Written evidence from North Sea Transition Authority (NSTA) (MET0010)

About the NSTA

The NSTA licenses, regulates and influences the UK upstream oil and gas, offshore hydrogen, and carbon storage industries. We support UK energy security, drive emissions reduction from UK supplies, and help accelerate the transition to net zero to realise the potential of the North Sea as an integrated energy basin.

The NSTA requires the upstream oil and gas sector to reduce greenhouse gas (GHG) emissions, including methane, from their production operations. We monitor and report on emissions from the sector, and issue consents for flaring and venting activity.

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Summary

- Globally, methane emissions from oil and gas is a major issue. In the UK the picture is a little different. Methane emissions from the UK upstream oil and gas production sector (the sector) account for **1.7%** of total UK methane emissions (2021, National Atmospheric Emissions Inventory).
- The UK upstream oil and gas sector has made progress in tackling methane emissions with a 40% reduction since 2018. In 2021 methane represented 7% of total carbon dioxide equivalent (CO2e) emissions from the sector.
- Hydrocarbon flaring and venting are the primary sources of methane emissions in the sector. The NSTA has overseen a 48% reduction in flaring since 2018.
- Existing NSTA guidance and the newly published Emissions Reduction Plan make clear our requirement on industry to end routine flaring and venting for all UK operations by 2030, going further than the World Bank target (flaring and oil only).
- The NSTA uses a range of regulatory tools including our consents process, performance benchmarking, publishing data and enforcement sanctions such as fines to hold industry to account.

- Power generation for offshore assets, which primarily emits carbon dioxide, remains the largest source activity for sector emissions at 79% (EEMS, 2022)*. The NSTA considers further action on methane generating activities in the context of overall progress on reducing greenhouse gas emissions.

Upstream oil and gas sector emissions context

1.7%: Contribution of the UK upstream oil and gas sector to total UK methane emissions in 2021, equating to 0.98MtCO2e of methane (Source NAEI).

The tables below* set out the relevant size and proportion of different greenhouse gas emissions from the upstream sector. Methane is a relatively small component (ca 7%) compared with carbon dioxide (on a CO2e basis), the main source of methane is flaring and venting activity, which account for approximately 20% of total emissions from the sector.

Table 1 – Breakdown of emissions from the sector by greenhouse gas (2021)

In 2021, emissions from upstream oil and gas production in the UK totalled 14.5MT CO2e.

Greenhouse gas	**Proportion of upstream emissions (CO2 equivalent)**
Methane	6.8%
Carbon Dioxide	91.5%
Nitrous Oxide	1.7%

Table 2 – Primary sources of all greenhouse gas emissions, and methane emissions from the sector by operational activity (2021)

Emission Source	Share of total Industry GHG emissions (2021)	Share of Industry Methane emissions (2021)
Combustion (gas and diesel for power generation)	75%	8%
Flaring	18%	29%
Venting	3%	46%
Fugitives	2%	7%
Non- combustion (oil loading, terminal storage etc)	1%	10%
Total	**100% (**14.5Mt CO2e)	**100%** *(*0.98Mt CO2e)

As highlighted in Table 2 flaring and venting activity are the biggest sources of methane emissions from the sector.

Flaring is the process of burning off 'waste' gas during the production process, primarily for operational safety. Almost all of the emissions from this process are carbon dioxide, however a small amount of methane is emitted if there are combustion inefficiencies and not all the gas is burnt.

Venting is the disposal of hydrocarbon gas where flaring is not feasible. The emissions from venting activity on most platforms is almost all methane.

Separately, non-hydrocarbon venting on the UKCS originates from a few key field and terminal sites where carbon dioxide in reservoir is removed and vented to the atmosphere.

Routine flaring and venting is required for the safe operation of an asset based on current design and operating at optimum efficiency. Roughly half of all flaring and half of all venting is classified as routine based on 2023 NSTA consents data.

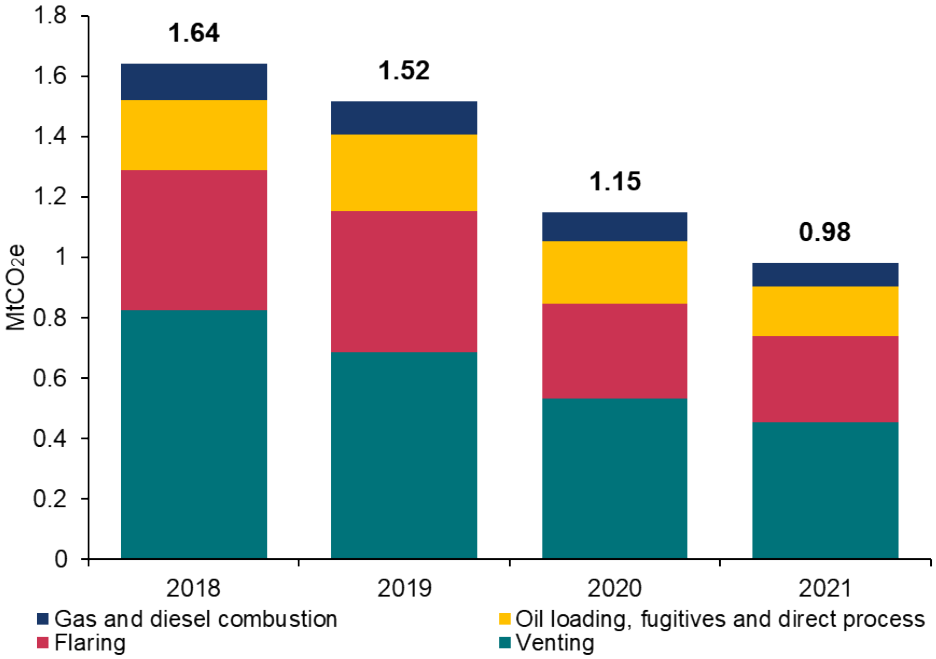
Progress to date

40%: Reduction in methane emissions from the sector since 2018 (Figure 1). Methane emissions halved between 1990 and 2006 and then remained relatively flat until 2018.

The decreasing trend in methane emissions since 2018 is a result of various factors: a reduction in overall gas production levels, recent reductions due to shutdowns and maintenance activities, and proactive initiatives from industry to reduce flaring and venting such as increasing equipment efficiency and leakage detection systems.

48%: Reduction in flaring activity since 2018. Monthly data indicates this downward trend has continued despite an increase in oil and gas production since the shutdowns in the pandemic.

Figure 1 – Offshore methane emissions by source, 2018 – 2021 (source: NAEI)



NSTA regulatory action

Progress on reducing flaring and venting and associated methane emissions is being driven by NSTA regulatory action. The NSTA requires industry to end routine flaring and venting by 2030, going above the World Bank target by also targeting the elimination of routine venting and extending the target to cover both oil and gas (not just oil) installations.

OGA Strategy

The NSTA's regulatory authority is underpinned by the OGA Strategy which sets out binding obligations on the upstream industry.

In 2021 we updated the strategy to require industry to make appropriate steps to assist the Secretary of State in meeting the net zero target. This includes reducing greenhouse gas emissions from sources such as flaring and venting.

Flaring and Venting guidance

In 2021 we published updated guidance setting out the following expectations to industry in relation to flaring and venting across all UKCS areas and oil and gas lifecycle stages:

- flaring and venting and associated emissions should be at the lowest possible levels in the circumstances.
- zero routine flaring and venting for all by 2030.
- all new developments should be planned and developed on the basis of zero routine flaring and venting.

Emissions Reduction Plan

In March 2024 we published a new emissions reduction plan, known as the OGA Plan, setting out new requirements on the industry to reduce upstream production emissions, including on flaring and venting. In addition to the guidance above the plan requires industry to:

- Provide documented projections of flaring and venting figures split by Category (A, B and C)** from 1 June 2024.
- Create budgeted plans to deliver continuous improvements in flaring and venting leading to GHG emissions reductions at the UKCS-level from 1 June 2025.
- Deliver continuous reductions of fugitive emissions.

Regulatory toolbox

The NSTA has a range of other regulatory tools to support action on flaring and venting:

- We issue consents for flaring and venting activity with strict limits. Operators who breach their flaring and venting consents can be sanctioned, and we have issued three fines worth £375,000 since 2022.
- We benchmark performance asset by asset across the UKCS and share findings with operators to encourage sharing of best practice.
- We publish data publicly on our website highlighting flaring and venting and methane performance of different assets.

We also work closely with government and other regulators, in particular the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED), on the vital role that the oil and gas industry must play in the UK energy transition, including to ensure we minimise duplication or extra burdens on operators.

Specific inquiry questions relevant to NSTA

8) What is the status of methane accounting, monitoring and reporting in the UK at present and how does it compare internationally? Is UK accounting and reporting considered to be accurate and robust? What improvements, if any, are possible and what benefits would these deliver?

9) What progress is being made on methane monitoring and data collection in the UK using technologies such as satellite data and drones?

Question 8 and 9 answered together.

Methane monitoring in the sector has been a focus of improvement in recent years.

The NSTA has introduced a new requirement on the sector to report the amount of gas venting taking place. Currently most flare stacks on the UKCS are

metered, however as methane emissions on an asset tend to be more diffuse it is harder to quantify emission levels from these low-level sources.

The NSTA also now requires operators to report so called 'cold flaring' as venting. This is where a flare stack is extinguished resulting in methane rather than carbon dioxide emissions. This therefore counts towards their venting consents limits and provides greater incentive to relight the flare as quickly as possible.

As a regulator the NSTA encourages improvement in monitoring and reporting and alongside initiatives from industry we now have a much better understanding of methane emissions from the sector, although there is more work to do.

12) What progress has the UK made on reducing methane emissions and where is there room for improvement?

40%: Reduction in methane emissions from the sector since 2018. Methane emissions halved between 1990 and 2006 and then remained relatively flat until 2018.

Further methane reductions in the upstream oil and gas sector can be achieved through initiatives to reduce flaring and venting activity and tackle diffuse fugitive emissions on platforms.

The NSTA has recently introduced new requirements on operators through our 'emissions reduction plan' to tackle both these sources (see above).

14) Are there sources that could be mitigated quickly and easily in the short term, and which would take longer or be more complex?

There is already significant action taking place in the sector to address methane emissions.

Existing technology, such as vapour recovery systems which are well established and in use, although they are expensive to install.

Improving metering and/or monitoring will give greater confidence in reported figures and enables better management of emissions and is being addressed as set in out in answers 8 and 9.

There is a balance between safety and environmental performance. Most flare systems in UK are primarily safety devices. Some improvement activities are good for both elements, such as improving ignition reliability and reducing flame out events, others are in conflict, such as flare gas recovery systems. Recent improvements have predominantly come from a focus on improving operational performance, and we are now moving on to the more challenging area of eliminating routine flaring.

25) Are there further methane reductions that could be made in the UK fossil fuels sector (e.g., oil, gas or other fossil fuels), or at a faster pace?

The NSTA is stewarding reductions in all greenhouse gas emissions from the sector and we are focussed on the initiatives which will have the biggest impact relative to the cost of implementation.

We therefore do not think there is significant scope to go faster than the planned pace on flaring and venting, which are the primary sources of methane emissions from the sector, without jeopardising wider progress.

The NSTA estimates ending routine flaring and venting as planned could reduce total emissions by nearly 3 MtCO2e between 2025 and 2050 with 64% coming from routine flaring elimination and 36% from routine venting elimination (source NSTA Emissions Monitoring Report, 2023).

26) How can we ensure that reducing methane emissions in the oil and gas sector are not at the expense of reducing CO_2 emissions?

As seen in Table 1 above methane emissions accounted for just 7% of the upstream oil and gas sector's total CO2e production emissions in 2021 with carbon dioxide accounting for 92% (CO2 equivalent).

The largest source of methane emissions is venting, followed by methane released to the atmosphere as a result of incomplete combustion during flaring operations. Together, and including the CO2 emitted through flaring, flaring and venting account for approximately 20% of all upstream emissions (CO2e)

In 2022, 79% of total emissions were derived from power generation on offshore assets (EEMS, 2022)* – either gas use or diesel, which primarily emit carbon dioxide.

The biggest prize in terms of reducing the industry's overall contribution to UK emissions (ca 3% in 2022) is therefore in reducing or eliminating emissions from power generation through the electrification or use of low carbon power on offshore assets.

The NSTA is using our regulatory toolbox to ensure operators prioritise projects which will have the greatest overall emissions impact. A narrow focus on one gas or one type of activity will not result in the most optimal way to reduce emissions.

This approach also applies to how we assess operator performance. For example, in bad weather it may make sense to run a flare at a higher rate and emit more carbon dioxide to avoid the flare being extinguished, which would result in higher methane emissions and a greater overall environmental impact on a carbon dioxide equivalent basis.

27) What impact would bringing forward the ban on flaring and venting have on both emissions and the industry?

Bringing forward the ban on routine flaring and venting from the current 2030 target would be challenging to deliver.

Many of the projects required to eliminate routine flare and vent are complex engineering projects which require detailed design, planning, and execution.

Industry has been working towards a 2030 target since 2021 and are building their work programmes around that target. There is a limited supply of people and companies able to carry out the work, bringing forward the ban at short notice risks exacerbating a skills shortage and creating a bottleneck. This will increase costs and could result in capital being spent on expensive projects which deliver marginal emissions gains which could be better allocated towards more impactful projects, such as asset electrification. It may also lead to premature decommissioning.

Crucially, flaring and venting are first and foremost safety operations on offshore assets. Bringing forward a ban would lead operators to suspend or cease production early, rather than risk running unsafe installations.

The NSTA is currently working to get a baseline identifying exactly which assets are potentially planning routine flaring still in 2030 and prioritise interventions with those. In addition, the OGA Plan published in March, has given new impetus for operators to reduce emissions from flaring and venting operations as well as take action on fugitives.

Annex

*Data Sources

- The data used in Tables 1 and 2 is taken from official UK NAEI statistics and there is a two-year lag on reporting. The figures for 2022 have just been released and are currently being analysed.
- The NSTA uses data from the UK Emissions Trading Scheme (UKETS) and Environmental Emissions and Monitoring System (EEMS) to estimate sector emissions for our annual emissions monitoring report. This explains the slight difference in the two numbers used for the proportion of emissions from power generation in our evidence.

** Flaring and venting source categories

As of 2021, reporting categories have been updated to support stewardship and align with other external reporting and flaring and venting reduction initiatives (e.g. World Bank Zero Routine Flaring Initiative) – these revised categories are set out below. These categories apply to reporting for both flaring and venting. The categories apply to gas obtained from the reservoir covered by consent. It should be noted that a flare gas stream emitted without ignition (i.e. Cold Flaring) should be reported as vent.

- Category A: Streams for the safe operation of the asset based on its current design and operating at optimum efficiency (excluding Category C). Streams in this category are generally inherent in the design of a facility and therefore reductions to flaring and venting allocated to this

category will generally require facility modifications. Aligns with the World Bank Zero Routine Flaring Initiative routine flaring category.

- Category B: Flaring and venting occurring during normal operations beyond levels optimum for the installation. Reductions in flaring and venting in this category can be achieved through operational changes and optimisation. Aligns with the World Bank Zero Routine Flaring Initiative non-routine category
- Category C: Emergency disposal and gas streams required specifically for the operation of safety critical equipment/elements. Aligns with the World Bank Zero Routine Flaring Initiative safety flaring category