

Briefing

The problem of hidden methane leakage from North Sea oil and gas operations



August 2024

Summary

Our analysis of the data from eight North Sea oil platforms has found that operators may be under-reporting their methane emissions (particularly from leaks) by a factor of 11 on average and, in some cases, emissions may be up to 70 times higher than the government reports, based on modelling and industry figures.

Norway clamped down on methane emissions from venting and flaring from oil fields when operations first began in 1971. They introduced high taxes for wasting gas in the 1990s. More action should be taken to reduce methane leaks and tackle methane emissions in the UK.

Background

Although methane is less persistent than CO₂ in the atmosphere over the longer term, it is over 80 times more potent over a 20 year period.

Reducing methane is essential for short term cooling and keeping global warming below 1.5°C, mitigating the risk of reaching dangerous climate tipping points as longer term solutions are implemented.

The International Energy Agency (IEA) has warned that methane emissions must fall by [30 to 60 per cent](#) over the decade from 2020 to 2030 to limit global warming to 1.5 degrees.

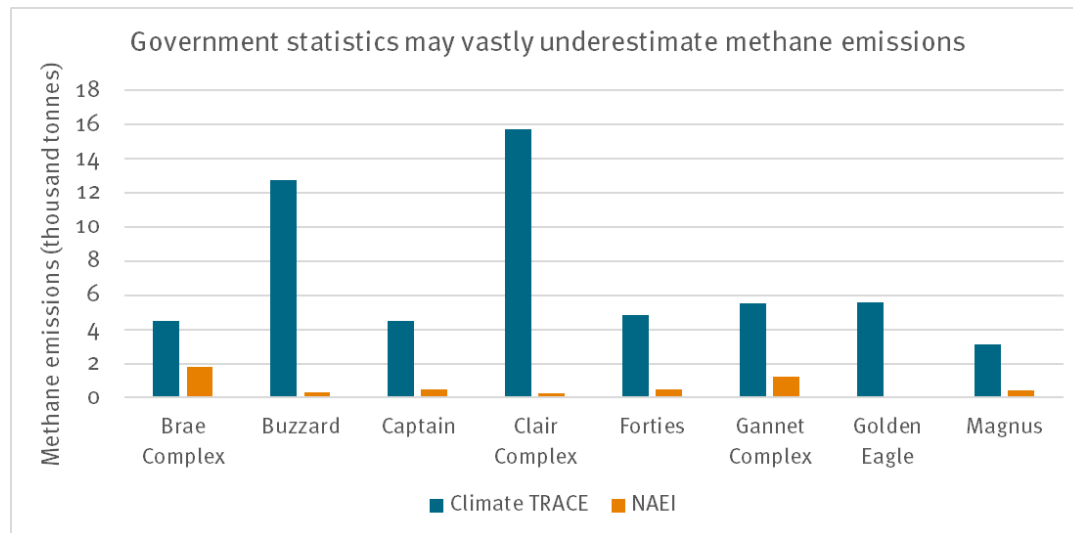
Despite being a signatory to the Global Methane Pledge, the UK has yet to impose stricter controls on its oil and gas operations or develop a detailed action plan to achieve the necessary reductions. In fact, the previous government recently opposed calls to phase out routine methane venting and flaring sooner than 2030, still six years away.

Emissions are self-reported

The UK National Atmospheric Emissions Inventory (NAEI), used by the UN to monitor national greenhouse gas emissions, relies on operator estimates and modelling with outdated emission factors, leading to significant inaccuracies.

More accurate data

The non-profit coalition Climate TRACE uses enhanced and bespoke modelling, combined with satellite data tracking of gas flaring and ‘super-emission’ events to reach more accurate estimations of emissions.^{1,2}



Our analysis of this more accurate data shows that methane emissions from eight significant UK offshore oil production platforms in 2021, as reported in the NAEI, could have been underestimated by a factor of 11 on average. For two sites (Clair and Golden Eagle), the Climate TRACE results suggested emissions could be 70 times higher than government statistics.³

From the data studied, the total quantity of missed methane emissions from just these eight oil fields in the North Sea could be as high as 50,000 tonnes a year, 2.5 per cent more than the UK’s already reported methane emissions. This is likely to be a mix of deliberately vented methane as well as undetected leaks, and incompletely burnt methane from flare stacks. If the additional, unreported methane lost from these eight fields was instead captured and sold at the average price of gas for the past 12 months in the UK, it would be worth over £23 million.⁴

Leaks are avoidable

The technology already exists to capture and make use of most of the methane gas knowingly emitted from oil and gas extraction sites and refineries. New technology also means that frequent detection and repair of accidental leaks is possible. The IEA estimates that [61 per cent](#) of existing methane emissions from the UK’s oil and gas sector could be abated with existing technologies and practices at no net cost, as the cost of the interventions would be less than the value of the recovered gas. But there is little policy in place to force operators to do this.

Recommendations

Immediate improvements are needed to methane emissions reporting and methane leak management.

We recommend that the government does the following:

- Introduce legislation to ban routine venting and flaring from 2027.
- Mandate monthly leak detection and repair for the oil and gas industry.
- Produce a National Methane Action Plan, in time for COP29 in Azerbaijan, to outline how the UK will cut emissions in line with the Global Methane Pledge.

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Endnotes

¹ Climate TRACE is a coalition of academics, engineers, climate leaders and NGOs working to harness the power of AI and big data to make greenhouse gas emissions visible. The coalition includes the Rocky Mountain Institute, WattTime, Transition Zero, Global Energy Monitor and AI Gore, originally brought together by a grant from Google.org to use AI to analyse emissions from space.

² Methodology [documentation](#) for the Climate TRACE data explains the ‘OPGEE’ model used to estimate emissions from oil production platforms. It uses many inputs to arrive at more accurate estimates than simple emission intensity calculations often used in government statistics. For example, OPGEE accounts for oil field age and depth, production volumes, gas composition, well characteristics, reservoir characteristics, oil densities, means and distances of transport, flaring volumes (via satellite data) and super-emitter events (via satellite data).

³ Our analysis used 2021 data for oil and gas production emissions from [Climate TRACE](#), and compared these to the data available in the National Atmospheric Emissions Inventory 2021 [point source data](#), supplied by operators to the environment agencies. We specifically studied the following eight North Sea oil platforms (and the “tied back” or linked platforms with pollution data available) because they were marked as ‘high confidence’ in the Climate TRACE dataset: Brae, Buzzard, Captain, Clair, Forties, Gannet, Golden Eagle, and Magnus. Confidence levels are determined based on the number of data inputs to the model and expected limitations of the model, which are understood to be more accurate for oil fields than for gas fields. Other platforms with medium or low confidence of accuracy in the Climate TRACE dataset also indicate a high level of under-reporting, but we have

not included them in this analysis. There are hundreds of oil and gas fields in the UK North Sea, but most have declining outputs, and only around a dozen are producing significant volumes of oil, and a similar number for gas. The platforms we have studied, with 'high confidence' in the Climate TRACE dataset, are amongst the highest oil producing platforms.

⁴ This assumes a price for natural gas, which is mostly methane, of 85 pence per therm. This was the average price natural gas was sold for in the UK over the 12 months from 23 August 2023 to 23 August 2024, according to tradingeconomics.com.