



**Institute for Energy Economics
and Financial Analysis**

UK Offshore Flaring and Venting

*Over £2.6 Billion of National Gas Resources
Up in Smoke During the Past Decade*

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March 2023

Key Findings

It is estimated that during 2021, some 143 bcm of fossil gas, with a market value of \$55 billion, were squandered through flaring—enough to support the import gas requirements of Germany, France, and the Netherlands.

Norway has successfully reduced flaring and venting activity with economic disincentives—a carbon tax for offshore oil and gas operations, in addition to joining the EU Emissions Trading Scheme in 2008.

By applying additional financial penalties to flaring and venting activity, the UK regulator could provide a clear financial incentive for oil and gas operators in the UKCS to further reduce the practice.

Over the past 10 years, the UK has wasted some 13 bcm of natural gas through flaring and venting, releasing 45 million tonnes of CO₂ emissions into the atmosphere, exposing oil and gas operators to £1 billion of ETS payments and £2.6 billion in lost gas sales.



Executive Summary

Globally, flaring and venting of associated gas from oil production is not only a major environmental problem, but also a colossal waste of money. It is estimated that during 2021, some 143 billion cubic meters (bcm) of fossil gas, with a market value of \$55 billion, were squandered through flaring—enough to support the import gas requirements of Germany, France, and the Netherlands combined.¹

As a declining but still significant indigenous producer of oil and gas, the UK is a significant contributor to global flaring and venting waste. In 2021, around 1 bcm of natural gas was either flared or vented across its oil and gas operations, equivalent to 3 percent of production. Over the past decade, the economic value of this gas has increased significantly, totalling some £2.6 billion in lost gas sales—accentuating recent gas shortages and increasing costs for consumers.

Although the UK regulator recognises that change is required to minimise flaring and venting, we believe that there is more they can do. The North Sea Transition Authority (NSTA), the UK regulator, has publicly stated that all routine flaring and venting should cease by 2030, and that it should be minimised as much as possible between then and now.

The sentiment is admirable, although the volume of flaring and venting remains high and will likely continue over the course of the decade. Other oil and gas producing nations in the North Sea, such as Norway, have significantly lower flaring and venting volumes despite significantly higher oil production. In 2021, Norway's oil production was more than double the UK amount, while flared and vented gas was 81 percent lower.²

Norway's reduced flaring and venting activity has been attributed to economic disincentives that have been put in place over previous decades—namely, its carbon tax arrangements. In the early 1990s, Norway introduced a carbon tax for offshore oil and gas operations, in addition to joining the EU Emissions Trading Scheme (ETS) in 2008. Norway's oil and gas companies effectively pay both taxes and as such, they are economically incentivised to reduce emissions and consequently, flaring and venting volumes.

For the UK to really make an impact in reducing its flared and vented gas, it also should consider implementing economic disincentives, mirroring the success of its North Sea neighbour and limiting environmental and economic damage.

¹ International Energy Agency. [Flaring Emissions Tracking Report](#). September 2022.

² Norwegian Petroleum. [Emissions to Air](#). December 20, 2022.

Introduction

Flaring and venting of fossil gas usually occurs when the gas is produced as a by-product of oil extraction, or when it presents a safety problem to operations. As many oil-producing countries across the world have undeveloped gas markets, it may not be economical to invest in gas processing and distribution infrastructure. The associated gas has limited value and is disposed of in the most economical manner.

Most excess gas is flared, simply burned at the production facility. Flaring releases carbon dioxide, black soot, nitrous oxide, and other greenhouse gases. The rest of the gas, which is predominantly methane, is often vented or released directly, without burning, into the atmosphere. This can be much worse than flaring as methane is more than 80 times more powerful than carbon dioxide as a greenhouse gas when measured over a 20-year timeframe.³

There are several alternatives to flaring and venting, such as investing in the processing and transport infrastructure to market the excess gas (although this may not be economical or practical in all situations). Other alternatives are to use the gas for power generation at site or reinject it into the reservoir to provide artificial lift.

Apart from the environmental impacts, gas flaring and venting is a huge waste of money. Globally, some 143 billion cubic meters (bcm) were flared in 2021, roughly equivalent to the total volume of natural gas imported into Germany, France, and the Netherlands.⁴ At a price of \$10 per thousand British thermal units (Mbtu), this represents \$55 billion of lost sales revenue. According to the International Energy Agency (IEA), “reducing flaring and bringing this gas to market could offer relief to very tight gas markets and, in many cases, could do so faster than investing in new supply.”⁵



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To minimise the wasteful practice of flaring and venting, the World Bank in 2015 launched the Zero Routine Flaring (ZRF) by 2030 initiative, which involves both governments and oil companies. Collectively, they seek to use technology, regulation, and financial arrangements to reduce the practice and commit to reporting their flaring and their progress towards reduction.⁶ ZRF endorsers account for about 60 percent of total gas flaring and include 34 governments, including the main European offshore oil-producing nations of Denmark, the Netherlands, Norway, and the United Kingdom.

³ UN Environment Programme. [Oil and gas sector can bring quick climate win by tackling methane emissions](#). June 2019.

⁴ International Energy Agency. [Flaring Emissions Tracking Report](#). September 2022.

⁵ Ibid.

⁶ The World Bank. [About the “Zero Routine Flaring by 2030” Initiative](#).

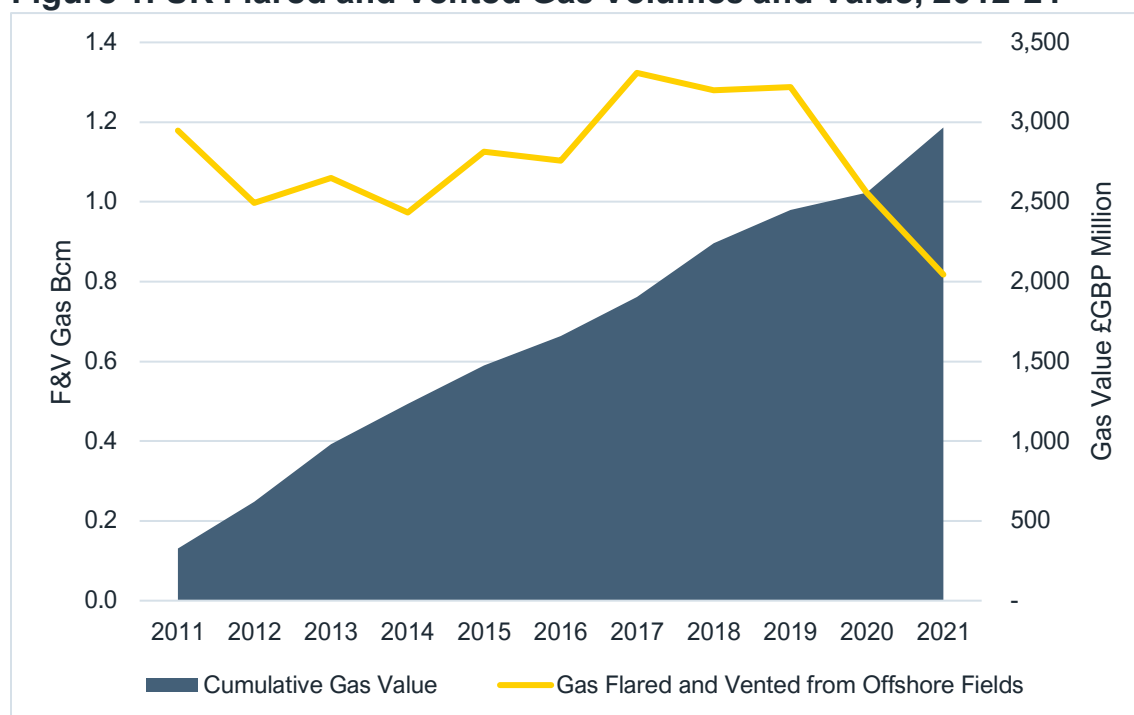
Flaring and Venting in the UK

The UK Continental Shelf (UKCS) has been producing both oil and gas since the late 1960s. While production is in decline, the basin still produces some 830,000 barrels of oil equivalent per day and 30 bcm of gas per annum.⁷

Despite the steady rise of European gas prices in 2021, UK fields flared and vented around 1 bcm.⁸ About 70 percent was flared from oil-producing fields and another 7 percent was vented. The remaining 22 percent was attributed to onshore oil and gas terminals.

In 2021, flared and vented gas equated to roughly 3 percent of UK gas production at a cost of more than £580 million from lost gas sales and UK Emissions Trading Scheme (ETS) payments. Over the past 10 years, the UK has wasted some 13 bcm of natural gas through this practice, releasing 45 million tonnes of CO₂ emissions into the atmosphere, exposing oil and gas operators to £1 billion of ETS payments and £2.6 billion in lost gas sales.⁹ (See Figure 1)

Figure 1: UK Flared and Vented Gas Volumes and Value, 2012-21



Source: *Digest of UK Energy Statistics, IEEFA analysis.*

⁷ North Sea Transition Authority. [Production and expenditure projections](#). August 2022.

⁸ Digest of UK Energy Statistics (DUKES). [Gas flared and vented by UK oil and gas fields and terminals](#). July 2022.

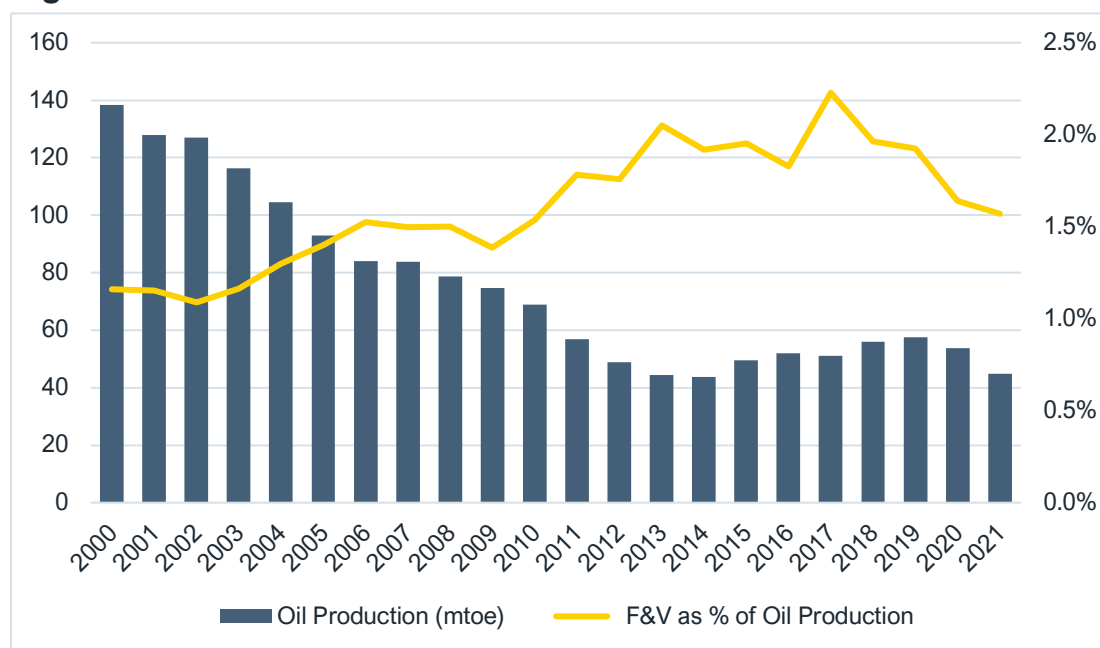
⁹ IEEFA analysis using historical gas and ETS prices from IHSMarkit and flaring and venting data from DUKES.

The North Sea Transition Authority (NSTA), the UK oil and gas regulator, recognises the environmental and economic cost and is targeting zero routine flaring and venting by 2030. This is in line with their World Bank ZRF obligations that stipulate all new oil and gas developments will have no routine flaring or venting. Additionally, in the interim, oil and gas companies should eliminate unnecessary or wasteful flaring and venting of gas.¹⁰ The regulator has been quick to act on companies that don't comply. In late 2022, NSTA fined two operators a total of £215,000 for exceeding their flaring permits.¹¹

As part of the NSTA's efforts to hold industry to account on emissions reduction targets agreed in the North Sea Transition Deal, the first annual Emissions Monitoring Report was published in October 2021. To supplement the report, the NSTA produced two interactive benchmarking dashboards, one of which tracks flaring and venting activity.

In a press release accompanying the 2021 data, the NSTA announced that offshore gas flaring had reduced by 19 percent year-over-year to a record low. This built on the 22 percent reduction witnessed the previous year, in part due to the fact that "the OGA's proactive approach supported and contributed to these reductions and reflects our sharpened focus on flaring and venting."^{12,13}

Figure 2: UK Flared and Vented Gas Vs. Oil Production 2015-21



Source: *Digest of UK Energy Statistics*, NSTA, IEEFA analysis.

¹⁰ NSTA. [Flaring and venting during the production phase](#). October 2016.

¹¹ NSTA. [Operators fined total of £265,000 as NSTA moves to enforce net zero and security of supply requirements](#). December 2022.

¹² The Oil & Gas Authority (OGA) was the previous name of the NSTA which changed in March 2022.

¹³ NSTA. [North Sea flaring cut by 19% last year, reaching record low](#). March 2022.

Since the World Bank ZRF initiative's instigation in 2015, the UK continued to increase its flaring and venting in the following two-year period by 18 percent, rising to 1.3 bcm by 2017. Flaring and venting volumes have reduced relative to historical levels only in the past two years, possibly representing only a temporary reprieve.

In the past two years, UKCS oil production has been affected by operational issues and the major overhaul of a key pipeline that led to a 22 percent reduction. Flaring and venting correlates to oil production; while NSTA have been quick to congratulate itself on reduced flaring and venting, the declines may correlate more with reductions in UKCS output than any new practices or approaches.

Norway's Approach Has Led to Significant Reductions in Flaring and Venting

Norway is one of the most progressive countries when it comes to environmental legislation. In 1991, it was one of the first countries to introduce a carbon tax for emissions related to oil and gas production.

The tax is levied on combustion of gas, oil and diesel from petroleum operations and their respective releases of CO₂. For 2023, the tax for combustion of natural gas is NOK 761 (£62.75) per tonne of CO₂. For emissions of natural gas to air, or that vented, the rate is NOK 13.67 (£1.13) per standard cubic meter.¹⁴

In 2008, Norway joined the EU Emissions Trading System (ETS), which applies the same rules for emissions trading as those countries within the EU. In effect, there are two carbon taxes applied to emissions on the Norwegian Continental Shelf (NCS). When the taxes are combined, companies pay around NOK 1100 (£90.70) per tonne for their CO₂ emissions.

Over the last 30 years, Norway has been proactive in introducing legislation and economic incentives to eradicate routine flaring and venting. The legislation has had a clear impact on reduced flaring and associated emissions from production activities. While flaring continues on the NCS, it is for emergency use only and the country has effectively eradicated routine flaring.

The differences in activity between the UK and Norway are stark. In 2021, the UK produced around half the oil of Norway's 1.8 million barrels of oil equivalent (mboe)/day, yet flared more than five times as much natural gas.¹⁵ About 60 percent of this flaring was "routine" and could be eradicated. Another statistic concerns the contribution to offshore emissions: In the UK, flaring accounts for 25 percent of total greenhouse gas emissions from offshore operations while in Norway it is only 5 percent, despite the higher production.¹⁶

¹⁴ Norwegian Petroleum, [Emissions to Air](#). December 2022.

¹⁵ The World Bank. [Global Flaring and Venting Regulations](#). September 2021.

¹⁶ NSTA. [UKCS Flaring and Venting 2020 Report](#).

Is NSTA Doing Enough?

Arguably not. Despite the rhetoric coming from the Emissions Monitoring Report, it could be argued that flaring and venting activity is showing few signs of reduction, other than that due to production decline. Although there is a clear message to companies operating in the UKCS that routine flaring and venting should be minimised—the NSTA is monitoring activity and will fine firms not complying—the impact has been muted thus far.

Other North Sea countries have similar legislation that seeks to prevent the unnecessary flaring of natural gas, but this alone is not enough to reverse trends and behaviours.

An analysis of Danish flaring relative to Norway completed by Energy Watch highlights that while Norway's CO₂ emissions from flared gas have reduced by 35 percent between 2009 and 2018, Danish activity has increased by 144 percent despite similar legislation and monitoring across the North Sea.¹⁷ We would argue that additional economic incentives would support the reduction of this wasteful and environmentally damaging practice.



“Norway’s carbon tax has had a large impact on making flaring and venting reductions lucrative.”

Perhaps the importance of additional economic incentives in Norway was best summed up by Anders Opedal, president and CEO of the Norwegian national oil company Equinor, in 2020: “Norway's carbon tax has had a large impact on making flaring reductions lucrative. It pays from a purely economic perspective.”¹⁸

¹⁷ Energy Watch. [Equinor: Norway's carbon tax has cut flaring](#). February 10, 2020.

¹⁸ Ibid.

Conclusion

Routine flaring and venting present a major environmental issue and waste of resources that governments and other stakeholders could do more to prevent. Flaring and venting volumes remain significant in the UK, despite the country's endorsement of the World Bank's ZRF initiative, and NSTA clear guidance and monitoring.

Evidence from Norway shows the introduction of additional taxes for CO₂ emissions can lead to significantly lower volumes of wasted gas resources. We would argue that by applying additional financial penalties to flaring and venting activity, the UK regulator could provide a clear financial incentive for oil and gas operators in the UKCS to further reduce the practice. We urge the North Sea Transition Authority to consider introducing additional penalties for flaring and venting emissions to reduce wasteful emissions and increase the overall efficiency of UKCS production.

About IEEFA

The Institute for Energy Economics and Financial Analysis (IEEFA) examines issues related to energy markets, trends and policies. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy. www.ieefa.org

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