OGUK

UK UPSTREAM OIL AND GAS SECTOR

Methane Action Plan 2021

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UK UPSTREAM OIL AND GAS SECTOR

Methane Action Plan 2021

Contents

1. Introducing the Methane Action Plan

In 2019, the UK became the first of the major G7 economies to commit to achieving a "net-zero" economy by 2050. This outcome is wholly supported by the UK's oil and gas industry, which has sought to be a leader in this field since the formulation of Roadmap 2035.[1] The sector has since agreed demanding targets for emissions reduction as part of the North Sea Transition Deal (NSTD).[2] These targets will lead to a halving of the sector's total greenhouse gas emissions (including methane) by 2030 and achieve a 90 per cent reduction by 2040, relative to a 2018 baseline. The Methane Action Plan (MAP) is one of the key deliverables of the North Sea Transition Deal agreed with the UK Government and announced in March 2021.

This document highlights the actions the industry will take now to cut methane emissions on the UK Continental Shelf (UKCS) and show wider leadership as to what can be achieved, even in a mature basin. Through the MAP, the industry is committed to achieve these outcomes with full transparency on actual emissions performance. Where there are continued uncertainties, these are acknowledged and addressed as part of validating the baseline and in setting meaningful targets.

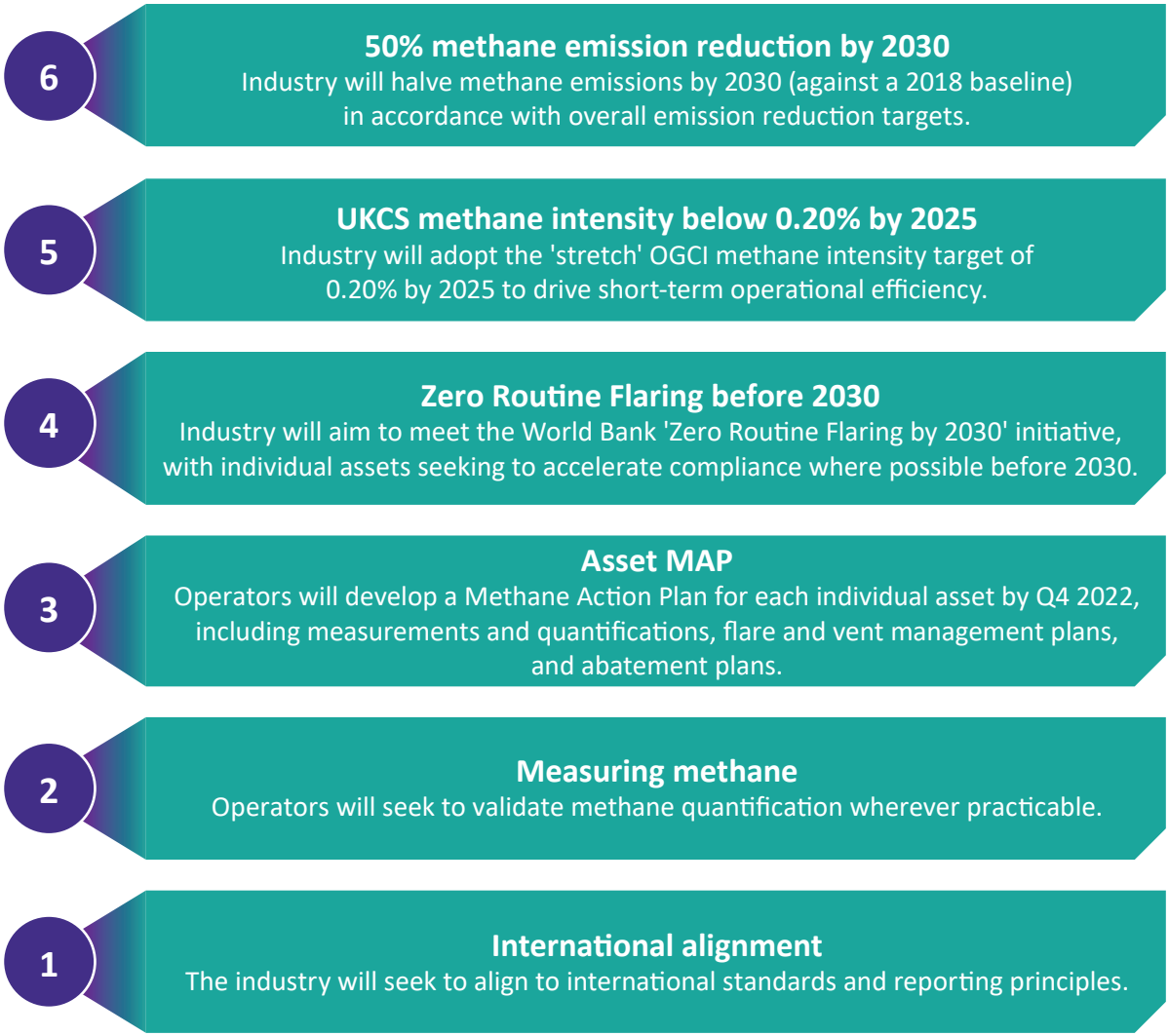
Headline actions

The Methane Action Plan and North Sea Transition Deal have identified six key actions which are summarised opposite.

[1] www.roadmap2035.co.uk/

[2] www.gov.uk/government/publications/north-sea-transition-deal

Figure 1: Main Elements of Methane Action Plan



2. Methane emission trends on the UKCS

Methane is a potent greenhouse gas (GHG) with 20–80 times[3] the global warming potential of CO_2 (depending on the time horizon) and is the second largest contributor to global carbon emissions after CO_2. Globally, the oil and gas industry is the third-largest emitter of methane after the agricultural industry and waste (such as landfill). Methane has a short atmospheric lifespan compared with carbon dioxide, which means that reducing emissions can have an immediate impact on the rate of global temperature increase, provided that the reductions are sustained.

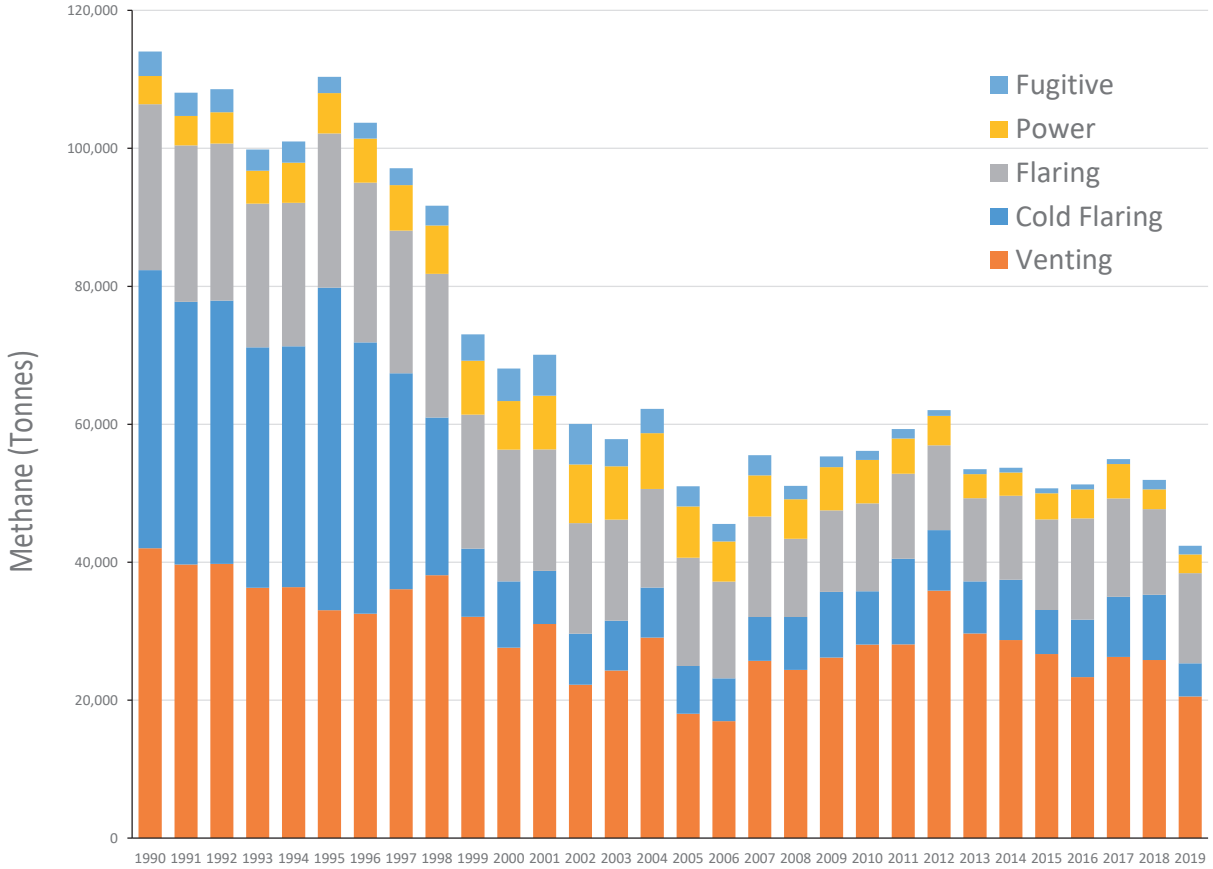
In 2019, total methane emissions from the upstream oil and gas sector in the UK including emissions at onshore terminals was 42,000 tonnes. Methane emissions from the upstream sector have more than halved since 1990, primarily from reductions in flaring and particularly venting activity. They have remained stable from 2013–18, during which time production has increased by 20 per cent, resulting in a sustained decline in methane intensity (methane emissions per unit of production) over the same timeframe (see Figure 2).

The offshore oil and gas industry represents 2.7 per cent of total UK methane emissions.[4] Methane is the second largest source of GHG emissions offshore after CO_2 emissions, and amounted to approximately 1.3 million tonnes CO_2 equivalent (CO_2e) in 2018.[5] In 2019 – the most recent year for which data is available – the largest sources of methane emissions were from venting (48 per cent), flaring during oil production (31 per cent) and cold flaring[6] (11 per cent) and emissions from incomplete fuel combustion offshore for power generations (7 per cent), as shown in Figure 3.

Further detail on methane emissions for offshore platforms can be found in the Environmental Emissions Management System (EEMS)[7] although this is offshore focussed and excludes emissions from terminals.

[3] www.ipcc.ch/report/2019-refinement-to-the-2006-ipcc-guidelines-for-national-greenhouse-gas-inventories/
[4] Source: https://naei.beis.gov.uk/
[5] Using a Global Warming Potential value of 25.
[6] Vent tip gas disposal.
[7] Source: EEMS www.gov.uk/guidance/oil-and-gas-eems-database

Figure 2: Historical Methane Emissions



Source NAEI

Figure 3: Methane Baseline

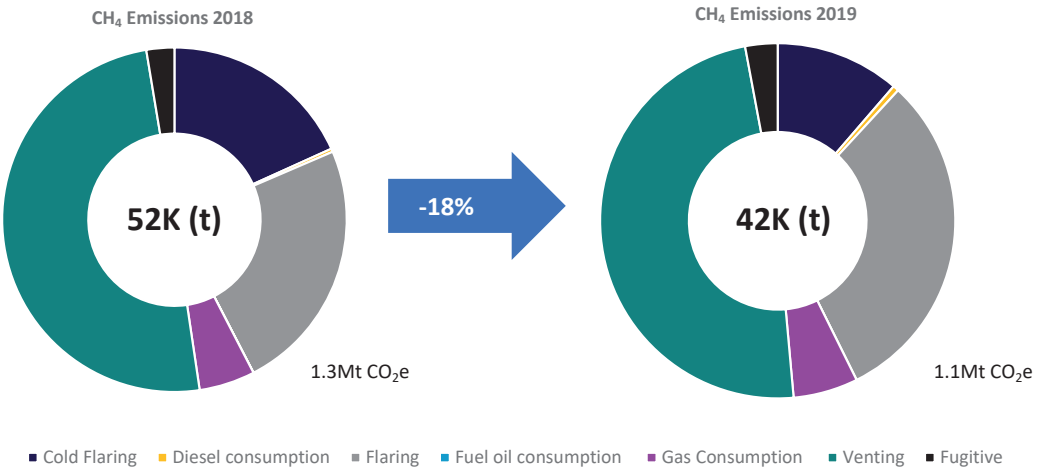
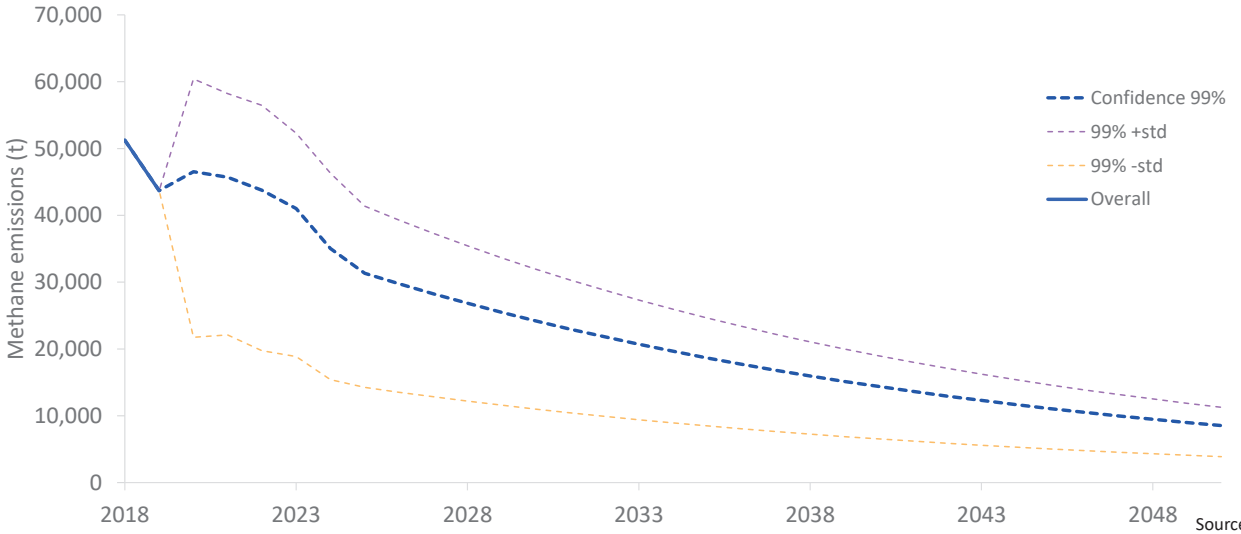


Figure 4: Methane Forecast



Source: OGUK

Venting is the controlled release of gases as part of the production process (such as in gas treatment, separation or dehydration), and occurs during the management of gases from equipment which uses natural gas as a seal. Venting also occurs occasionally when it is not possible to light the flare — either because there is insufficient volume of gas, or the gas composition is such that ignition is not possible. Other causes of methane emissions are in fuel combustion for power generations offshore (in turbines, heaters, and engines), offloading operations (to ship) and/or during well testing.

Fugitive emissions accounted for less than 4 per cent of the total methane emissions offshore in 2018. However, the key objective of this plan is to continuously reduce methane emissions through reduced flaring and venting, wider use of gas recovery and improved leak detection, coupled with better quantification of emissions.

Gas is flared offshore as part of the production process and for safety reasons, where flaring enables the removal of highly combustible gases effectively and quickly from the vicinity of the installation's personnel and infrastructure.

The baseline of recorded methane emissions shows an overall decrease of 18 per cent between 2018 and 2019, reflecting the trends in operational and facilities improvement outlined above.

However, it is recognised that the forecasting of methane emission trends contains inherent uncertainty reflecting variations in process, safety and operations year on year. In Figure 4, a forecast of UKCS methane emissions is provided with an appropriate error bar reflecting these uncertainties. As action continues to be taken to reduce total methane emissions, it is anticipated that variability in emissions will further narrow as absolute emissions decline. It is also recognised that further technological improvements will be needed to continue to accurately measure and drive emissions down in the decades to come, and this Methane Action Plan will be a catalyst for such an outcome.

3. Action Plan commitments

The following provides further details on the actions and related targets within the Methane Action Plan. Each aspect is being worked in further detail as part of the OGUK-led Methane Task Finish Group. Whilst industry is fully committed to meeting its regulatory obligations, this is simply a starting point for further performance improvement. Regulatory requirements on methane emissions are provided by the relevant regulators — such as the Oil and Gas Authority (OGA), Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) — and include the OGA Strategy update issued in December 2020, Stewardship Expectation 11 and the OGA's *Flaring and Venting Guidance*,[8] amongst other aspects of regulation.

Industry is creating a UKCS methane guideline based on international standards to be issued by Q2 2022, with a task finish group set up to ensure delivery by this date. The industry is intent on revising the baseline forecast in Q1 2024 using 2023 data. In the intervening period, in collaboration with regulators, the industry will continue to enhance its knowledge of installation performance to improve its ability to estimate methane emission factors. This work will then be built into future emissions baseline forecasts. The industry will also engage with the supply chain to translate the MAP targets in a related, supply chain-specific Methane Action Plan by Q4 2022.

A separate workgroup has been set up to address well emissions and more firmly quantify the baseline and trends. This group will define a subset of decommissioned wells to be surveyed independently by Q4 2023 to quantify methane emissions from suspended and decommissioned wells.

3.1 Scope

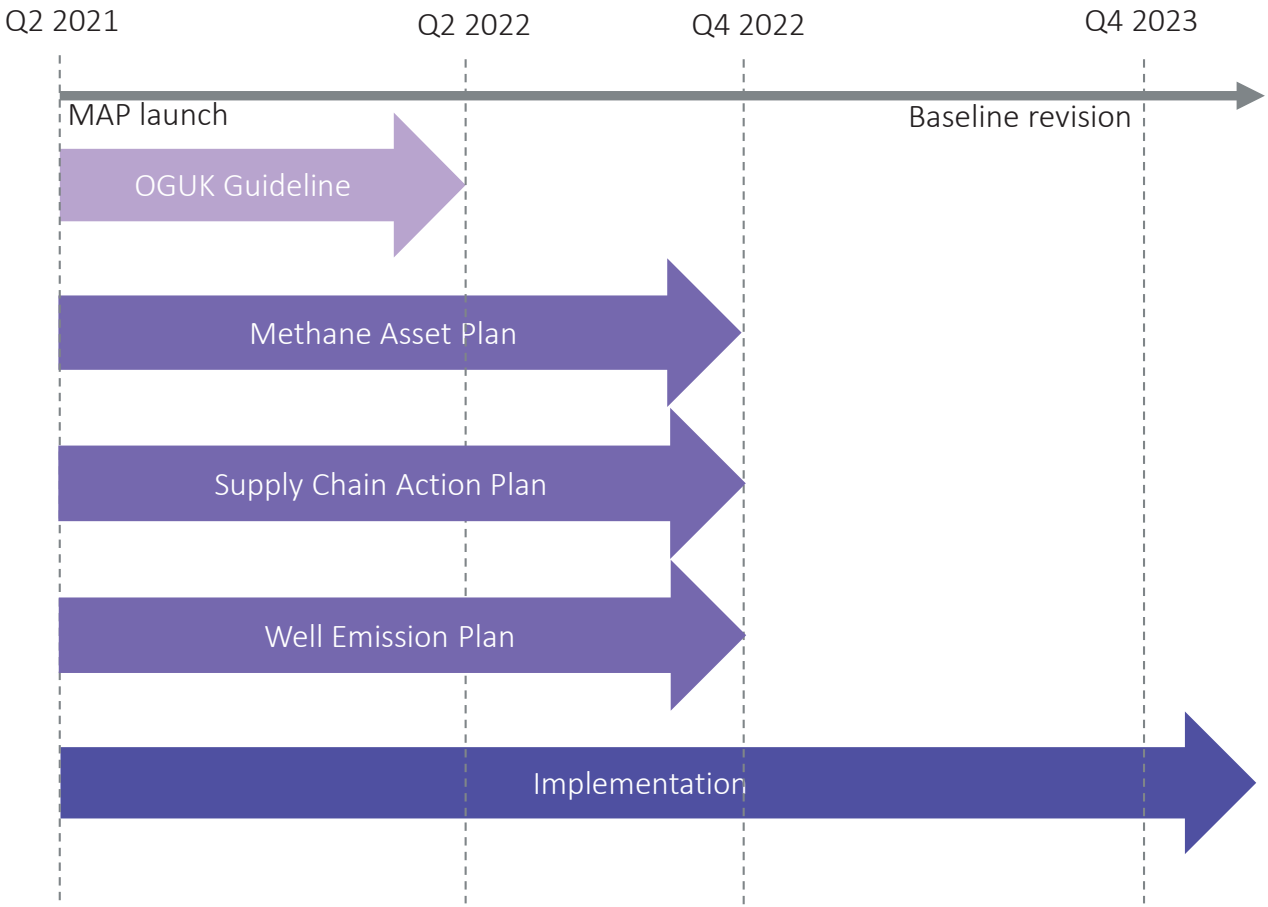
The MAP covers the whole UKCS, including all oil and gas offshore installations and transportation to shore. The MAP covers offshore methane emissions from flaring and venting, unburnt methane from combustion equipment, pipework and equipment such as valves, decommissioned wells, and fugitives (including those generated in the transportation of methane from offshore assets to the coast) and at upstream oil and gas terminals. The MAP does not cover management of major hydrocarbon releases (HCRs).[9]

3.2 Timeline

Once the MAP is launched, the OGUK task finish group will develop an operational guideline for methane based on

[8] www.ogauthority.co.uk/media/7647/flaring-and-venting-guidance_june-2021-final.pdf
[9] www.oguk.org.uk/hydrocarbon-release/

Figure 5: Methane Action Plan Timeline



the international standards *Methane Guiding Principles* and OGMP2.0 (Oil and Gas Methane Partnership), to be issued in Q2 2022. Operators will then develop asset-specific plans — Asset Methane Action Plans (AMAPs) — which will include measurement-based quantification, flare and vent management plans and abatement plans, by Q4 2022 at the latest. The MAP will be complemented by specific actions on supply chain and well methane emissions by Q4 2022. The methane baseline will be consolidated by 2023 as all individual MAPs will be implemented.

3.3 Action delivery

Action 1: International Alignment

The industry will seek to align to International standard and reporting principles.

The commitment by the UK sector will incorporate relevant international methane reduction initiatives. As well as the summary set out here, the European Union is preparing a new legislation focusing on methane to be issued in Q4 2021 following the launch of its methane strategy in autumn 2020.[10] The United Nations also launched the International Methane Emission Observatory[11] (IMEO) in March 2021 with the goal of full accounting of methane emissions by country.

As part of the MAP the UK oil and gas sector, through OGUK, is endorsing the World Bank's 'Zero Routine Flaring by 2030' initiative[12] on the UKCS. This includes signing up to the *Methane Guiding Principles*[13] establishing a UKCS-wide baseline and ambitious UKCS methane sector-specific reduction targets encompassing all significant methane sources with appropriate reporting and performance. The industry will work closely with regulators (OGA and OPRED) and any relevant international bodies (MGP, OGMP, IOGP, IPIECA, IEA and World Bank) to align reporting principles and methodology. The industry will publish emission and its performance toward the set targets on a yearly basis at aggregate UKCS level.

It is intended that the Methane Action Plan is seen as a template for cohesive industry action which encompasses operational, policy and technological developments. It has the benefit of utilising existing and credible methodologies developed by the Oil and Gas Methane Partnership[14] and recognised by responsible investment guides.

[10] ec.europa.eu/energy/topics/oil-gas-and-coal/methane-emissions_en
[11] www.fsr.eui.eu/international-methane-emissions-observatory-a-new-step-in-limiting-global-ghg-emissions/
[12] www.worldbank.org/en/programs/zero-routine-flaring-by-2030
[13] www.methaneguidingprinciples.org/
[14] www.ccacoalition.org/en/resources/oil-gas-methane-partnership-ogmp-overview

Figure 6: International Methane Initiatives

OGCI	Climate & Clean Air Coalition	World Bank Group	EDF	Methane Guiding Principles	ipieca	IOGP
Intensity targets	**Global Methane Alliance**	**Aim for Zero Routine Flaring by 2030**	**Support studies, business action, embed standards**	**Industry coalition**	**International ESG Association**	**Support policy development internationally**
0.25% by 2025 (reduction of 20%) 0.2% ambition Baseline of 2017 Circa 5% of global production – 12 members Likely to increase ambition in near future Covers both production and processing of natural gas, but not exploration	Oil & Gas Methane Partnership (OGMP) – improved methane reporting frameworks Partners Include EDF, European Commission, UNEP Mineral Methane Intuitive – 45% reduction in methane 2015-2025 60-75% by 2030 Success through OGMP, scientific studies, peer to peer regulatory support	Open to governments, oil companies or institutions 32 countries, 38 companies, 15 institutions 61% coverage of global flaring Not legally binding 3 components: create environment to reduce flaring, avoid on new developments, make efforts to reduce flaring over time	"Goal: European countries and companies have made strong commitments to reduce methane emissions, consistent with achieving a 45% global reduction by 2025" Collaborate with O&G firms METHANESAT to launch in 2022, covering all major basins	Best practice guidelines/best practice toolkits Continual reduction Across gas supply chain Improve accuracy Advocate sound policy Increase transparency Companies and supporting organizations	Promotion of good practice in ESG Sustainability reporting guidance – benchmark framework for oil and gas companies Workshops, knowledge shares etc	Signed up to Methane Guiding principles Comparison of methane reporting requirements Methane Reporting Taskforce Workshops, knowledge shares Support European Commission Methane Strategy

Action 2: Measuring Methane

Operators will seek to validate methane quantification wherever practicable.

Measuring Targets

The aim is to update the baseline in Q1 2024 using 2023 data validated by the relevant measurements. By 2025, it is intended that 95 per cent of industry emission volumes are measured at the frequency appropriate to the nature of the emission, allowing the sector to reduce the current assumption factors built into current baselines. This work also ties into the development of asset-based AMAPs, where operators will address quantification, evaluation, measurement and monitoring of methane by asset by Q4 2022 at the latest, and should agree an accounting approach for flaring and venting by Q4 2023. This will include studies to map all (potential) methane emissions sources including wells, based on the *Methane Guiding Principles* technical guidance.

Through a Joint Industry Partnership, the industry will conduct an independent study of methane emissions from a relevant subset of decommissioned wells to compare with the Geomar[15] study and estimate the methane emissions from such wells across the UKCS by Q4 2023.

In addition, the Methane Action Plan commitment on measurement will be extended in scope to the supply chain by Q4 2022.

Accounting and Quantification

Accounting and quantification of methane sources and related volumes remains challenging and the industry should endeavour to take appropriate action to reduce uncertainties and consolidate the baseline.

There are several challenges to methane emissions reductions. In particular, the quantification of methane emissions globally is associated with significant uncertainty. While some methane emissions are measured and monitored, some are estimated using standard emission factors, or calculated on standard gas compositions.

The MAP requires the UK oil and gas sector to commit to improving the accuracy of methane data through better understanding of methane emissions sources and quantification (both in design and fugitive), defining the industry baseline against which reduction can be measured and agreeing standards for measurement, monitoring and reporting.

[15] www.geomar.de/en/news/article/oil-and-gas-wells-as-a-strong-source-of-greenhouse-gases

The future approach to methane quantification falls into two main categories of (i) bottom-up estimates and (ii) top-down physical measurement on the source stream or in the atmosphere (such as methane sensors mounted on fixed-wing planes, drones or vessels or the use of satellites).

Recent technological developments in measurement and monitoring, and research on relevant emissions factors mean that there are opportunities to improve understanding of the methane emitted by operations on the UKCS. Therefore, operators are encouraged under the MAP to ensure they have completed a desktop exercise to identify and quantify all significant sources of methane on their assets, using standard quantification approaches. The Oil and Gas Methane Partnership (OGMP) Technical documents,[16] *Methane Guiding Principles Best Practice*[17] and Methane Emissions Glossary[18] documents provide useful resources.

Through OGUK, these bottom-up estimates will be collated to consolidate UKCS baseline for upstream methane emissions which covers all sources and utilises a standard methodology for quantification.

Through the OGUK guidelines and the task finish group, OGUK will work with members, regulators, industry associations and the scientific community to agree consistent standards for methane quantification (including physical measurement, metering and monitoring, or standard emissions factors) and furthermore, develop consistent approaches to validation of methane estimates and physical measurements. This will inform operators' approach to monitoring on their assets.

OGUK will also work with UK regulators to agree standards for reporting of methane emissions (starting from the OGMP Framework 2.0), increase centralisation of methane reporting and ensure that all significant sources of methane are captured in the regulatory reporting regime.

Quantification of methane emissions must be efficient. Some technological development will also be required in physical atmospheric methane measurement and on source streams, such as unlit flare streams. OGUK will continue to engage and support the Oil and Gas Technology Centre's (OGTC) Net-Zero Solution Centre, which is facilitating these improvements.

[16] www.ccacoalition.org/en/content/oil-and-gas-methane-partnership-technical-guidance-documents
[17] www.methaneguidingprinciples.org/best-practice-toolkit/
[18] www.ipieca.org/resources/awareness-briefing/methane-emissions-glossary/

Action 3: Asset MAP

Operators will develop a Methane Action Plan by Q4 2022 for each individual asset (AMAP), including measurement and quantifications, flare and vent management plan, and abatement plan.

Operators will develop asset-based AMAPs, which should include all aspects of methane management, including regulatory requirement and guidance from OGA. The aim of the AMAP is not to duplicate any work operators are doing in methane management and should encompass existing work such as Stewardship Survey requirements, which report to internationally recognised standards. It is expected that the operator describe the methodology they are following to quantify methane emission and how it relates to measurement taken by the operator or public domain measurement. Additionally, it is expected that operators follow a flare and vent management plan that aims to minimise methane emission, and that they have an abatement plan which describes action to reduce methane emission and the future methane emission profile of the asset. AMAPs should take account of the asset position within the life cycle; as such, greenfield assets are expected to have more ambitious management plans.

Action 4: Zero Routine Flaring before 2030

Industry will aim to meet the World Bank 'Zero Routine Flaring by 2030' initiative, with individual assets seeking to accelerate compliance where possible before 2030.

The overarching objective of achieving a net-zero basin by 2050 requires a fundamental transformation of operational approach to prevent waste gas emissions for reasons other than safety. This outcome is reinforced by the World Bank's 'Zero Routine Flaring by 2030' initiative which has broad industry support. A number of offshore assets already meet this criteria and it is the intent of operators on the UKCS to accelerate compliance before 2030.

Practical steps are being taken in the meantime. For instance, operators are considering recovery of "waste gas" for sale or use to generate power (if an asset cannot be fully electrified). More systematically, operators should seek to prevent flaring by designing systems that do not produce waste gases. In other instances, for example, methane emissions can be cut by the use of both high- and low-pressure separators on well tests. When appropriate, waste gases from well tests that are currently flared could be introduced to gas-processing facilities, where they are recovered as natural gas and natural-gas liquid products. Alternatively, waste gas can be reinjected for Enhanced Oil Recovery (EOR) or

storage in the reservoir. Where flaring cannot feasibly be prevented, improving the combustion efficiency of flares can also reduce emissions of methane.

The MAP includes a commitment that all newly built facilities installed on the UKCS post-2025 will comply with zero routine flaring and include gas recovery.

Action 5: UKCS methane intensity below 0.20% by 2025

Industry will adopt the "stretch" OGCI methane intensity target of 0.20 per cent by 2025 to drive short-term operational efficiency.

The MAP is following international standards and uses the Oil and Gas Climate Change (OGCI) methane intensity target to drive short-term improvement in methane emission. The target might be revised following the 2023 baseline revision. OGCI methane intensity is expressed as total methane emissions, divided by the gas exported to onshore terminals. This definition is only relevant in aggregate, i.e. at a corporate or basin level. It is meaningless at individual asset or installation level, in particular for gas-deficient assets. OGUK will report the basin-wide methane intensity on an annual basis.

Action 6: Achieve 50% methane emission reduction by 2030

Industry will halve methane emissions by 2030 (against a 2018 baseline[19]) in accordance with overall emission reduction targets.

The industry will be following the same reduction pathway for methane than the overall emission reduction. The adoption of 'Zero Routine Flaring by 2030' will contribute to this objective. Operators will contribute to this objective via their vent and flare management plan and abatement plans included in their AMAP. It is expected that operators will focus their attention on major methane sources as identified by the baseline (see Figure 3). It is expected that the operators will identify the relevant abatement options for their asset's characteristics.

Where applicable, operators should consider new designs that minimise, if not eliminate, methane emissions. Operators should seek to reduce their methane emission via flare and vent management plan. Operators should seek to improve combustion efficiency to prevent unburnt methane emission.

[19] This baseline will be revised in 2023.

To underpin continuous reduction in methane emissions, monitoring of equipment to establish sources of smaller leaks is required. This can be achieved through leak detection and repair programs (LDAR) that are accompanied by monitoring of operational repairs inventory, and minimisation of emissions during maintenance and repair. Assessment of the effectiveness of repairs should also be considered.

3.4 Immediate actions

In the short term, the industry should focus on quantification of both the source and volume of methane emissions (for instance, by measuring flare efficiency) and on operational efficiency measures which focus on the main source of methane: venting and flaring. For example, one route is to redirect vent gas to be burnt in a flare, though this may require additional equipment.

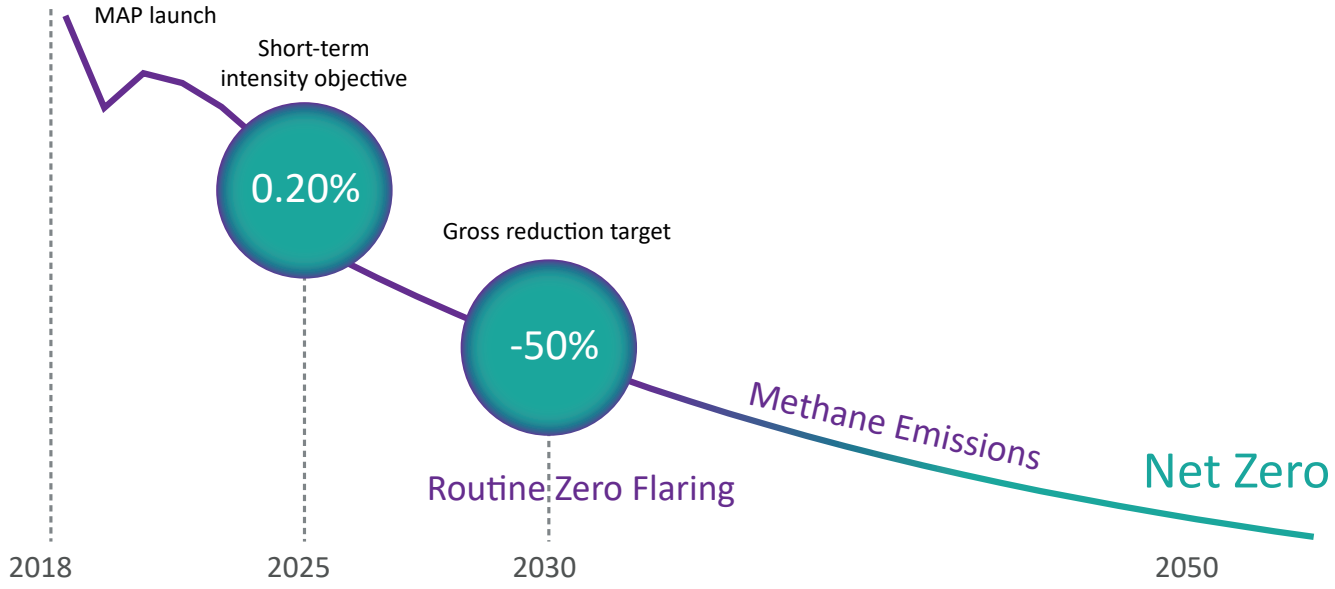
For greenfield developments in the near term, operators are encouraged where possible to eliminate sources of methane and reduce and control emissions from any remaining sources. This could include the use of pipelines for liquid and gas export, recovery of methane for beneficial use and consideration of alternative low-emission and low maintenance equipment such as electric, mechanical, or compressed air equipment.

4. The long-term path to methane emissions reduction

The UK oil and gas sector is committed to continuously reducing its methane emissions. This will be achieved through setting industry-wide methane reduction targets, developing Best Available Techniques (BAT) for methane reduction on UKCS assets, sharing best practice, supporting the development of AMAPs and facilitating step-change reduction strategies.

To support the net-zero ambition, demonstrate leadership, align action, and facilitate performance monitoring, OGUK and its members have developed voluntary methane emissions reduction targets. These targets are accompanied by a clear implementation timetable (Figure 6) and cover all sources of methane emissions. The targets will be accompanied by cross-industry benchmarks, Key Performance Indicators (KPIs) and annual assessment of progress towards the target through OGUK.

Figure 7: Pathway to Methane Emissions Reduction



The UK oil and gas sector will develop BAT for reducing methane emissions, focusing initially on the largest sources such as minimising flaring and venting wherever possible and reducing emissions of methane from these sources where it is not possible to entirely eliminate them.

The MAP will stimulate cross-industry and stakeholder work on the development of step-change methane reduction strategies for the UKCS, supporting efforts to eliminate routine flaring by 2030 and promoting consideration of methane emissions during the design of new oil and gas assets. OGUK will work with members and regulators to investigate causes of and identify BAT for minimising methane emissions.

Get involved

OGUK encourages all members to join the debate and support the industry's work in delivering on our climate ambitions.

To hear about our relevant forums and workgroups, and where your views can make a difference, visit our website:

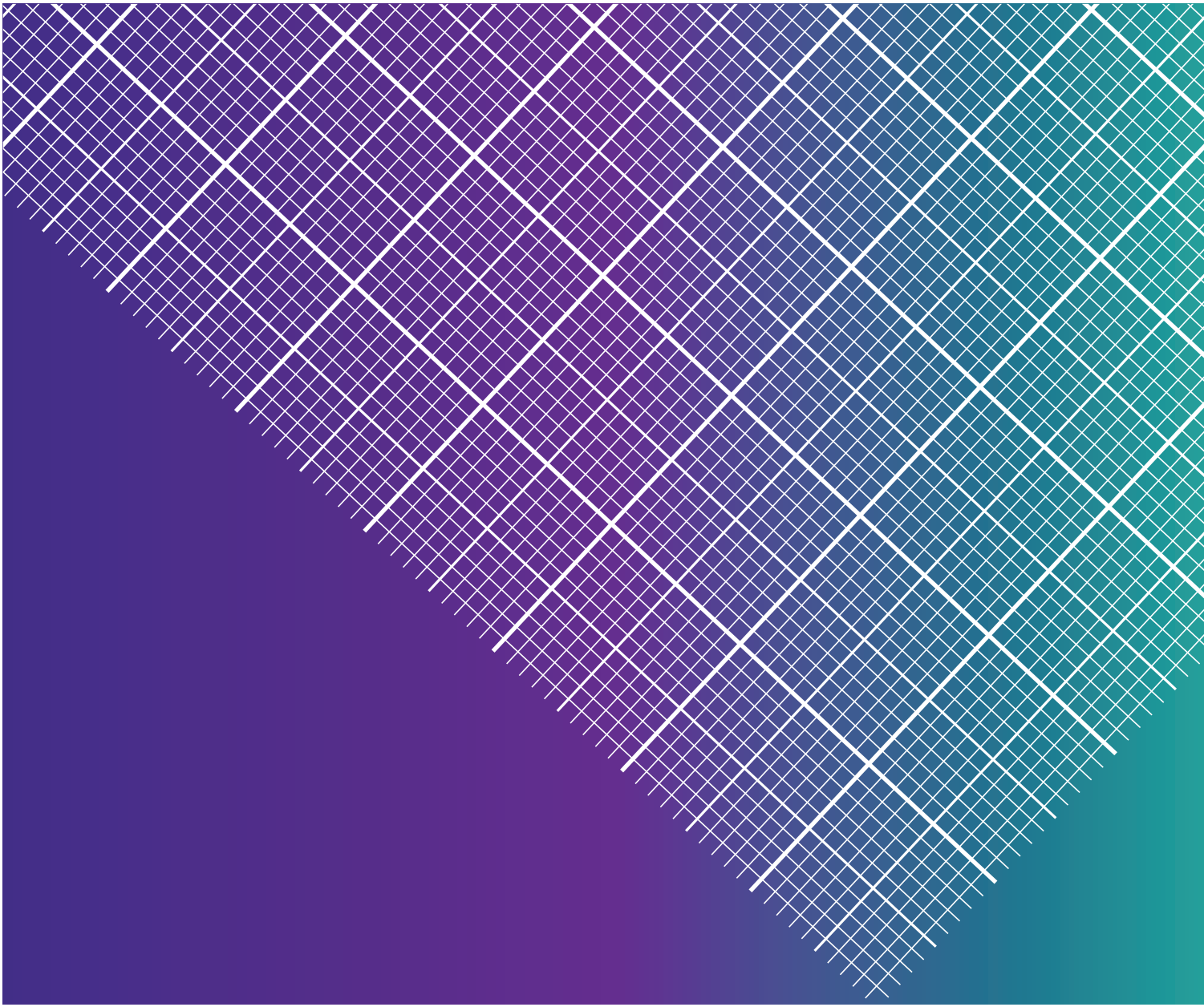
oguk.org.uk

or email the team:

sustainability@oguk.org.uk

If you'd like to hear more about membership of OGUK, get in touch with our membership team:

membership@oguk.org.uk



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oguk.org.uk

info@oguk.org.uk

@OGUKenergy

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