EMISSIONS REPORT 2023



The emissions performance of the UK offshore oil and gas industry







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Foreword

Michael Tholen Sustainability Director, Offshore Energies UK



This report provides an update of the UK oil and gas industry's efforts to reduce greenhouse gas (GHG) emissions – mainly carbon dioxide (CO_2) and methane (CH_4) – from its oil and gas production. This is a key part of the North Sea Transition Deal (NSTD)¹.

The NSTD is a transformative partnership between the UK government and the offshore oil and gas sector. It is the first deal of its kind for a G7 country, and a striking example of the UK showing global leadership in regard to climate change.

The NSTD will harness the power of the offshore oil and gas industry to help the UK meet its net-zero targets by 2050 – and to do so affordably and at pace. The NSTD addresses the challenge of decarbonising oil and gas supply, while also ensuring the transition to a lower carbon economy benefits the UK economy.

The outcomes are already impressive: greenhouse gas emissions in 2022 were down by more than 24% on the 2018 base year (outperforming UK overall performance),

which provides more evidence of steady progress towards industry targets for 2025 (10% reduction) and 2027 (25% reduction). Over the same period, $\mathrm{CH_4}$ emissions fell 45%.

The industry is committed to meeting the 50% emissions reduction target for 2030 and delivering net zero by 2050. So far, operational efficiency, process optimisation and the decommissioning of older assets have done most of the heavy lifting.

The industry focus is now turning to capital intensive projects to deliver the targets for 2030.

Collective action is required to unlock investment in highly complex projects such as the electrification of production facilities and other approaches that are new to the UK. Industry cannot do this alone.

The government and the regulators need to enable grid access for electrification projects before 2030 and streamline consenting to help industry meet decarbonisation targets in a timely manner.

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¹ North Sea Transition Deal - GOV.UK (www.gov.uk)

Electricity market reform should not only support new renewable energy projects but also facilitate the timely electrification of existing assets.

The industry recognises it has a key role to play in helping the UK tackle the energy trilemma: reduce emissions and energy costs while securing energy supply.

In the best-case scenario, the UK can produce half of the oil and gas it needs throughout the transition from indigenous resources. However, this will not happen unless the government, industry and regulators work together to support further investment in the basin to reduce its dependency on imports. UK production with an emissions intensity that is lower than the global average benefits the environment, as it displaces production from elsewhere that come with a larger carbon footprint. That makes it easier for the operator to further invest in decarbonisation, triggering a virtuous circle.

Investing more in the basin will enable the offshore supply chain to diversify faster into

renewable energy. Local content in renewable production will grow, to the benefit of the national economy. Decarbonising offshore operations can also bring benefits - it is for instance estimated that via the Innovative and Target Oil and Gas (INTOG) round, electrification projects can unlock up to 5.5 GW of floating wind. This alone would meet the government's 2030 target.

With energy prices remaining high, a busy, low-carbon UK continental shelf (UKCS), as set out in the NSTD commitments, can be critical for the UK economy. The UK offshore is proceeding at pace to meet this challenge but the government needs to take further action on electricity grid access, regulatory streamlining and new business models which encourage investment in renewables and offshore power generation alongside conventional oil and gas operations.

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Key facts - UK emissions performance

2022 Overall emissions performance

GHG 24% reduction

Overall GHG emissions are down 24% on 2018 (the base year) saving around 10 million tonnes (Mt) CO₂e to date. Emissions intensity has improved despite the maturity of the basin – 19.5kg CO₂/boe while production has been steady.

50% reduction

Flaring and venting halved since 2018.

2022 Methane emissions performance

45% reduction

45% reduction since 2018.

Impact of flaring and venting reductions on methane emissions has been significant.

0.15% Methane Intensity

Methane intensity of 0.15% is already below the 2025 target of 0.2% required by the industry's Methane Action Plan.



In 2024, the baseline will be reviewed based on latest installed metering technology.

Emissions targets

met targets

3
years
early

Industry has met the 2025 target three years early, even with new production coming online.



Incremental efforts are needed to deliver the 2027 (25% reduction) target, taking new production into account. Major
investments
will need to be
undertaken to meet
the 2030 (50%
reduction) targets.
These include the
electrification of
long-life assets,
major changes
to operations
and embracing
low carbon
technologies.



Continued investment in renewing and upgrading offshore production alongside new investments is the optimum scenario to beat these long-term targets.

Policy priorities to deliver decarbonisation

The UK Emissions Trading Scheme must support progressive decarbonisation and avoid premature cessation of production. The volatility of the UK ETS scheme has made it all the harder to plan long term investments.

Decarbonisation must be approached holistically, with clear accountabilities for the industry, regulators and government. This will require regulatory alignment between the NSTA and OPRED and other regulators including Ofgem and the National Grid Electricity System Operator (ESO) and industry to ensure that decarbonisation of offshore assets is timely, consistent with delivery of the targets of the NSTD and reflects the wider business environment.

Ensure the UK's oil and gas facilities are seen as part of a wider, integrated energy system. The remit of the Future System Operator (FSO) needs to adopt a "wholesystem approach" which is aligned with other regulators' remits. Infrastructure development needs to make the most of the UK's energy resources both on and offshore to support the growth of the economy.

Create an environment where the UK is again an attractive destination for investment in offshore energy: the Energy Profits Levy casts a shadow on investment and makes it much harder to secure long-term investments in the production assets and infrastructure needed to electrify offshore operations. Decarbonisation mechanisms, now seen as part of the fiscal regime, play a vital role in facilitating investment across the energy sector but they are expensive.

Collective action is needed:

Electrification of North Sea platforms is important if the NSTD targets are to be met. It is estimated that INTOG (Innovative and Target Oil and Gas) could unlock up to 5.5 GW of floating wind. This will require timely grid connections and tailored contracts for differences (CfD) to accommodate application from INTOG developments including applicants for AR6.

Halve wind project turnaround time to support electrification (reduce consenting time, accelerate grid deployment and queue reform so that whoever is readiest first moves to the top of the queue as per the Winser report).²

² Electricity Networks Commissioner letter to Secretary of State for Energy Security and Net Zero (publishing.service.gov.uk)



Progress against objectives: overview

Greenhouse gas emissions for the whole of the UK economy for 2022 were 417 Mt CO₂e,³ to which the offshore oil and gas sector contributed 3.4%. This was also the case in 2021, when it emitted 14.9 Mt CO₂e. Since 2018, the sector's emissions have fallen faster than in the rest of the UK and 2022 was the third consecutive year in which industry has reduced emissions.

The total emissions reported include those from beach terminals as well as offshore sources: production installations, mobile offshore drilling units, support vessels of all types and helicopter flights.

Further information regarding the methodology used to quantify the emissions from each of these is available in the Appendix.

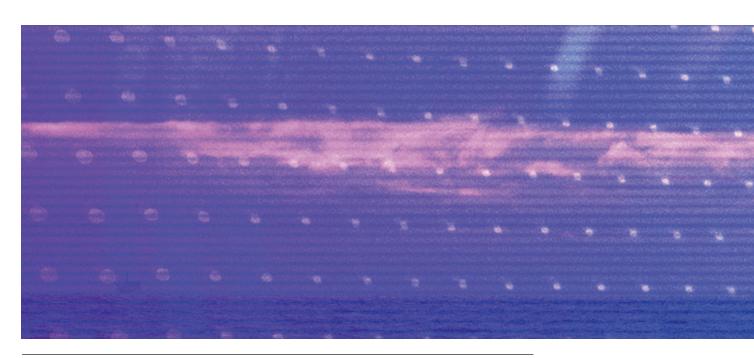
Overall, emissions in 2022 are down by 24%, falling from 18.8 Mt $\rm CO_2e$ in 2018 to 14.3 Mt $\rm CO_2e$. Even with ongoing developments, the industry is beating the NSTD goal for 2025 and is on track to meet the 2027 goal of 25%, which is halfway to the 2030 target.

It can be seen that the scale of the interventions needed to reduce emissions becomes ever more demanding as time goes on. The rate has slowed to about a 4% improvement year on year, but this is still good performance, particularly considering that a year ago emissions had been expected to remain flat.

Now the focus is more on step-change projects of which the electrification of offshore production facilities is the most impactful. For the most part, electrification will either entail connecting a cluster of fields directly to the onshore national grid; or to grid-linked windfarms as part of a bolder electrification network.

There are also scenarios where individual wind turbines supply intermittent power to an installation, though this will more likely require firm power remains fully operational on the platform as back-up.

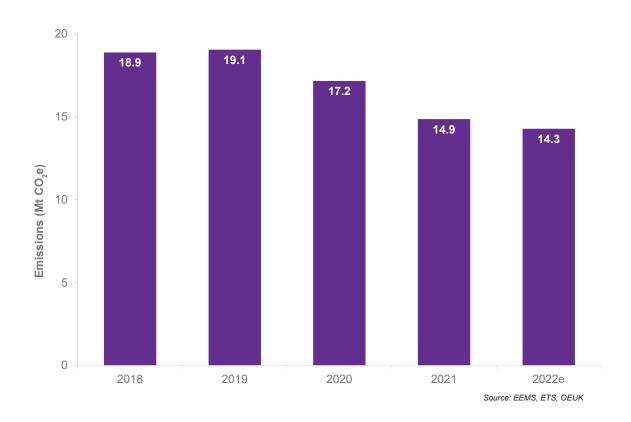
Operators are also exploring the application of renewable bioliquids and hydrogen carriers such as methanol that could be used as substitutes for diesel or even fuel gas. However, these capital projects will typically take several years to deliver, even assuming they are approved given the uncertain investment environment.

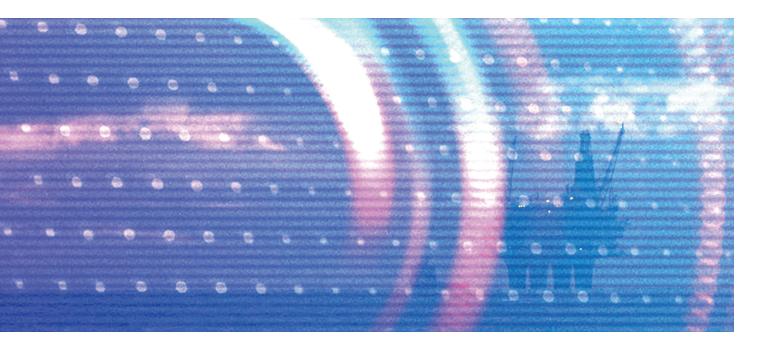


³ DESNZ 2022 UK greenhouse gas emissions, Provisional figures. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1147372/2022 Provisional emissions statistics report.pdf



Figure 1: Total emissions (Mt CO₂e)





Assessment of 2022 emissions

Emissions reduction has outperformed "business as usual" expectations since the NSTD was agreed. Last year's report predicted that absolute emissions were likely to rise in light of the return to pre-pandemic activity and production levels.

This predicted increase failed to materialise. In fact, GHG emissions fell again last year by almost 4%, down to an estimated 14.3 Mt CO₂e (see graph below).

This represents significant progress towards the NSTD emissions reduction expectation of 25% by 2027.

Emissions from production installations have been the biggest driver of change to date, but there are opportunities remaining in logistics and aviation, particularly with the introduction of alternative fuels such as sustainable aviation fuels, and the expected changes in the UK ETS that will not only incentivise more companies to move ahead with emission reductions but will also improve the quality of monitoring and reporting.

Emissions fell from 14.7 Mt CO₂e to 10.5 Mt CO₂e in 2022, on the basis of EEMS data (10.7 Mt CO₂e including ETS).

Operators had been reporting environmental data to OPRED's environmental and emissions monitoring system (EEMS), including atmospheric emissions, for many years before it was required. One consequence of this is that the categories of reporting, which were intended to clarify the

sources of emissions, are not always aligned with those defined in the latest regulations.

OEUK continues to encourage the review of EEMS so that it aligns with the World Bank's definitions of flaring and that the conversion factors it uses are based on the latest understanding. Aviation and logistics emissions are simpler and they are quantified using fuel use and activity data respectively.

Analysis of EEMS' reporting categories for tracking emissions reductions by source shows that cleaner power generation and less flaring have been the main causes of the drop in emissions.

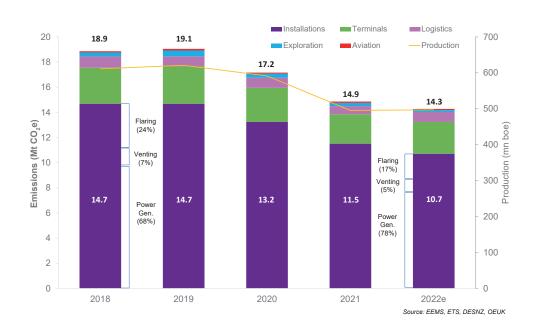
Emissions from flaring and venting have fallen by around 2.3 Mt CO₂e, from 4.6 Mt CO₂e since 2018. This halving in flaring and venting includes only 0.2 Mt CO₂e from assets taken offline.

The operators' focus on improving flaring and venting comes from installation modifications, supported by a cultural change that is placing emissions performance alongside the safety imperative as the driving factors that guide companies' operating ethos.

Regulatory scrutiny of flare and vent consents is amplifying this effort, ensuring levels are as low as reasonable in the circumstances and that there is no conflict with the requirements imposed by other atmospherics regulations such as Pollution Prevention and Control (PPC).

Although half of the decrease in previous years

Figure 2: Total emissions by source (Mt CO₂e)



can be attributed to less output and installations ceasing production, in 2022 operational efficiencies improved further, with some installations even delivering an absolute decrease in emissions while their production of oil and gas

went up. Analysis shows that more than half of the reduction in emissions seen since 2018 is attributable to active reduction measures rather than decommissioning.

Figure 3: Installation emissions reduction by source (Mt CO₂e)

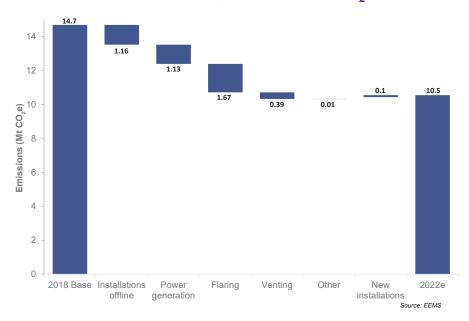
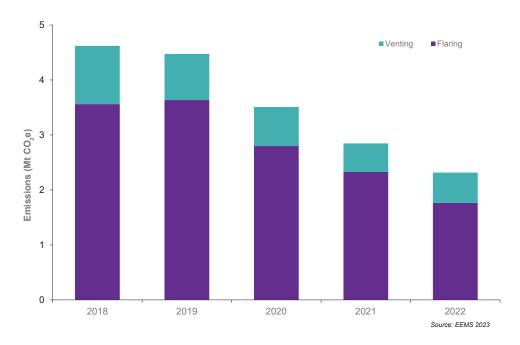


Figure 4: Installation flaring and venting emissions (Mt CO₂e)





Carbon intensity

The carbon intensity of produced oil and gas – which measures total emissions per unit of oil and gas production – has become even more relevant in recent years.

The "import gap" between the oil and gas the UK can produce domestically and its overall energy demand, is a reality that must be faced. Even as renewables such as offshore wind and solar are contributing more and the energy system is rebalanced towards low carbon power, oil and gas remain critical.

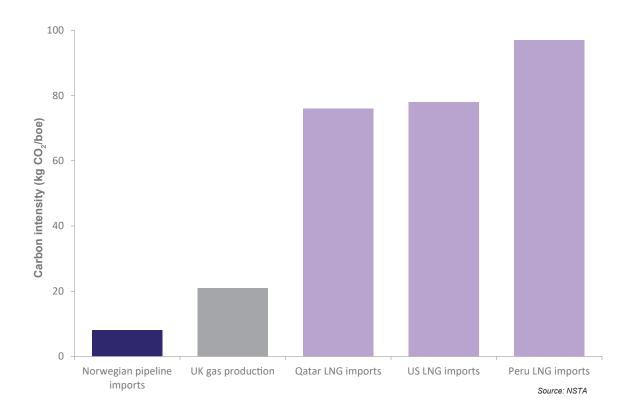
The carbon intensity of domestic production is typically less than tenth of those associated with the refining and use of oil and gas as a fuel. The emissions from combustion of oil products and gas are pretty much the same regardless of source, and will only drop when the demand is reduced, or the way in which oil and gas are used changes.

It will take time and considerable investment to replace gas in the UK energy system, both because of the very high penetration of gas in the domestic sector and because it is used so much as a back-up for electricity generation.

Here the use of carbon capture and storage will have a key role in power generation. Gas also has a key role to play in many industries such as steel, cement, petrochemicals and fertilisers.

But gas demand for households should drop depending on the pace of roll out of heat pumps, hydrogen blending and other factors.

Figure 5: UK carbon intensity compared with top four gas import sources, 2022 (kg CO₂/boe)





Oil and gas sector expertise is helping to decarbonise many industrial and domestic processes through investment in carbon capture and storage which will produce a lot of blue hydrogen.

However, to change the world economy from an oil and gas-based system to a low carbon system will take time, and careful planning, and both are in short supply.

The risk that the present resilience of the energy system and its flexibility will be lost is real. Both demand-side and supply-side measures will still be needed.

UK domestic production had a carbon intensity of 19.5 kg/boe in 2022, down from 20.4 kg/boe in 2021. In a mature basin, carbon intensity is likely to go up as recovering the remaining barrels becomes more challenging. So, any decrease is a significant step in the right direction.

Figure 5 (see below) shows the comparative emissions intensity of domestic gas production against the top four sources of imported gas in 2022: in order of magnitude, piped Norwegian gas, followed by LNG from the US, Qatar and Peru.⁴



⁴ DUKES Table 4.5



Methane reduction progress

Anthropogenic methane is the second biggest source of greenhouse gas emissions. It is 86 times more potent than CO₂ over 20 years and 34 times more potent over 100 years (see Appendix for global warming conversion factors).

But having a shorter atmospheric lifespan than CO₂ means that reducing methane emissions can have an immediate impact on the global temperature increase, provided that the reductions are sustained. Recognising this, industry has been focused on reducing methane emissions in recent years.

As part of a voluntary industry initiative, the Oil and Gas Methane Partnership (OGMP), participating operators validate, quantify and report methane emissions in line with international standards and reporting principles. Building on these "best practice" voluntary schemes, in 2021 OEUK published the Methane Action Plan⁵, a key deliverable under the NSTD, which included commitments to halve methane emissions by 2030, support asset-specific methane action plans, and meet the World Bank's 'Zero Routine Flaring by 2030' initiative.

Needless to say, compliance should be accelerated where possible. It also committed to meeting a methane intensity target for the basin of 0.2%, based on the Oil and Gas Climate Initiative methodology. OEUK also supports the Methane Guiding Principles programme, committing to five key goals:

- i. Continually reduce methane emissions.
- ii. Advance strong performance across the gas supply chain.
- iii. Improve accuracy of methane emissions data.
- iv. Advocate sound policy and regulations on methane emissions; and
- v. Increase transparency.6

With CO₂, the opportunities for emissions reduction range from marginal energy efficiency improvements all the way to capital projects such as platform electrification or gas reinjection modifications. Flare and vent systems are safety-critical elements of installation design, so any modifications need to be carefully planned and

scheduled for periods when the installation is not producing, such as summer turnaround periods. It is a similar case with methane emission reductions: where an economically viable export route is in place, this can also add to the bottom line, increasing the produced gas available for sale to market and reducing the cost of implementing the installation modifications required. However, such routes are not always available, and industry faces a significant challenge in meeting the 2030 methane targets.

As can be seen from Figure 6 below, methane emissions have improved significantly since 2018, demonstrating the industry's commitment. In absolute terms, they have fallen by more than 23,000 tonnes (nearly 0.8 Mt $\rm CO_2e$) since 2018. This 45% reduction is significant progress towards the 2030 target.

The UK industry has also committed to meeting the OGCI methane intensity target of 0.2% by 2025. NSTA monitors this metric, which represents emissions as a proportion of gas to market and it estimates that in 2022 the UKCS was ahead of this target, at 0.15%.

As the graph shows, flaring and venting remain the key contributors to methane emissions on offshore installations, accounting for 80%.

Methane quantification remains a challenge for industry. Although elements of production will be metered (for example, fuel gas, export gas and flare gas), the actual proportion of methane emitted can often only be understood by a combination of measurement and calculation. The amount of methane emitted via "methane slip" – the incomplete combustion of gas, for example from a flare or a turbine – depends on system efficiency, which is usually based on the original equipment maker's data or average values rather than *in situ* measurement – although the volume of gas itself will be measured, as will the average ratio of its constituent impurities.

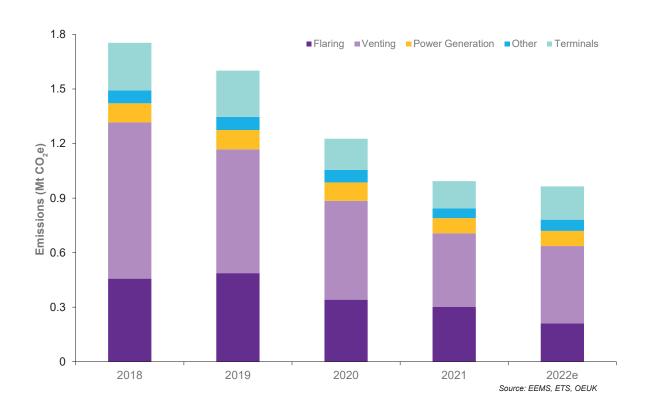
Improvements in technology, including satellite and drone-mounted measurement and computer modelling, shed light on, and allow more accurate measuring of, an installation's methane emissions. This knowledge allows operators to identify appropriate solutions and act where it will make the most difference.

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⁵ https://oeuk.org.uk/product/methane-action-plan-2021/

⁶ https://ogmpartnership.com/

Figure 6: Methane emissions sources (Mt CO₂e)



UK emissions regulation and trade

Greenhouse gas emissions from the offshore oil and gas sector in the UKCS are strictly regulated. The key regulatory control is the UK ETS, a market way of pricing carbon that replaced the EU ETS when the UK left the European Union. The following section describes in more detail the current functioning of the scheme and explores the changes expected in the next few years.

Other regulatory controls relating to atmospheric emissions include the regulations on environmental impact assessments, including a proposed project's atmospheric emissions, before consent is granted.

Annual flare and venting consents must be received from the NSTA beforehand and fines have been issued for non-compliance with this regulation. The NSTA reviews these applications to ensure that emissions are at the lowest possible

levels in the circumstances. Energy efficiency requirements in other legislation such as the Offshore Combustion Installations (Pollution Prevention and Control) Regulations 2013 (as amended), and the Energy Savings Opportunity Scheme have an indirect effect on reducing greenhouse gases.

UK Emissions Trading Scheme

Carbon pricing has proved an effective mechanism for cutting emissions across specified sectors of the economy, which include offshore oil and gas. It provides a market price that enables and supports decisions on decarbonisation investments, a signal that will grow louder as the emissions certificates become more expensive.



The price of carbon in the UK in 2022 continued to exceed the EU scheme, hitting a peak of over £90/tonne, before dropping substantially below the EU price in 2023 (see Figure 7). The volatility of the carbon price is not helpful as it sends mixed signals. Stability fosters confidence in investment in decarbonisation; volatility increases the risk.

For those sectors included in the UK ETS, the predicted price of carbon is included in evaluations of commercial activity, and directly influences the economic viability of future projects.

The government has said it will consult on changes to the market mechanism controlling the allocation of free allowances and reduce the overall allowance pool before the end of 2023, which will probably mean higher prices, all else being equal.

In 2022 the government consulted on wideranging changes to the ETS and has recently indicated its intention to widen the scope of the scheme to sectors that are now outside it, and to expand the sources and types of GHG.

Changes impacting offshore installations include the extension of the scheme to include CO₂ stripped from produced hydrocarbons and vented offshore. In the current scheme, only CO₂ from combustion is included, so this change will require additional monitoring, reporting and verification activity as well as the surrender of additional allowances for those installations affected. This

change is expected to be implemented in 2025 and apply to installations which vent more than 1,000 tonnes of stripped CO₂.

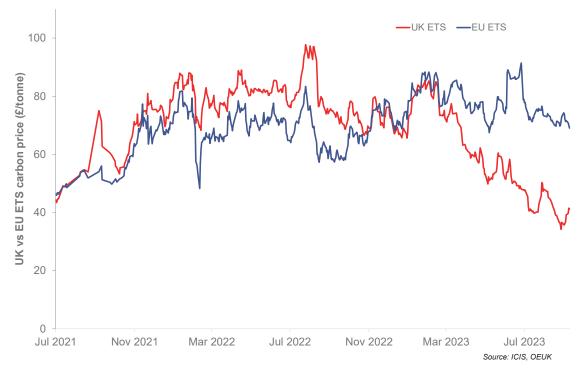
A further consideration of the methods used to allocate free allowances to ETS installations will include a review of those related to gas flaring, to ensure that all policies and regulations align with the UK's goals on emission reduction.

The government also intends to widen the scope of UK ETS to include shipping, much of which is related to offshore energy. Construction and diving support vessels, seismic and remotely operated vehicles all support offshore energy installations in the UKCS and many of these are likely to exceed the suggested threshold vessel size of 5,000 gross tonnage. These could be included in the ETS after 2026.

Pending further consultation, there is also a proposal to include nitrous oxide (N₂O) emissions from offshore installations in the UK ETS. Although in other industrial sectors N₂O may be emitted from various processes, offshore installations mainly produce it during fuel combustion, alongside CO₂ that is already priced. Given the close correlation between the two, the sector is already actively targeting the key environmental factors.

One of the biggest changes to ETS proposed for offshore installations is the inclusion of methane emissions, necessitating an overhaul of the monitoring, verification and reporting

Figure 7: EU vs UK ETS historic prices (£/tonne)





(MVR) requirements for installation operators, as well increasing the economic cost of emissions. Further consultation on this is also expected in the year ahead before any final decisions are made.

While companies are already focusing on managing methane emissions, direct measurement is not always practicable.

OEUK will work with regulators and members to ensure that any measures arising from these consultations are aligned with existing industry commitments under the NSTD, and initiatives such as OGMP and Zero Routine Flaring.

Role of carbon markets in decarbonisation

Policy alignment on net-zero goals is critical for all stakeholders, and OEUK will continue to seek proportionate and focused atmospherics regulations that encourage further emissions reductions.

The total value of carbon markets continues to grow as mandatory, regional, voluntary and international regimes extend to carbon allowances.

OEUK sees the markets continuing to grow at scale over the coming years as implementing governments' strategic intentions become more urgent.

Key requirements

i. Liquidity and depth

Carbon markets are fundamental to achieving net zero targets and governments should consider ways to make them more tradeable, including the relinking of UK and EU emission trading schemes post-Brexit. The advantages of linkage are clear in terms of liquidity, price discovery and the ability to attract abatement technology from across Europe rather than just the UK. It would also create a level playing field in terms of carbon pricing, avoiding competitive distortions, and leading to aligned cost implications for industry across the UK and the European Economic Area.

ii. Robust carbon border adjustment mechanism and carbon leakage policy

Decarbonisation should not be achieved by deindustrialisation and the subsequent offshoring of emissions and vital, well-paid jobs to other regions with weaker health, safety and environmental regulations. The growing carbon leakage risk associated with manufacturing sectors is of concern: steel manufacturing and cement will rely heavily on new energies, and this could have consequences on the wider value chain and consumer.

Carbon border adjustment mechanisms (CBAM) and carbon leakage policies are highly complex instruments, with numerous design elements that impact their overall effectiveness in addressing carbon leakage risks, as well as their legal and political viability in global trade agreements.

The European Union's WTO-compliant CBAM took off October 1, although its first phase is very much a "soft landing" as the bloc will take a couple of years experimenting with the different measurement methodologies and so on.

iii. An energy strategy conducive to low carbon technology

To encourage investors to support decarbonisation techniques, including the voluntary market, clear long-term strategies will be fundamental. This will in turn ensure growth across the sector.





Reaching net zero: scenarios

Industry has set up ambitious targets to reach net zero in 2050 (*Table 1*). OEUK has developed a number of scenarios to determine what is required to meet those targets, two of which are presented below.

The scenarios only consider emissions from offshore installations and assumed that other emissions (terminals and logistics. etc) will decline at the same rate as the installations' own emissions.

Please note that these scenarios have been modelled in light of existing policy and the current political environment. As always with scenarios, these are not predictions, but plausible outcomes based on a range of different circumstances.

Scenarios:

1) NSTD Strategy

A full-scale investment scenario sees all unsanctioned production coming online; equally, full abatement options are triggered, and all large-scale investments proceed as planned.

2)Accelerated Energy Decline:

Sanctioned developments come online. But it is assumed that these investments, and production online today, will be the final development activities on UKCS. Abatement projects that have been triggered do progress to development, but no new abatement takes place.

These scenarios, which OEUK has formerly termed 'Sunset' and 'Clear Blue Sky' respectively, are tested against the targets within the NSTD to assess our ability to meet them under such circumstances.

Table 1: Sector reduction targets to 2050

Sector reduction target	2025	2027	2030	2040	2050
NSTD targets*	-10%	-25%	-50%	-90%	NZ
Methane Action Plan – Methane targets	Methane intensity below 0.2%		-50%		NZ

^{*} Reduction from 2018 baseline

Scenario outcomes

Conclusion: Under either scenario the NSTD target for 2025 will be met. The 2027 target of a 25% cut is also likely to be delivered with additional operator improvements, while working towards eliminating routine flaring and venting for non-safety related reasons by 2030.

In all scenarios, large-scale investment, such as platform electrification, is required to make the 2030 target safe.

Those investments require support from regulators and government as outlined elsewhere in this report.

Prompt action is essential if the full abatement potential is to be achieved. Since last years' report, new projects have been added to the baseline and the cessation of production date has increased more than a year on average per installation.

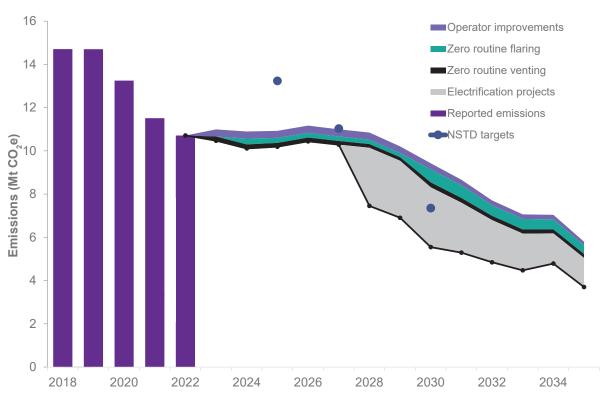
NSTD Strategy

All abatement measures and options are brought into play. Sustained investment allows operators to produce at maximum with significant capital projects. Inessential maintenance is prioritised, as is cutting flaring, venting and lowering emissions from plant start-ups and process upsets.

Revenues can cover capital investment for abatement projects and new production comes online from new installations running at their maximum efficiency.

Under this scenario, the NSTD targets are amply met and energy security is improved, with around 50% of oil and gas demand continuing to be met by UK production, the other half of a diminishing volume still being imported. It is the best scenario for overall emissions as the UK relies less on imports, while keeping on reducing emissions intensity over this decade.

Figure 8: NSTD Strategy



Source: EEMS, ETS, OEUK

Accelerated Energy Decline

This scenario reflects the consequences of doing only what has been committed to. No further investment in oil and gas production proceeds and only production that has been sanctioned goes ahead.

Equally, as opportunities for new production stagnate, investment in abatement projects is curtailed with only the already-activated improvements continuing.

Under this scenario, the UK becomes even more reliant on imports, so global emissions are higher and the 2030 target is seen to be at risk. Energy security is sacrificed and imports equivalent to 80% of oil and gas demand are needed in the early 2030s.

Supply chain capacity is reduced before wider decarbonisation and renewable energy can be sanctioned, delaying the deployment of renewable energy.

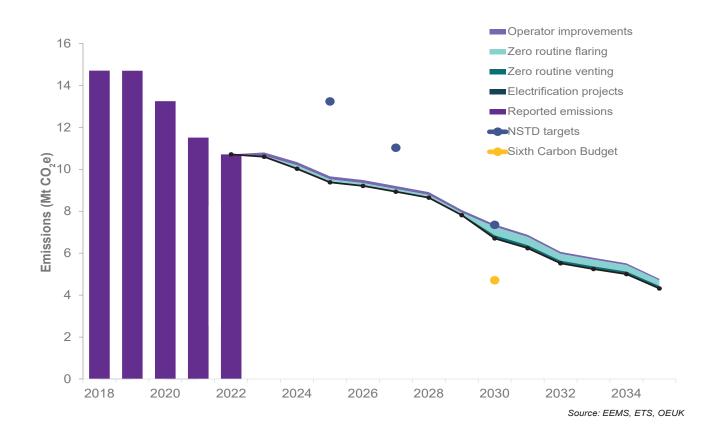
The NSTD Strategy recovers 1.5 billion boe more than the alternative – and with lower emissions per barrel – than those likely to be imported in their place. This is equivalent to around 18 months of UK oil and gas demand at current levels.

The UK is producing only around half its demand. The marginal barrels needed to meet UK demand are generally having a much higher carbon intensity than the domestic production has, so, low investment in UK production means a higher overall footprint.

In gas, the marginal import is from LNG which has an average carbon footprint four times higher than UK production.

OEUK estimates that with low investment in the UKCS, emissions from supply will go up by 50 Mt $\rm CO_2e$ more between now and 2050, thanks to increased dependence on LNG imports.

Figure 9: Accelerated Energy Decline (Mt CO₂e)



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Figure 10: Comparison of production with demand under the two scenarios (Mboe)

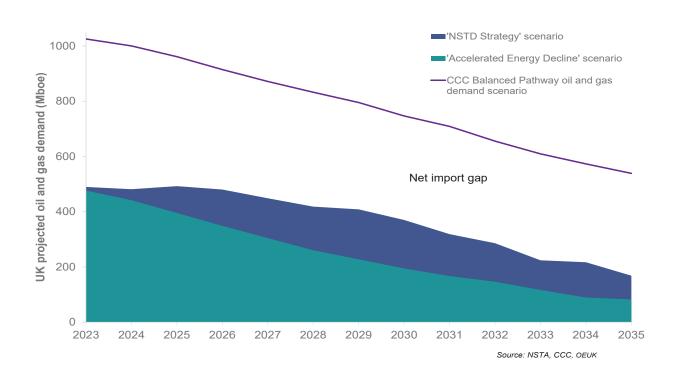
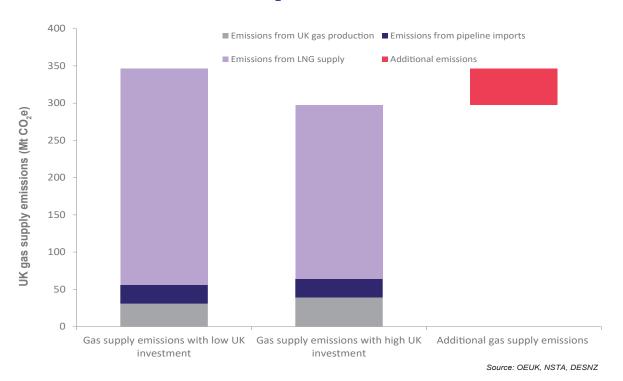


Figure 11: UK gas supply emissions (Mt CO₂e)



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Appendix

Reporting historic emissions: methodology

The below methodology sets out OEUK's preferred method for gathering and collating data which encompasses the totality of GHG emissions from the upstream oil and gas sector. It includes offshore oil and gas installations, onshore terminals processing oil and gas, offshore shipping supporting UK oil and gas production (logistics and drilling rigs) and aviation (helicopter journeys).

The targets cover the full scope of GHGs: CO₂, CH₄, N₂O, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride gases (HFCs, PFCs and SF₆ respectively).

For the purposes of evaluating the upstream oil and gas production industry as an entity, OEUK has broadly used the definition outlined in the International Petroleum Industry Environmental Conservation Association's petroleum industry

guidelines for reporting GHG emissions. Scope 1 emissions are defined in the previous paragraph.

At present verified measured and monitored CO₂ emissions exist for ETS-regulated installations only and are partly available for aviation flights.

OEUK continues to work with stakeholders to agree metrics for emissions reporting.

But in order to make comparisons meaningful, this year sees industry's emissions move to IPCC AR 5 with carbon feedback applying a 100-year time horizon⁶ using 34 tonnes CO₂e corresponding to 1 tonne CH₄; and 298 tonnes CO₂e corresponding to 1 tonne N₂O as the standard.

As HFCs, ²PFCs and SF₆ produce negligible emissions, data is limited. Accordingly, estimates have been applied for these, based on discussions with OEUK member companies and external stakeholders.

Table 2: Global warming potentials and conversions

Global warming potential

Assessment Report	Greenhouse gas	20-year	100-year
	CO ₂	1	1
IPCC AR 46	CH ₄	72	25
	N ₂ O	289	298
	CO ₂	1	1
IPCC AR 57	CH ₄	84	28
	N ₂ O	264	265
	CO ₂	1	1
AR 5 with carbon feedback	CH ₄	86	34
	N ₂ O	268	298

⁷ https://www.ipcc.ch/report/ar5/syr/

https://archive.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html

https://www.ipcc.ch/assessment-report/ar5/



Table 3: Sources and nature of emissions

	UK ETS	EEMS	National inventory	NAEI	Stakeholder estimates
Installations		CO ₂ supplemented.			HFC
	CO ₂ (verified)	CH₄			PFC
		N ₂ O			SF ₆
Terminals		_	CO ₂		HFC
			CH ₄		PFC
			N ₂ O		SF ₆
Logistics				CO ₂	HFC
				CH ₄	PFC
				N ₂ O	SF ₆
Exploration		CO ₂			HFC
		CH ₄			PFC
		N ₂ O			SF ₆
					CO ₂
Aviation					CH ₄
					N ₂ O
					HFC
					PFC
					SF ₆



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