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Why COP28 Is Right to Prioritize Global Methane and Flaring Reduction

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FOREWORD

By Landon Derentz, senior director of the Global Energy Center and Morningstar Chair for Global Energy Security at the Atlantic Council

We cannot leave any stone unturned as we abate greenhouse gas emissions throughout the economy. This applies to all industries, but especially to the oil and gas sector, which constitutes 54 percent of global primary energy supply and produces about 15 percent of total energy-related emissions. Fortunately, the cost of reducing emissions from operations in oil and gas production is relatively low, while the reward—slowing down future warming—is invaluable.

Fittingly, the 28th United Nations Climate Change Conference, also known as COP28, is positioned to drive tangible, verifiable progress in achieving this aim. Taking place from November 30 to December 12, 2023, in the United Arab Emirates, an oil- and gas-producing country, COP28 is fostering much-needed dialogue around the fossil fuel industry's response to the climate challenge. The conference provides a unique opportunity for the industry to demonstrate that it is serious about cutting its scope one and scope two emissions. The steps to accomplish this are already well known: address fugitive methane emissions, end routine flaring, slash intentional venting, and facilitate other solutions such as electrifying upstream operations that can lead to the abatement of 5 gigatons of greenhouse gas emissions stemming from oil and gas production.

A broad consensus is emerging among oil and gas operators, governments, and civil society that implementing these solutions—particularly steps to abate methane emissions—is both economically viable and readily achievable. Inaction is no longer an option, making COP28 a litmus test for the industry's ability to serve as a valued partner in climate change mitigation and decarbonization. Operators must set ambitious emissions reduction targets, create and maintain a transparent reporting system, and champion collaboration within the sector.

The Atlantic Council Global Energy Center develops and promotes pragmatic and nonpartisan policy solutions designed to advance global energy security, enhance economic opportunity, and accelerate pathways to net-zero emissions.

Gas flares are seen at the state-owned oil company PDVSA, in Punta de Mata, Venezuela on April 5, 2023. Venezuela is one of the biggest methane emitters in both absolute terms and in emissions intensity. REUTERS/Leonardo Fernandez Viloria

The benefits of methane abatement extend beyond climate change mitigation. Captured methane emissions from oil and gas operations can be sold, enhancing economic growth and energy security. Turning what would be wasted emissions into an energy source has the potential to yield an additional 255 billion cubic meters of global supply, more than Europe's imports from Russia in 2021 prior to the war in Ukraine. Methane abatement is, therefore, not only a climate solution, it is a commercial opportunity, with advantages for energy security and climate change mitigation.

In the global push toward net-zero emissions by 2050, the oil and gas industry must exhibit a level of excellence in managing scope one and scope two emissions akin to its commendable work on safety. By extending this commitment to emissions management, it can secure a pivotal role in global climate dialogues. Embracing these ideals will be instrumental for the industry to not only meet environmental goals but also demonstrate its value in shaping a sustainable future.

As the need to address climate change becomes ever more urgent, it is important to hear from industry leaders who see each day how these challenges are playing out. Mark Davis, the primary author of the following analysis, works in this market and thus has first-hand experience as the CEO of Capterio, a company that provides analytics and solutions to methane flaring. In support of finding new solutions to the issue of methane abatement, we are publishing the following data-based analysis and recommendations to help solve this global challenge.

EXECUTIVE SUMMARY

- **To deliver the energy transition and meet the Paris Agreement's goals, material reductions in all emissions from oil and gas, especially the 20 billion CO_2 metric tons per year of scope three emissions from end-use combustion, are imperative. However, reductions in scope one and scope two emissions present a near-term opportunity for constructive, quantifiable, and verifiable action.**

- **Reduction of waste emissions from flaring, venting, and leaking in the form of methane or carbon dioxide gas in the oil and gas supply chain is an area that demands prioritization. This waste accounts for at least 2.6 billion carbon dioxide equivalent (CO_2e) metric tons of emissions annually, more than double that of aviation. Half of these emissions come from countries that have not endorsed the Global Methane Pledge (GMP)—an initiative to reduce global methane emissions by at least 30 percent from 2020 levels by 2030. Implementing the GMP has the potential to eliminate over 0.2 degrees Celsius warming by 2050. It is, therefore, essential to engage as many countries as possible in an inclusive, collaborative COP28.**

- **The COP28 platform must accelerate on-the-ground action to drive methane and flaring reductions. Encouragingly, this objective aligns with the core mission of the Oil and Gas Decarbonization Accelerator, an industry-focused group that the United Arab Emirates is planning to launch at COP28.**

COP28 must prioritize three objectives to ensure its success:

- **First, it should focus on developing committed engagement by emphasizing positive economic opportunities associated with methane capture and return on investment for methane abatement projects.**

- **Second, it should establish a project development fund that identifies, prioritizes, and de-risks investments, or provides technical assistance to generate investment-grade projects.**

- **Third, it should unlock and diversify capital to scale up the deployment of proven methane abatement solutions while also showcasing and celebrating recent success cases.**

THE SCALE OF THE METHANE AND FLARING CHALLENGE

Today, the upstream oil and gas industry loses 255 billion cubic meters (BCM) of gas as a result of flaring, venting, and leaking.[1] That is 6.3 percent of all gas produced, 1.6 times Europe's imports from Russia in 2021, and a loss of up to $69 billion in revenue to host nations. Flaring, venting, and leaking also generate at least 2.6 billion CO_2-equivalent (CO_2e) metric tons of emissions (Figure 1[2])—more than double the emissions from aviation and equivalent to twice the energy-related emissions from the whole of Africa. These waste emissions—part of the industry's scope one emissions—represent a significant loss in energy efficiency that is particularly unacceptable during a global energy security, cost, and climate crisis.

The waste is also substantial in terms of its climate impact because some 46 percent of the volume is emitted in the form of methane, a greenhouse gas that is so potent (by a factor of thirty to eighty-three times more than CO_2[3]) that cutting methane emissions is "*the best way to slow near-term warming,*" according to Durwood Zaelke, a peer review scientist for the Intergovernmental Panel on Climate Change's (IPCC's) Sixth Assessment Report.[4] Of course, it is also important to put this component of scope one emissions into the context of the industry's scope three emissions (representing end-use combustion). For oil and gas, scope three emissions constitute 20 billion metric tons of CO_2—meaning that flaring, venting, and leaking represent 13 percent of scope three emissions in carbon dioxide-equivalent terms.[5]

Fortunately, most scope one emissions can be eliminated with proven technology, at a negative net cost, and with some of the lowest capital investment per metric ton of abated greenhouse gas.[6] It is time to virtually eliminate flaring, and end venting and leaking.

1 "About the Partnership, Global Gas Flaring Reduction Partnership (GGFR)," World Bank, accessed September 1, 2023, https://www.worldbank.org/en/programs/gasflaringreduction/about; "Global Methane Tracker," IEA (International Energy Agency), accessed September 1, 2023, https://www.iea.org/reports/global-methane-tracker-2023; "IPCC Sixth Assessment Report Global Warming Potentials," ERCE, August 2021, https://erce.energy/erceipccsixthassessment/.

2 We assume here that methane is 29.8 times more potent, on a *mass* basis, than CO_2, over a hundred-year basis, to be consistent with numbers presented by the International Energy Agency. A more assertive assumption is to use the International Panel on Climate Change's Global Warming Potential estimate over a twenty-year basis (which we think is more relevant), which is eighty-three times. Using this figure, the CO_2-equivalent emissions rise from 2.6 billion metric tons per year to 6.7 billion metric tons (see Figure 2).

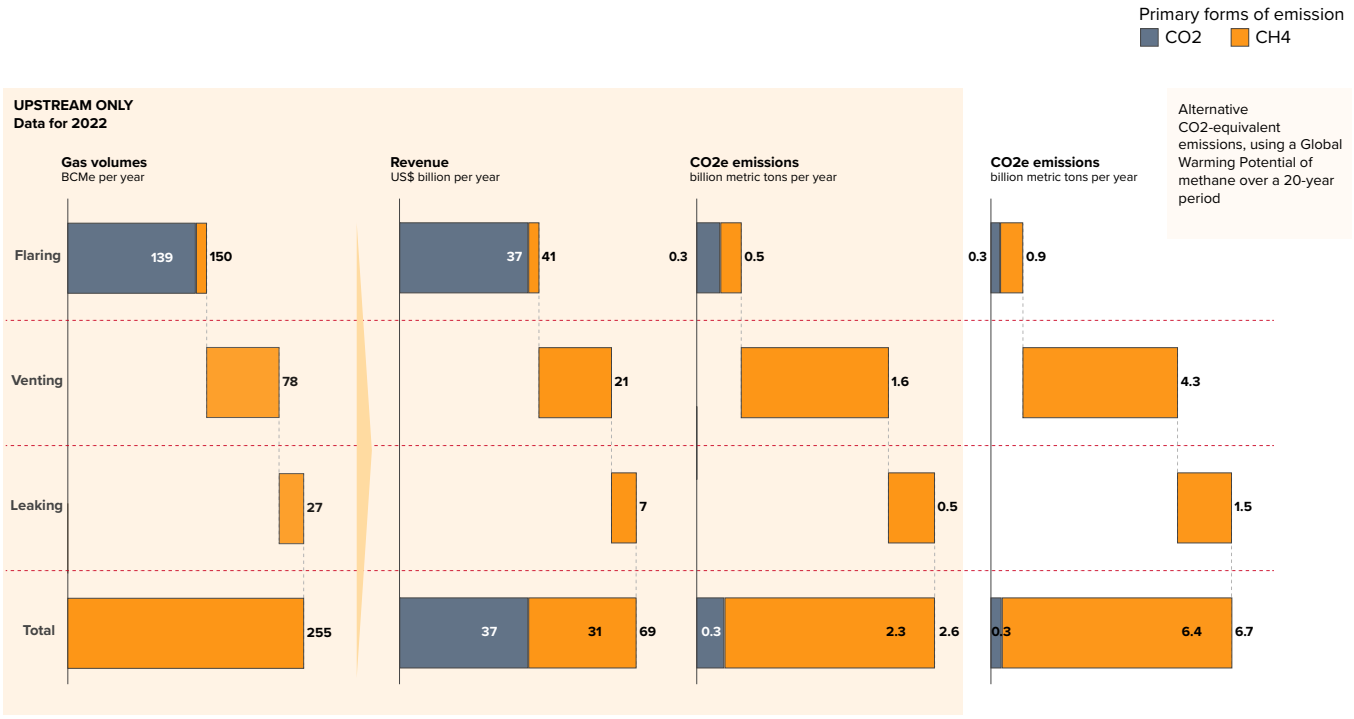
3 "About the Partnership."

4 Fiona Harvey, "Eight things the world must do to avoid the worst of climate change," *Guardian*, March 21, 2023, https://www.theguardian.com/environment/2023/mar/21/methane-to-food-waste-eight-ways-to-attempt-to-stay-within-15c.

5 "Global Carbon Budget 2022,"Global Carbon Project, November 11, 2022, https://www.globalcarbonproject.org/carbonbudget/22/files/GCP_CarbonBudget_2022.pdf.

6 IEA (International Energy Agency), *Financing Reductions in Oil and Gas Methane Emissions: A World Energy Outlook Special Report on the Oil and Gas Industry and COP28*, June 2023, https://iea.blob.core.windows.net/assets/ff747fc8-a8d9-4eda-9bc9-0e2b628cb019/Financingreductionsinoilandgasmethaneemissions.pdf

Figure 1. An overview of the scale of the flaring, venting, and leaking opportunity in terms of volume (BCM, left chart), revenue loss (middle), and CO_2-equivalent emissions (right).



Note: Gas priced at $7.5/MMBTU. CO_2e emissions from methane estimated using multiple of 29.8 of that of CO_2 on a mass basis, based on a 100-year timescale. Second emissions chart shows the emissions over a twenty-year period. Also, incorporated is the IEA's assumption that the global average methane slip at flares is 7.6 percent due to incomplete combustion and that natural gas is predominantly methane. Colors show the relative contributions from combusted gas (leading to emissions mainly comprising of CO_2) versus uncombusted gas (emission of the more-potent greenhouse gas, methane).

Sources: "Global Gas Flaring Data, Global Gas Flaring Reduction Partnership (GGFR)," World Bank, accessed October 1, 2023, https://www.worldbank.org/en/programs/gasflaringreduction/global-flaring-data; "Global Methane Tracker 2023," IEA (International Energy Agency), accessed October 1, 2023, https://www.iea.org/reports/global-methane-tracker-2023;IPCC (Intergovernmental Panel on Climate Change), "Climate Change 2022: Mitigation of Climate Change," IPCC Sixth Assessment Report, 2022, https://www.ipcc.ch/report/ar6/wg3/; Capterio analysis.

It is fitting, therefore, that the International Energy Agency (IEA) states in its recent report, *Financing Reductions in Oil and Gas Methane Emissions*, not only that tackling methane is an urgent short-term priority, but also that we need a 75 percent reduction in methane by 2030 to be on track to reach net-zero emissions by 2050.[7] It is also helpful that more than one hundred countries have signed up to the Global Methane Pledge (GMP),[8] and another one hundred plus organizations have endorsed the World Bank's Zero Routine Flaring by 2030 program,[9] but now is the time for action.

7 Ibid.

8 "Pledges," Global Methane Pledge, accessed October 1, 2023, https://www.globalmethanepledge.org/#pledges.

9 "Zero Routine Flaring by 2030 (ZRF)," World Bank, accessed October 1, 2023, https://www.worldbank.org/en/programs/zero-routine-flaring-by-2030.

THE ROLE OF THE OIL AND GAS INDUSTRY IN METHANE AND FLARING REDUCTION AT COP28 IS CRITICAL

A COP process that does not constructively engage with the oil and gas industry is neither likely to deliver the required reduction in emissions, nor can it mobilize investment in the right places.

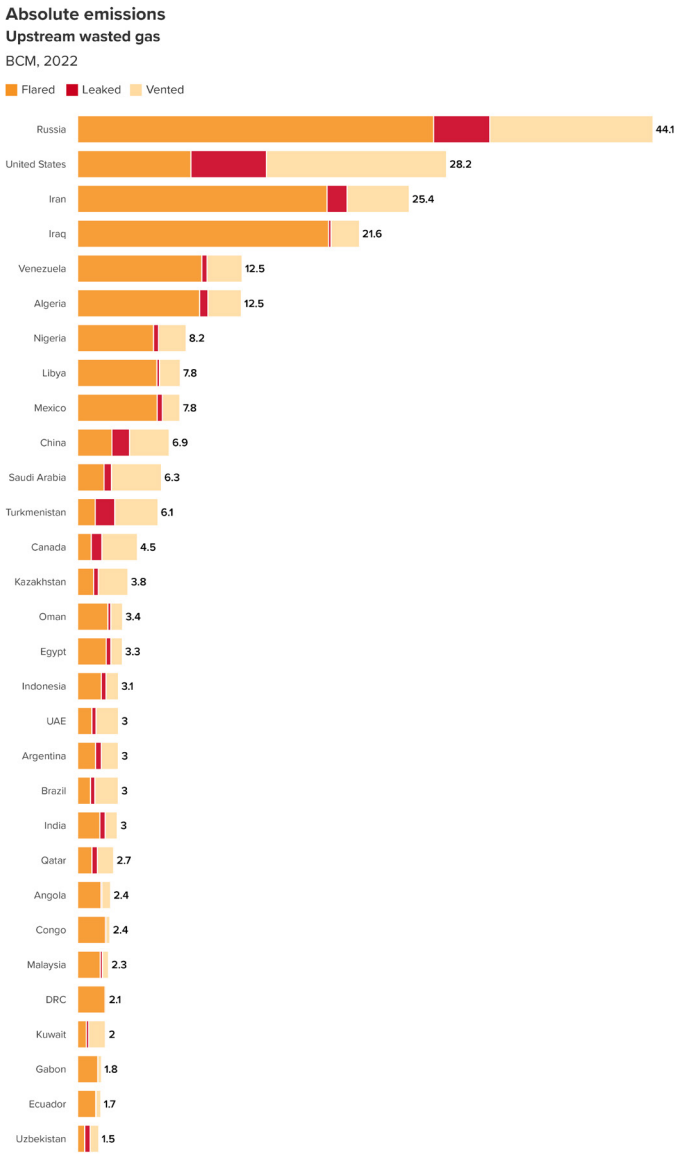
The stakes for the industry and its ability to contribute toward, rather than inhibit, climate progress could not be higher. The COP platform must steward the global oil and gas industry to over deliver on expectations and provide tangible progress to give it the continued opportunity to constructively engage with future COP processes.

The leading international oil companies (IOCs)—investor- or shareholder-owned, private-sector oil and gas producers—and their coalitions and partnerships (such as the Oil and Gas Climate Initiative, a federation of twelve of the largest operators representing industry best practices in waste emissions management) need to do more (especially for their so-called non-operated assets[10]). Put more strongly, IOCs must be held to account and ensure that they reduce emissions across their entire portfolio (not just those that they operate).

To make material reductions in flaring and methane, policy makers must recognize the international nature of the challenge and of the dominant role of national oil companies (NOCs)—oil and gas companies which are fully or majority-owned by governments.

The top five countries with the most significant improvement opportunity are Russia, the United States, Iran, Iraq, and Venezuela (in absolute terms). The top five countries in emission intensity (a measure of waste from flaring, venting, and leaking per unit of oil and gas production) are Venezuela (215 kg CO_2e per barrel of oil equivalent), Turkmenistan (183), Libya (119), Nigeria (89), and Algeria (83)—versus a global average emissions intensity (from flaring, venting, and leaking) of 44 kg CO_2e/boe.[11] In contrast, Norway excels with an emissions intensity of just 0.8 kg CO_2e/boe. This success is driven by their long-standing anti-flaring policy, in place since 1971, and a culture of strong governance, innovation, and transparency. Incidentally, given that most barrels have a scope three emission intensity of around 400–500 kg CO_2e/boe, these scope one emissions account, on average, for 10 percent of end-use emissions.[12]

Figure 2. Geographical breakdown of flaring, venting, and leaking in absolute terms



The most striking insight comes through a comparison of countries that have endorsed the GMP with those that have not. Forty-six percent of the emissions reduction opportunity is within the countries that have not endorsed the GMP (1.4 billion CO_2e for GMP-aligned versus 1.2 billion CO_2e for non-GMP). The emission intensity of non-GMP countries is 1.8 times that of GMP countries (at 63 versus 36 kg CO_2e/boe).

10 "Non-operated" assets are those that companies have an equity interest in but are not responsible for day-to-day operations. Most companies have only limited influence over their non-operated partners, especially those that are national oil companies.

11 Calculation explainer: global liquids (oil, condensate, and natural gas liquids) production was 93.8 million barrels per day (34.3 billion barrels p.a.), according to the Energy Institute Statistical Review of World Energy. See "Resources and data downloads," Energy Institute, accessed October 1, 2023, https://www.energyinst.org/statistical-review/resources-and-data-downloads. Add to this gas production of 4,044 BCM (24.6 billion oil-equivalent barrels per year) to derive a total boe production of 59 billion boe p.a. Scope one emissions from flaring, venting, and leaking (noting there are other sources of scope one emissions too) are 2.6 billion CO_2-e metric tons (see Figure 1). Therefore, the average emissions intensity of the scope one production from flaring, venting, and leaking = 2.6x109/59x109 = 0.044 metric tons/boe, 44 kg/boe.

12 See "Assessing Global Oils," Oil-Climate Index, Carnegie Endowment for International Peace, accessed October 1, 2023, https://oci.carnegieendowment.org/ downstream emission by crude types. Some countries have an emissions intensity from scope one emissions that is almost on par with their scope three emissions.

Figure 3. Breakdown of flaring, venting, and leaking in relative terms for GMP countries

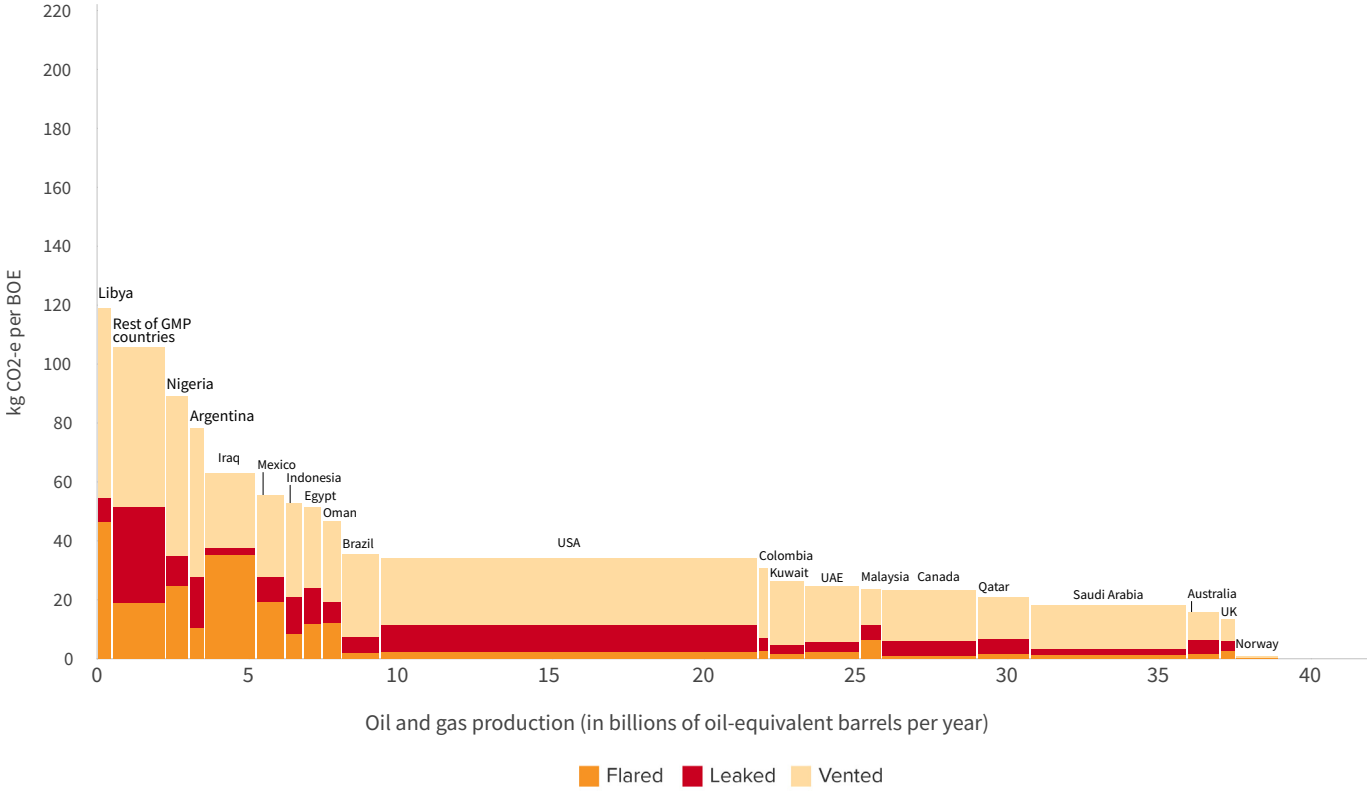
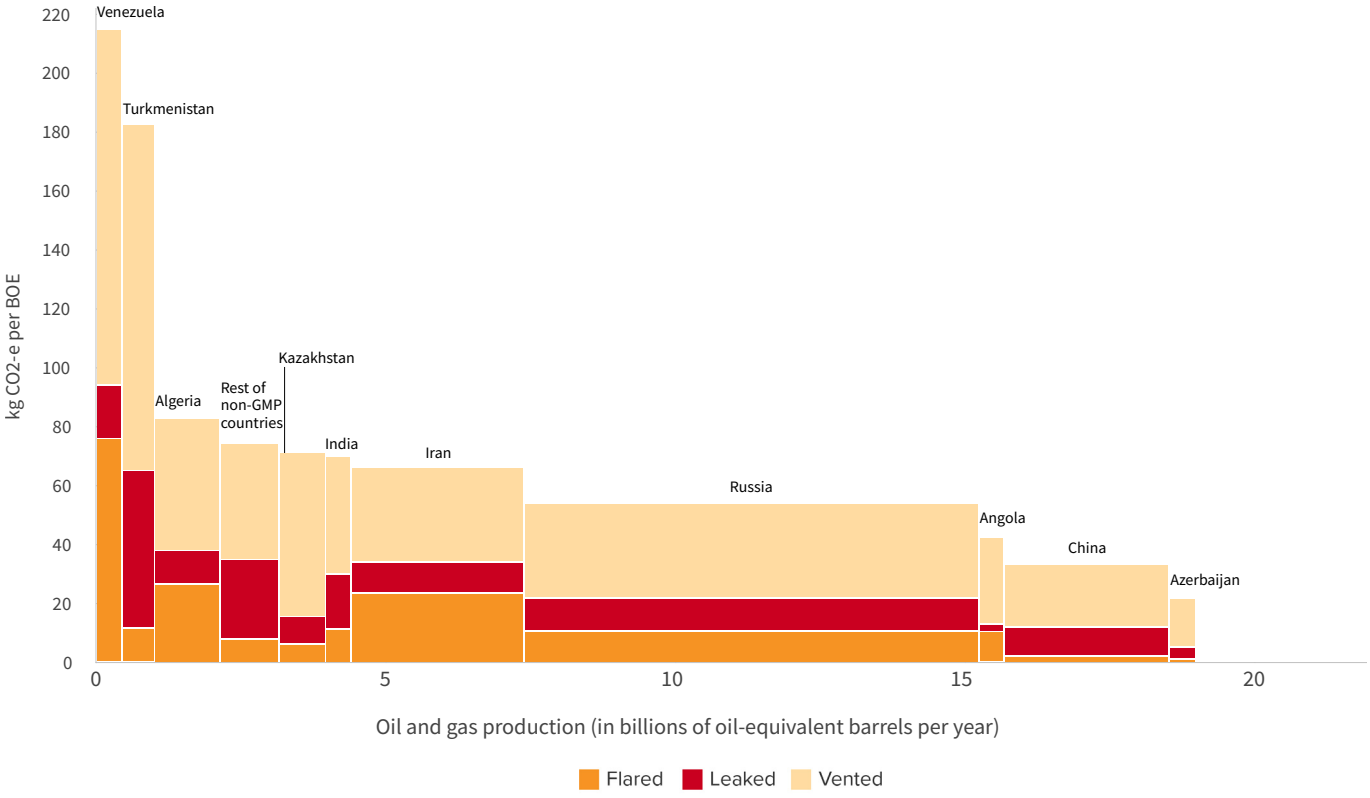


Figure 4. Breakdown of flaring, venting, and leaking in relative terms for non-GMP countries



Note: Emissions intensity is calculated here as CO_2-equivalent kg of emissions from flaring, venting, and leaking per oil-equivalent barrel. The top chart, figure 3, shows countries that have endorsed the GMP (accounting for 1.4 billion CO_2-e metric tons), and the bottom chart, figure 4, shows those countries that have not endorsed the GMP (accounting for 1.2 billion CO_2-e metric tons). The emissions intensity of the non-GMP countries is double that of GMP countries'. Flaring volumes are from the World Bank, venting and leaking data are from the IEA's Global Methane Tracker, and oil and gas production is from the Energy Institute's "2023 Statistical Review of World Energy." Emissions of methane are presented in CO_2-equivalent terms using the IPCC's factor for the Global Warming Potential of methane over a 100-year timescale of 29.8 on a mass basis.

Sources: "Global Gas Flaring Data"; "Global Methane Tracker"; "2023 Statistical Review of World Energy," Energy Institute, accessed October 1, 2023, https://www.energyinst.org/statistical-review; Capterio analysis.

Table 1. Key annualized metrics for the top countries, combined with their alignment to the Global Methane Pledge and the World Bank's Zero Routine Flaring by 2030 initiative

Country	Global rank	Volume (BCM)	% as methane	Revenue ($ billion)	Revenue ($ per second)	Emissions (million metric tons CO2e)	Carbon cost ($ billion)	Carbon intensity (CO2e/boe)	Global Methane Pledge?	Zero routine flaring?
Russia	1	44.1	42%	11.8	374	424	21.2	54	No	Yes
United States	2	28.2	72%	7.6	240	426	21.3	34	Yes	Yes
Iran	3	25.4	32%	6.8	215	197	9.9	66	No	No
Iraq	4	21.6	17%	5.8	183	107	5.4	63	Yes	Yes
Venezuela	5	12.5	31%	3.4	106	96	4.8	215	No	No
Algeria	6	12.5	31%	3.3	106	94	4.7	83	No	Yes
Nigeria	7	8.2	35%	2.2	70	69	3.5	89	Yes	Yes
Libya	8	7.8	30%	2.1	66	58	2.9	119	Yes	No
Mexico	9	7.8	27%	2.1	66	53	2.6	55	Yes	Yes
China	10	6.9	64%	1.9	59	95	4.7	33	No	No
Saudi Arabia	11	6.3	71%	1.7	54	94	4.7	18	Yes	Yes
Turkmenistan	12	6.1	82%	1.6	52	103	5.2	183	No	Yes
Canada	13	4.5	79%	1.2	38	74	3.7	23	Yes	Yes
Kazakhstan	14	3.8	73%	1.0	32	58	2.9	72	No	Yes
Oman	15	3.4	38%	0.9	29	30	1.5	47	Yes	Yes
Egypt	16	3.3	41%	0.9	28	32	1.6	51	Yes	Yes
UAE	17	3.1	70%	0.8	26	45	2.2	25	Yes	No
Global		255	46%	68.8	2,180	2,613	131	44		

Note: Revenue assumes a price of $7.5 per MMBtu, and carbon cost is calculated assuming a price of $50 per CO_2-e metric tons. Emissions of methane are presented in CO_2-equivalent terms using the IPCC's factor for the Global Warming Potential of methane over a 100-year timescale of 29.8 on a mass basis.

Sources: "Methane Tracker," IEA (International Energy Agency), last updated February 21, 2023, https://www.iea.org/data-and-statistics/data-tools/methane-tracker; "Zero Routine Flaring by 2030 (ZRF)," World Bank, accessed October 1, 2023, https://www.worldbank.org/en/programs/zero-routine-flaring-by-2030.

Therefore, engaging with non-GMP countries is a critical outcome of COP28 if there is to be any chance of meeting net-zero emissions by 2050. Fortunately, there are clear economic incentives, as by reducing flaring, venting, and leaking countries can capture methane that can be brought to market as natural gas, generate revenue, and generate attractive returns. Fourteen countries have a revenue opportunity of $1 billion and above annually ($30 per second—see Table 1) at an indicative price of $7.5 per million British thermal units (MMBtu). The US-led initiative to plug Turkmenistan's methane leaks is a great example of how progress can be made in a non-GMP country through diplomacy.[13]

13 Damian Carrington, "Turkmenistan moves towards plugging massive methane leaks," *Guardian*, June 13, 2023, https://www.theguardian.com/environment/2023/jun/13/turkmenistan-moves-towards-plugging-massive-methane-leaks.

COP28 MUST ADVANCE METHANE AND FLARING REDUCTION IN THREE KEY AREAS

The COP28 platform is well placed both to make action on methane and flaring a priority, and an enduring strategic initiative to 2030 and beyond.

This ambitious aim will require a step change in focus and action. Despite the many commitments (to zero routine flaring and the GMP), global progress is underwhelming. The recent Oil and Gas Benchmark report highlighted that "*the oil and gas sector has made almost no progress towards the Paris Agreement goals since 2021.*"[14] Flaring, for example, is down only by 3 percent in 2022 compared to 2021, whereas it needs to decline by 50 percent per year, every year, through 2030 to meet the IEA's net-zero scenario. There are many ways to reduce flaring (e.g., by capturing the gas and sending it to a pipeline, using it for power generation—in oilfield electrification, or for the grid). Similarly, there are many ways to reduce venting and leaking through replacement of valves, installation of vapor recovery units on tanks, and improving maintenance programs.

Action on flaring and methane has been slow to date in part because of a market failure. To make material progress, policy makers and industry must overcome persistent market failure by addressing leadership visibility and engagement, project development, perceptions over economics, project financing, regulatory effectiveness, and limited capacity or capability.

To accelerate progress, we recommend that in the area of flaring, venting, and leaking, the proposed Oil and Gas Decarbonization Accelerator should prioritize three outcomes: (1) generating engaged commitment, (2) setting up a project development fund, and (3) supporting financing and celebrating the clear benefits that result.

1. **COP28 should generate engaged commitment from NOCs and their ministries to reduce flares, vents, and leaks, motivated by clear economic benefits**. The current commitments are generally voluntary, partially executed, and are generally not verifiable, although the data transparency initiative from Oil and Gas Methane Partnership 2.0 is making excellent progress. The COP platform can help by:

    - *Shifting the conversation to constructive engagement with host governments and NOCs based on positive economic narratives* focused on revenue opportunity, energy security, jobs, and investment.[15]
    - *Creating compelling leadership-driven mandates.* A top-down mandate can galvanize action and transform performance. Countries should each generate a nationwide flare reduction task force. Progress without such a clear top-down mandate is hard, especially since we need action at multiple organizational levels, right down to the operational leaders at individual assets.
    - *Creating a space* for ministers to engage with company executives and operational leaders about emissions reduction without fear of negative consequences. Independent and credible data should be used (self-reported data is often underreported, sometimes by a factor of ten).

2. **COP28 should expand on existing progress by establishing a flaring and methane fund that helps identify and mature flaring, venting, and leak abatement projects to an investment-ready state.[16] The UAE is well positioned to leverage its leadership in finance and energy to create this fund.**

    - The new project development organization should originate projects:
        - One outcome from COP28 should be the creation of a $500 million-plus *project development entity* that specifically funds the identification and development (technically and commercially[17]) of a pipeline of attractive, investment-ready capital projects. Note the funding here is meant for project origination prior to front-end engineering and design. The aggregate capital required to deliver these projects through capital expenditures is probably in the $100–$200 billion range to achieve the goal of a 75 percent reduction in oil and gas methane emissions globally by 2030.
        - This fund is needed as too few investment-grade projects are being developed today. Operators often do not properly identify or acknowledge opportunities. Turning a blind eye (as some NOCs and IOCs appear to be doing) creates a lack of visibility and data needed to make informed investment decisions and blocks progress of viable projects. Increasingly common public reporting or data inventories, however, will bring greater transparency around oil and gas operational emissions.

14 "Oil and Gas Benchmark." World Benchmarking Alliance, accessed July 10, 2023, https://www.worldbenchmarkingalliance.org/publication/oil-and-gas/rankings/.

15 The alternative—a critical or negative narrative—is likely to be met with resistance and denial, leading to delay.

16 Reductions of flaring, venting, and leaking should be prioritized ahead of drilling new exploration wells or starting aspirational shale gas programs.

17 As part any technical evaluation, factors such as the scale of the emissions, the gas condition (composition, pressure, temperature), technology options (e.g., gas compression and separation, pipeline and power generation infrastructure, and other "exotic" solutions) should be fully understood.

- The new project development organization should also partner with key governments to define pragmatic road maps**:**
  - *COP28 should encourage countries to develop data-led road maps.* Credible and independent data is key. Self-reported data invariably underestimate opportunities, and without an accurate big picture view, aggregation and collaboration opportunities are missed. To ensure that the national interest is optimized, governments must work across organizational and contractual boundaries and maximize use of existing infrastructure. The best minds should collaborate to resolve competing commercial interests using novel commercial structures. For example, Capterio and Columbia University conducted a study in 2022 and found that up to 24 BCM of gas from Algeria, Libya, and Egypt could be brought to market through one of four pipelines and four LNG terminals within twelve to eighteen months, if all barriers were unblocked.[18]
  - *The COP platform should also encourage governments and NOCs to use the best technology* (satellite-based, as a minimum) to track performance at a facility level and publicly disclose data on a monthly or quarterly basis. NOCs that require technical or financial assistance should be provided this assistance through a central clearinghouse. Flaring can be accurately and independently tracked by satellite at an asset level on a daily basis down to rates of approximately 0.3 million standard cubic feet (scf) per day. Similarly, methane can be tracked by global-coverage satellites[19] such as Landsat 8, Sentinel-2, and Sentinel-5 down to rates of approximately 1 metric ton/hour (1.3 million scf/day), albeit with lower spatial and/or temporal resolution—and at rates as low as 0.25 metric ton/hour by "taskable" commercial satellites. Emerging technologies such as fixed site-level detection equipment will also facilitate measurement in a significantly less labor-intensive manner than contemporary handheld devices. Taken together, technology to facilitate site-level monitoring is rapidly improving and should be implemented comprehensively.

3. Unlock and diversify the financing of emissions-reduction initiatives and celebrate the success of recently financed projects.

- *COP28 should focus on unlocking finance for projects that reduce emissions*, in part by diversifying sources of funding. Some banks are reticent to fund methane and flaring abatement due to policies discouraging investment in oil and gas production projects.[20] There is, however, keen interest from both private credit and sovereign wealth funds to fund methane projects. International or bilateral carbon markets may also provide a source of financing. The COP28 platform should seek to further strengthen Article 6 of the Paris Agreement to mobilize more capital to support flaring, venting, and leak abatement projects.
- *COP28 should also encourage the industry to finance emissions reductions from its cash flows*, encouraged by regulators who enforce penalties for waste emissions, and investors who offer to withhold financing from operators with poor emissions performance. At 2 percent of revenues, the oil and gas industry should be able to afford the $75 billion plus required to fix the problem.[21] Only a select few countries should require a modest $15–$20 billion in additional finance mobilization.
- *COP28 should encourage companies to celebrate successful projects that delivered material reductions* and share best practices. Many examples highlight how investments in pipelines or other power generation infrastructure can substantially reduce flares.[22] Positive leadership contributions made by several operators over a range of scales can inspire others to act.

There are naturally a range of other important initiatives that will also accelerate action. These include improving the effectiveness of regulation, imposing or enforcing flaring penalties, embedding carbon pricing or border adjustments, improving the effectiveness of international carbon markets under Article 6 of the Paris Agreement through voluntary and compliance markets, driving collaboration between operators and governments, overhauling commercial contracts, building deeper local contractor capabilities, among others.

At COP28, the world has a unique opportunity to exercise principled leadership and pragmatic solutions. This moment must not be wasted.

18 Mark Davis, Perrine Toledano, and Thomas Schorr, "North Africa Can Reduce Europe's Dependence on Russian Gas by Transporting Wasted Gas through Existing Infrastructure," Columbia Center on Sustainable Investment, March 29, 2022, https://scholarship.law.columbia.edu/sustainable_investment_staffpubs/217/.

19 As opposed to "taskable" satellites such as GHG Sat, PRISMA, etc., which have lower detection limits; Evan D. Sherwin et al., "Single-blind validation of space-based point source detection and quantification of onshore methane emissions," *Scientific Reports* 13 (3836) (2023), https://doi.org/10.1038/s41598-023-30761-2.

20 IEA, *Financing Reductions*.

21 "Global Methane Tracker."

22 IEA (International Energy Agency), "Strategies to reduce emissions from oil and gas operations," Global Methane Tracker 2023, https://www.iea.org/reports/global-methane-tracker-2023/strategies-to-reduce-emissions-from-oil-and-gas-operations.

ABOUT THE AUTHORS

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Davis has an MA in natural sciences from the University of Cambridge, a PhD in geophysics from the University of Liverpool, and an MBA from IMD in Lausanne, Switzerland. He is a fellow of the Geological Society of London.

Landon Derentz is senior director and Morningstar Chair for Global Energy Security at the Atlantic Council's Global Energy Center. Under his leadership, the Global Energy Center devises solutions to the geopolitical, sustainability, and economic challenges of the changing global energy landscape.

During his career, Derentz has engaged in all facets of US energy and climate policy, including as director for energy at the White House, director for Middle Eastern and African affairs at the Department of Energy, as an energy policy adviser in the Department of State's Bureau of Energy Resources, and as a presidential management fellow in the Office of Energy Efficiency and Renewable Energy at the Department of Energy. Derentz has deep experience building diverse coalitions across governments, the private sector, and civil society. He led US efforts to establish the Net-Zero Producers Forum and served as the US representative and vice chairman of the International Energy Agency's standing groups on emergency questions and the oil market. Additionally, Derentz served as an officer in the United States Air Force.

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