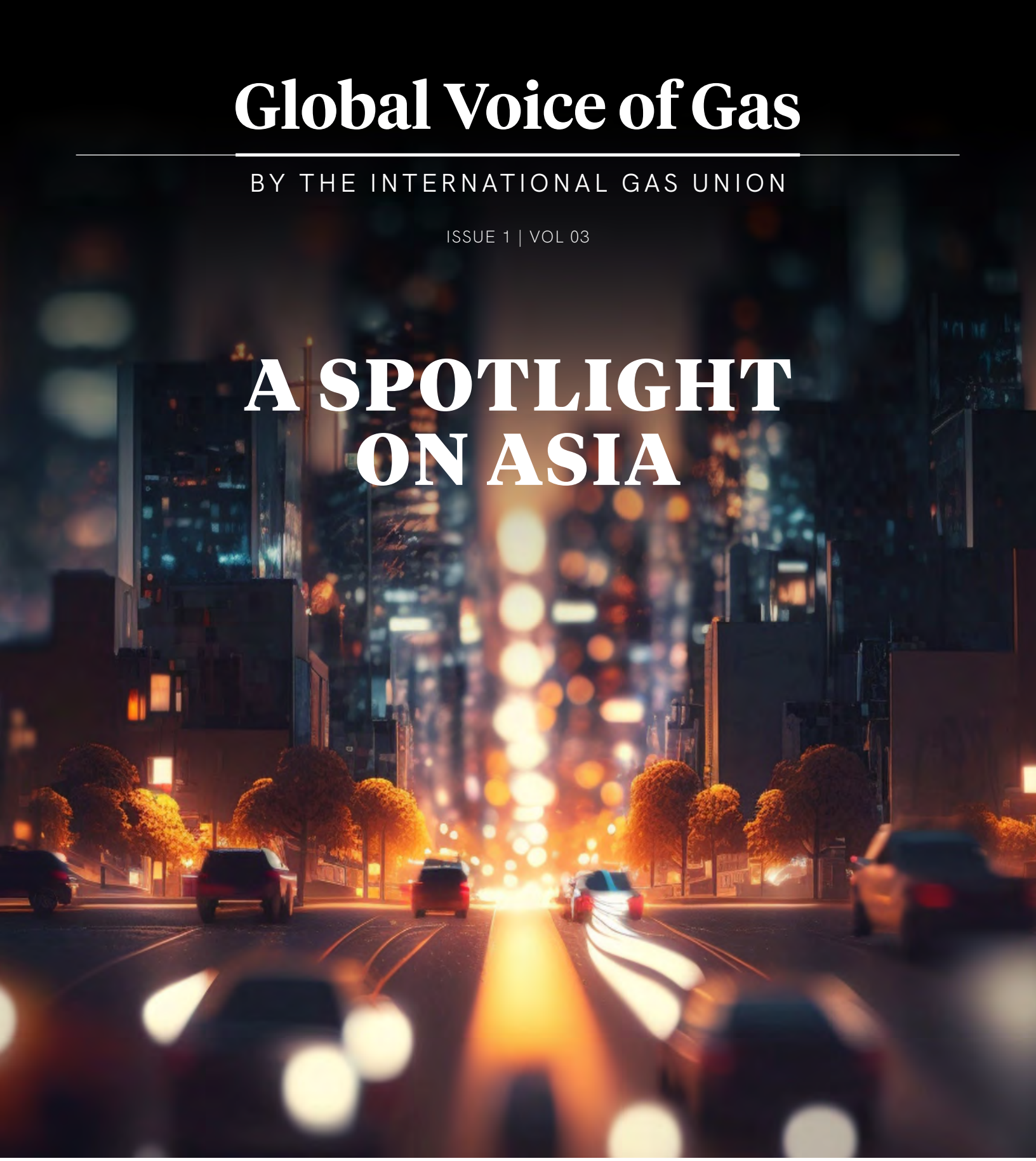

A SPOTLIGHT ON ASIA

High prices pose challenge to Indian gas ambitions

Will Asian LNG demand bounce back?

The journey of a startup that is having a real impact in reducing flaring and related methane emissions

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INNOVATIVE BUSINESS MODELS AND TECHNOLOGIES THAT CAN HELP COMPANIES REACH NET-ZERO.

MARK DAVIS
CEO OF CAPTERIO

Gas flaring is a major global challenge. Some 150 bcm of gas is flared per year, yet much of it could be saved and utilised or sold, using proven technology, today. In doing so, governments and operators stand to improve revenues by some $70bn per year[1], whilst also reducing emissions by up to 1bnCO_2-equivalent. This article tells the story of Capterio[2], an innovative UK-based start-up company that is mission-driven to help the oil and gas industry reduce gas flaring, create value and accelerate the energy transition.

Introduction – gas flaring as a major global opportunity

Gas flaring – the operational combustion of natural gas at oil and gas fields, refineries, processing plants and LNG terminals – is a significant source of economic and environmental waste. Most flaring occurs when operators do not have a ready solution to deal with gas that is produced as a by-product of oil production. But despite commitments from 100+ organisations to materially reduce flaring and deliver, by 2030, on the World Bank's "zero routine flaring" initiative, flaring volume has remained almost unchanged for almost a decade, at an astonishing 140-150 bcm per year. And when methane emissions (from flaring, venting and leaking) is included – as the IEA's Global Methane Tracker[3] estimated last month – the scale of waste rises to more than 270 bcm per year (1.7x times the EU's imports from Russia prior to Ukraine). *Figure 1* shows how widespread flares are globally.

Gas flaring is a global economic and environmental opportunity

Figure 1: Overview of the 10,000+ gas flares visible today by satellite. Data here from Capterio's FlareIntel Pro platform which incorporates data from the Colorado School of Mines. The league table of gas flaring for 2021 is provided by the World Bank.

Source: Capterio FlareIntel Pro

Capterio 1.0 is focused on delivering on-the-ground projects

At Capterio, we see this wasted gas as an opportunity. In 2018, we established Capterio as a UK-based "B-corp" and secured funding from a US-based climate fund to tackle this issue head-on. Our hypothesis was simple: gas flaring can be commercialised with existing technology and generate attractive returns – if only we can understand and overcome the barriers to acting at scale.

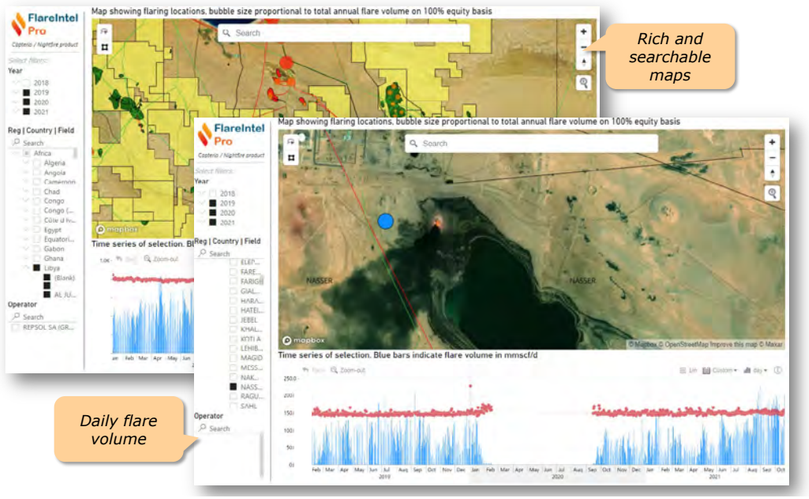
Our research found that progress in this area is being hindered by a "market failure". Our discussions identified a lack of focus and visibility, weak regulation, and limited resources of both capabilities and capital. These challenges mean that projects that *should* be happening simply aren't. And whilst we quickly identified many investors who wanted to support finance-ready projects, these projects were not available to be financed – mostly because the incumbents had not developed the opportunities with comprehensive technical, economic and commercial evaluations. For many operators, solving gas flaring was in the "too hard" bucket – especially so for the non-operated assets of some of the larger players, particularly those with complicated contractual relationships.

To mitigate these challenges, our "big idea" was to define an innovative business model that brings together assets, technology, and financing to provide scalable outsourced solutions. Our model was backed by specialised agile teams with deep gas processing expertise, innovative commercial contracting and patient capital. With this exciting proposition, we developed a range of flare reduction opportunities worth multiple →

1: Assuming $12 per mmbtu, or €40 per MWh. 2: www.capterio.com

3: https://www.iea.org/reports/global-methane-tracker-2023

FlareIntel Pro gives unrivalled insight into every flare world wide



Key features

- Independent, credible and calibrated
- Every flare, every asset, every company and every country worldwide
- Processed dynamically in the cloud and refreshed every 24 hours
- Powered by AI with advanced analytics and benchmarking
- Customisable and delivered securely on any platform

Figure 2: Overview of FlareIntel Pro (a subscription service) which tracks every flare for every asset, for every company, in every country – daily. FlareIntel Pro helps operators and governments alike to improve visibility into flaring, improve operational performance and prioritise capital investment into flare reduction projects.

Source: Capterio FlareIntel Pro, which incorporates data from the Colorado School of Mines

hundreds of millions of dollars in net present value (and investable post-tax rates of return). We quickly found – using satellite data – scores of attractive potential flare capture projects and screened them against technology solutions, commercial attractiveness, and stakeholder alignment. We pitched these proposals to our counterparties (generally National Oil Companies, supermajors, or independents), supported by a wide set of MoUs and other strategic relationships with local partners and EPC groups.

Then the world changed. Partly because of COVID, subsequent economic slowdown and fierce budget-cutting, our focus on delivering projects went rather slower than we expected. Additionally, we were met with – in some cases – flat denial that flaring was even an issue. We heard many times "we don't flare", or "we only have occasional upset flaring", when the data showed the contrary. And the disappointing piece was that we were always very clear that by reducing flaring, companies can reduce emissions and make money, plus improve their ESG credentials. Flare reduction should be seen as an opportunity for revenue capture and global leadership, not a threat. Solving it is a win-win.

But as a startup, it's pretty common to tweak the company strategy, and we did just that. We put a temporary pause (until now, that is) on our project work and instead focussed on innovation through smart analytics.

Capterio 2.0: driving change with advanced analytics and consulting

Since we discovered first-hand that many operators were underestimating flaring (and sometimes ignoring or denying it), we developed a core business around analytics and consulting. We built an analytics platform – FlareIntel Pro – which brings unrivalled visibility into flaring. FlareIntel Pro (which is available on a subscription basis) firstly tracks – using satellites – every gas flare for every asset, for every company, in every country, every day. And secondly, it integrates this data with recent imagery, and rich metadata including field outlines, block boundaries, operator and ownership data, gas pipelines, gas power stations, power lines, refineries and LNG terminals. *Figure 2* gives an overview.

Figure 2: Overview of FlareIntel Pro (a subscription service) which tracks every flare for every asset, for every company, in every country – daily. FlareIntel Pro helps operators and governments alike to improve visibility into flaring, improve operational performance and prioritise capital investment into flare reduction projects.

Flaring is detected – by satellite – from the heat anomaly generated by the combustion of gas. The analytical method was originally developed as a public good by scientists from NOAA and NASA[4] and has been around, surprisingly perhaps, for a couple of decades. Two instruments on two different satellites detect night-time heat anomalies from flares. By evaluating the frequency/amplitude relationships at different wavelengths and by fitting a "Planck Curve" (based on black-body radiation) through both the "signal" and the "background"[5], both the volume and the temperature of the flare can be calculated. One of our innovations was to take the existing science to a new level of impact by making it directly relevant to operational leaders, country managers, sustainability/HSE leaders and executives at oil and gas companies, service companies, regulators/ governments and financing bodies. This was the game-changer that opened up conversations and started to convert flaring reduction from a "non-issue" to a real commercial investment opportunity for reduction – and a positive force for good.

At the same time, our team was also writing many thought pieces that explored different elements of the flaring challenges, including the topic of methane slip, carbon-neutral LNG, technology options, case examples, country roadmaps, carbon border adjustments and policy interventions. Several surprising insights appeared.

- Firstly, Europe could substitute 15% of previously imported Russian gas by supporting the capture of 23 BCM of wasted gas and using the four LNG terminals and four pipelines (most of which have spare capacity), and capturing wasted gas is quicker and cheaper than exploring for new resources;
- Secondly, 54% of all flaring is within 20 km of an existing gas pipeline. Equally, many flares are on the "oil rims" of oil plus gas/condensate fields (and therefore are de facto already very close to existing gas processing facilities). What's required is joined-up creative thinking and innovative contracting given that the equity structures of the two operations are different - and not always aligned on their incentives;
- Thirdly, in many cases, gas is being flared right next to a diesel-fired power generation unit (but if it is being burned, why not at least generate power to save on the diesel and reduce emissions?).
- And fourthly, by fixing flaring, we can also dramatically reduce emissions of methane from inefficient combustion.

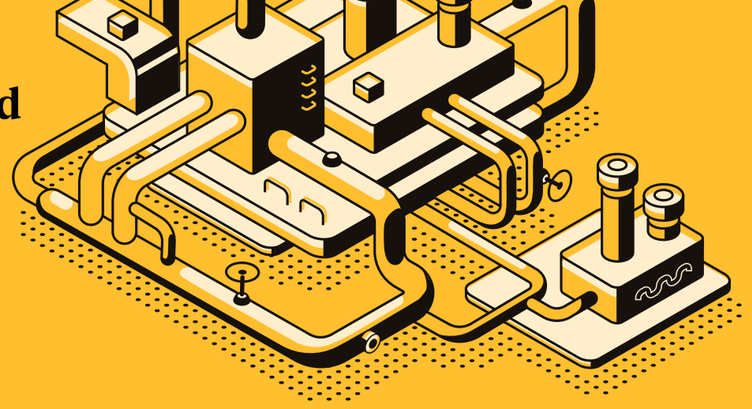
So far from being "stranded", most gas flaring already has a ready solution.

These articles became increasingly important as we partnered with groups such as Colombia University, EDF, Chatham House, RMI, Clean Air Task Force which led to our work being featured on the front page of the *New York Times* and *Washington Post*, in the *FT*, and live on the *BBC* and on Australian and British Radio. We also released a free version of FlareIntel[7], which makes available annual data on every flare, complete with the field name and operator. The aim being that by putting this data in the public domain we can raise awareness of flaring, improve accountability and facilitate on-the-ground action. We were delighted to see a surge of signups and to have over 3000 active users today.

How we help our clients now

Arguably, the ongoing energy crisis exacerbated by Russia's war in Ukraine has increased both the political imperative and the commercial incentive to act , and is increasingly being backed by high-level government-to-government initiatives. Our team now helps a growing range of companies, regulators and financial groups to track flaring in near real-time. Our main services include (a) improving visibility – which is especially important for "non-operated joint ventures", (b) improving operations (by detecting operational upsets, which can be due to equipment failures, poor maintenance, new wells, changing subsurface performance, control system or user error), and: (c) identifying and prioritising →

4: The Colorado School of Mines has since taken over the initial processing of the rawest data. 5: VIIRS Nightfire: Satellite Pyrometry at Night, Elvidge et al, 2013
6: https://flareintel.com/#register. 7: See our paper which has been widely read: https://flareintel.com/insights/north-africa-can-reduce-europes-dependence-on-russian-gas-by-transporting-wasted-gas-through-existing-infrastructure



We are thrilled to have helped our clients to reduce flaring by 20%, whilst also reducing emissions by 4.86mn CO_2-equivalent T. That's the equivalent of taking 1.1mn cars off the road!

investment cases (to reduce gas flaring, to prove it, and potentially to monetise on the international carbon markets).

But beyond operators and governments, we also work with financing groups to identify hidden risks in their portfolios and give them the tools to help them to influence their partners to develop Paris-compliant net-zero pathways, whilst also highlighting exciting investment opportunities, see Figure 3.

Figure 3: Innovative and impactful use cases for FlareIntel Pro and examples of groups with whom we collaborate today.

The impact is significant. We are thrilled to have helped our clients to reduce flaring by 20% (in 2022, vs 2021) whilst also reducing emissions by 4.86mn CO_2-equivalent T. That's the equivalent of taking 1.1mn cars off the road! Some of the biggest surprises we have found, together with our clients, have been:

- Many of our clients are unaware of the flaring at their assets, especially if non-operated. This is very often because the operator doesn't communicate this information (and much of flaring isn't measured anyway) – and it creates a potential liability;
- Some of our clients have noticed some shifts from flaring to apparent no flaring. Yet in some cases, this gas was simply vented (and sometimes this coincided with a management visit). Of course, the climate impact of venting is worse than flaring, given that methane is more potent than CO_2;
- Many of our clients appeared to believe that flaring at particular assets is "upset related" only (i.e. episodic), yet the facts helped them to be persuaded otherwise. This is a critical discovery for operators that have endorsed the World Bank's zero routine flaring policy.

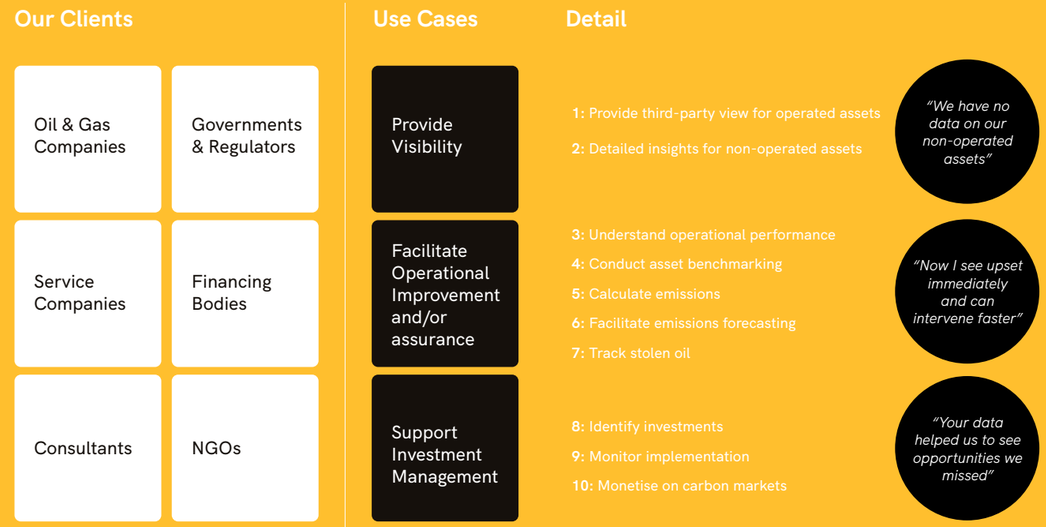
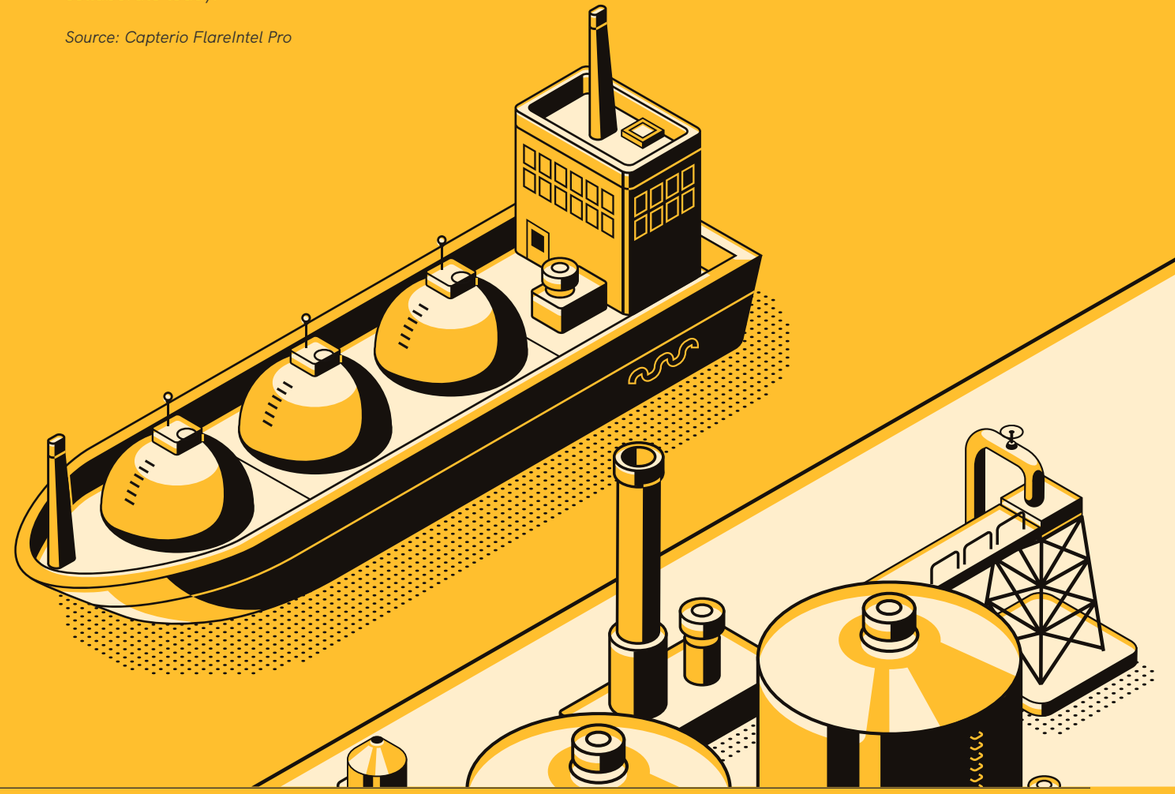
Equally, we have seen some great examples where operators have invested to reduce gas flaring. We have written several case studies[8] and some inspirational examples include:

- A leading independent in Egypt delivered a brand new 20 km pipeline to capture 5 mcf per day, within 11 months of the exploration discovery – showing how fast it is possible to act for relatively low volumes of gas;
- A leading service provider who dramatically reduced gas flaring in Iraq by installing a 165-MW power plant, dramatically improving grid stability and supporting the economic growth of a critical area;
- A leading independent who reduced consumption of diesel by 85,000 litres per day by instead capturing – and combusting – previously-wasted gas, thereby dramatically reducing costs and emissions;
- For completeness it is probably worth mentioning some of the more exotic solutions such as cryptocurrency mining, vertical farming and synthesis of alternative proteins.

Overall, we are proud to be innovating using technology to have a real impact in reducing flaring (and related methane) emissions. Startups inevitably evolve their approaches over time (and we are no different). But it is pleasing to see that we have now gone full circle and Capterio 1.0 is back in force as the world urgently needs to accelerate the energy transition. We are increasingly hearing about "a wall of cash" that is looking for attractive investment opportunities that significantly decarbonise, and solving gas flaring is one of the very best ways to do just that. And with today's technology it there is no good reason not to! ■

8: https://flareintel.com/insights/celebrating-successful-flare-capture-projects-with-independent-data-driven-evidence

FlareIntel Pro has a broad set of applications across the industry



Source: Capterio FlareIntel Pro