Emissions Reduction Action Plan

Guideline

Issue 01

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- Alex Johnstone, Ithaca
- Andrew Wright, Repsol Resources UK
- Craig Stevenson, Equinor
- Gregor Rothnie, bp
- Jenni Whitfield, NSTA
- Katherine Meffen, OEUK
- Matthew Neal, Serica Energy
- Paul Hatton, Harbour Energy
- Sarah De Boer, Equinor
- Sarah Doyle, OEUK
- Simon Marshall, Xodus

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London Office:

1st Floor, Paternoster House, 65 St. Paul's Churchyard, London EC4M 8AB
Tel: 020 7802 2400

Aberdeen Office:

4th Floor, Annan House, 33-35 Palmerston Road, Aberdeen, AB11 5QP
Tel: 01224 577250

info@oeuk.org.uk

www.oeuk.org.uk

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List of Abbreviations

Abbreviations	Definitions
APM	Association for Project Management
CAPEX	Capital expenditure
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
EEMS	Environmental and Emissions Monitoring System
ERAP	Emissions reduction action plan
ERP	Emissions reduction plan
ESOS	Energy Savings Opportunity Scheme
GHG	Greenhouse gas
IOGP	International Association of Oil and Gas Producers
IRR	Internal Rate of Return
JV	Joint Ventures
KPI	Key performance indicator
MACC	Marginal abatement cost curve
NPV	Net present value
NSTA	North Sea Transition Authority
NSTD	North Sea Transition Deal
OCM	Operating Committee
OEM	Original Equipment Manufacturer
OGA	Oil and Gas Authority
OPEX	Operating expenditure
OPRED	Offshore Petroleum Regulator for Environment and Decommissioning
OSPAR	The Convention for the Protection of the Marine Environment of the North-East Atlantic
SE 11	Stewardship expectations #11
SPP	Simple Payback Period
TAR	Turnaround
UK ETS	UK Emissions Trading Scheme
UKCS	UK Continental Shelf
UKSS	UK Stewardship Survey
WP&B	Work Plan & Budget

1 Introduction

1.1 Regulatory context and industry commitment

The UK government's energy security plans[1] show that oil and gas will remain an important part of the national energy mix for decades to come. Continuing to produce oil and gas as cleanly as possible while maximising the wider economic benefits from the UK continental shelf (UKCS) supports both domestic energy security and the drive to net zero emissions. Rapid and sustained reductions in oil and gas production emissions therefore remain crucial.

The central obligations set out in the OGA Strategy[2] form an important element of the decarbonisation activity and the industry will continue to provide leadership and support. The North Sea Transition Deal's (NSTD) targets were agreed on a cross sector basis. Industry will continue to own the decarbonisation agenda, supported by the expectations in Stewardship Expectation 11 (SE 11)[3], net zero emissions targets and requirements of the OGA Plan[4].

Ongoing collective action is required for the UK to meet its target of net zero emissions by 2050. The NSTD committed to reduce offshore production emissions by 10% by 2025, 25% by 2027, 50% by 2030 against a 2018 baseline with the objective of delivering a net zero basin by 2050. The industry's performance to date (end of 2022) has surpassed these targets with a 24% reduction in greenhouse gas (GHG) emissions, against the 2018 baseline, and a 45% reduction in methane emissions. It is on track to beat the 2027 emissions reduction target.[5]

1.2 Purpose and scope

The NSTA, via SE 11, outlined that operators should develop, implement and maintain asset and/or infrastructure hubs' GHG Emission Reduction Action Plans (ERAPs) in order to reduce their GHG emissions and support delivery of the UK's net zero target.

An ERAP summarises and assesses the applicability of available emissions abatement and monitoring opportunities and technologies, and outlines the planned emissions reduction initiatives.

Given the diverse nature of UKCS assets, including wide variations in geography, geology, age and processing plant complexity, there is no one-size-fits-all approach to emissions reduction. The guideline acknowledges this diversity and does not prescribe specific activities or projects. It is not intended as a checklist or template solely for SE 11 compliance but rather to serve as a framework for implementing good practices and offering guidance in planning GHG emissions reduction.

To communicate and share good emissions reduction practice within UK oil and gas operations and foster a more sustainable business, companies will benefit from having an embedded emissions reduction strategy that is specifically targeted at reducing Scope 1 (direct) emissions during the

[1] https://www.gov.uk/government/publications/powering-up-britain/powering-up-britain-energy-security-plan
[2] https://www.nstauthority.co.uk/regulatory-information/regulatory-framework/the-oga-strategy/
[3] https://www.nstauthority.co.uk/news-publications/stewardship-expectation-11-net-zero/
[4] https://www.nstauthority.co.uk/regulatory-information/regulatory-framework/the-oga-strategy/oga-plan-emissions-reduction/
[5] NSTA Emissions Monitoring Report 2023

production phase of an asset's life cycle. The emission reduction strategy is the overarching guide that informs emissions reduction planning. The strategy sets the direction and priorities, while the plan outlines the precise steps and the timeframe to follow that direction and achieve those priorities.

These guidelines have been developed based on feedback obtained from operators through the OEUK ERAP survey conducted in October 2023. They also incorporate feedback from the NSTA's assessment of net zero emissions reviews and input from other stakeholders who are actively involved in supporting operators' energy and emission reduction plans and projects, in alignment with SE 11 objectives.

2 Emissions reduction strategy

2.1 Why have a strategy?

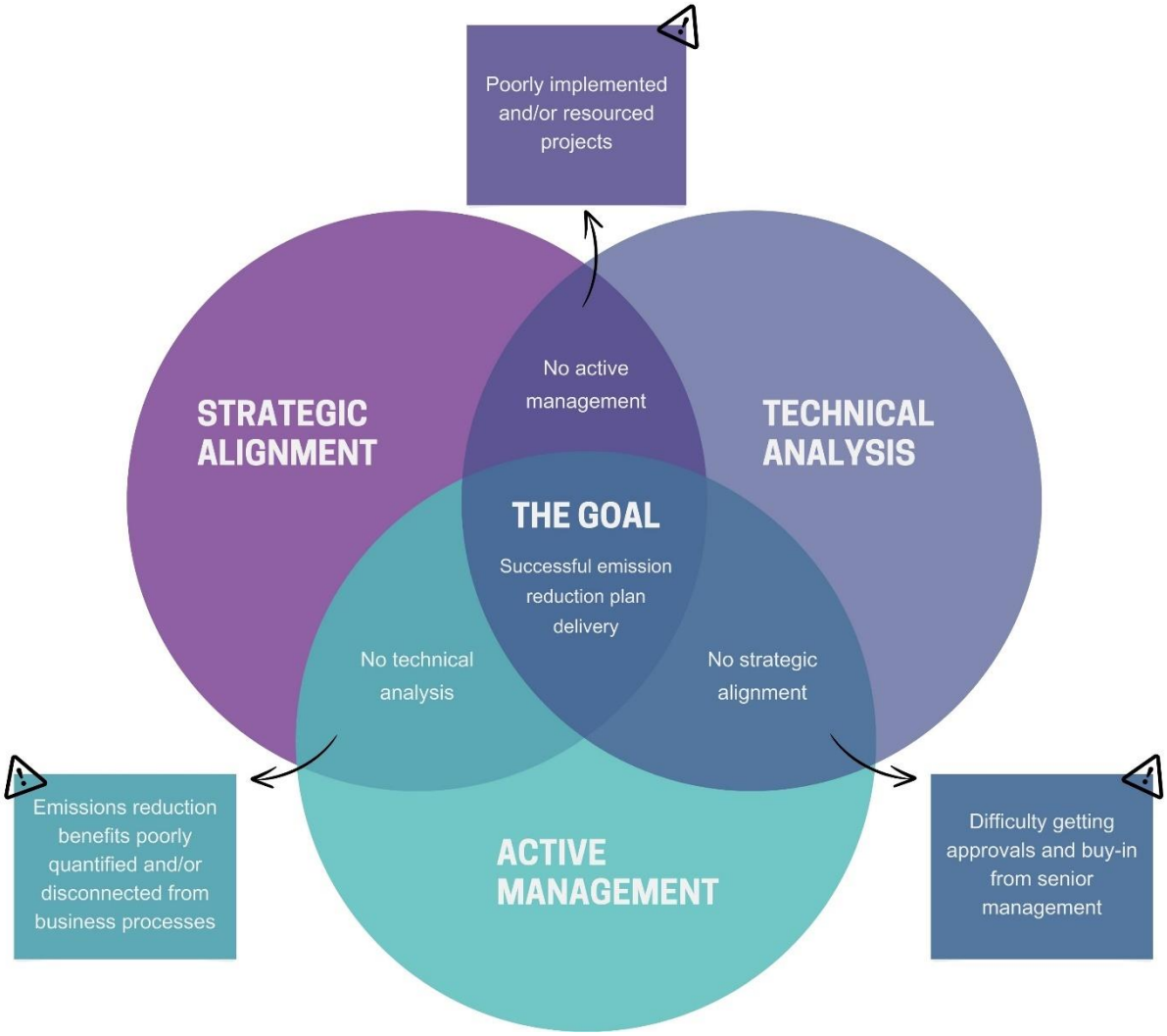
Operating companies could benefit from creating an emissions reduction strategy before implementing an asset/hub ERAP. This strategy emphasises the urgency of reducing emissions and aligns the company and its partners with this goal. The strategy supports the following:

- Clear alignment with overall company strategy.
- Improved asset and hub strategy planning.
- Increased operational efficiency.
- Enhanced and effective decision-making.
- Improved stakeholder communication and alignment.
- Enhanced communication and motivation with employees for environmental, social and governance (ESG)/ net zero ambitions.
- Fulfilment of regulatory obligations.

Operating companies that have a well-aligned strategy, actively managed initiatives, and analysis-driven emissions reductions are more likely to achieve sustained success (see Figure 1).

An ERAP based only on technical analysis might lack support from leadership. A purely strategy-focused approach might result in unrealistic projects or conflicting priorities. A management-driven initiative might implement ineffective projects or deviate from the strategy. Without integrating all three elements – strategy, technical analysis and management – the ERAP may slow down or stall.

Figure 1: Three aspects of emissions reduction strategy-to-plan implementation



2.2 Strategy components

The suggested ten components of an emissions reduction strategy in support of a sustainable business culture are:

1 Senior leadership commitment to an emissions reduction strategy
Reducing emissions in reality requires a properly resourced implementation plan. Sustained senior leadership commitment at the asset management and Operating Committee (OCM) is fundamental.

2 Embed emissions reduction in the strategic intent of the company/ asset.
At the core of every company are four important elements: employees, customers, assets and reputation. These elements, aligned with the company's purpose, vision, mission, and values, collectively form its strategic intent.

3 **Understand the emissions baseline and forecasts to set credible, measurable, and visible targets.**
Recognise the assets' baseline emissions performance, set appropriate and credible reduction targets and establish performance indices at both the organisational and asset levels.

4 **Define an appropriate scope and boundary to drive emissions performance improvement.**
Develop an ERAP which is aligned with, and integrated into, the endorsed JV Hub/ Asset Strategy.

5 **Integrate emissions reduction management into core business and asset management processes.**
Develop an ERAP as the operational asset entity or area plan to support decarbonisation projects and energy integration opportunities across multiple assets.

6 **Confirm the impact of emissions reduction management on business activities.**
Identify emissions reduction opportunities (registered in a hopper) and rank, screen and prioritise projects accordingly.

7 **Maximise sustainable value of emissions management through prioritised opportunity identification.**
Integrate emissions reduction programmes into the business planning process, covering work programmes, budget, oil and gas production and carbon emissions forecasting, based on technical and economic assessments.

8 **Determine the necessary cultural and behavioural changes for transformation.**
Foster a decarbonisation culture on the UKCS to support responsible operations, mitigate climate change, preserve the social licence to operate and ensure energy security.

9 **Establish activities to create and sustain a positive culture.**
Regularly share the status of emission reduction projects and activities across the organisation, celebrate successes, recognise contributions and share lessons learned with peers, partners and industry forums.

10 **Implement the strategy through effective emissions reduction projects and activities.**
Progress emission reduction projects according to existing project management standards, integrate them into asset planning and incorporate them into the carbon forecasting for the asset.

3 Managing and delivering emissions reduction

3.1 Elements of a successful ERAP

The ERAP is basically a programme of projects and investments. As such, many of the traditional principles of programme management can be applied to delivery of emissions reduction.

From the Association for Project Management (APM) Body of Knowledge:

- *"A programme is a unique, transient strategic endeavour undertaken to achieve beneficial change and incorporating a group of related projects and business-as-usual (steady-state) activities."*
- *"Programme management is the co-ordinated management of projects and business-as-usual (steady-state) activities to achieve beneficial change."*

Activities within the ERAP that are integrated into the asset activity execution plans alongside other deliverables, rather than being developed in isolation, ensures that the process of reducing emissions benefits from being embedded within the organisation.

The asset's ERAP, aligned with and in support of the JV Hub Strategy, would benefit from being owned and endorsed by the JV OCM while the implementation of the asset's ERAP is the duty of the operator's asset management team.

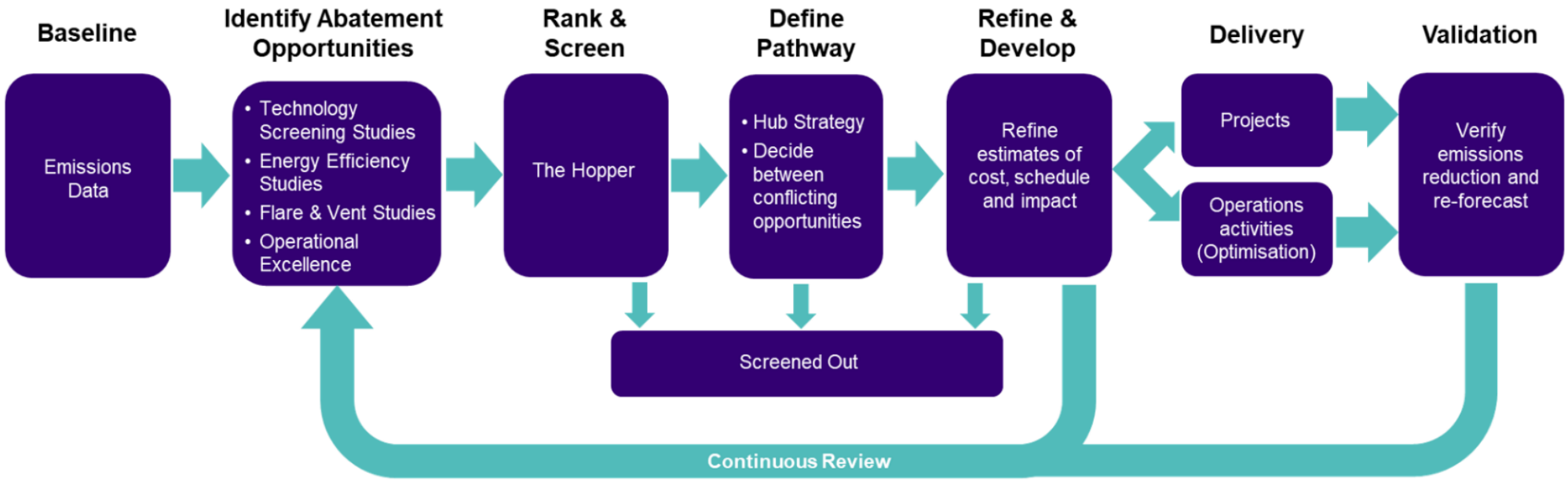
Initiating this process is easier if there is a document that pulls all the relevant information together. This can cover a wide range of topics, e.g. activity plans, management systems and processes, project progression criteria, company standards, key performance indicators and targets.

A 'top-down' approach may start with a central document which describes the strategy and the programme of selected projects and then be cascaded through the wider organisation for execution. A 'bottom-up' approach may result from a company or asset defining its own emissions reduction activities as priorities. The actual approach may well take both approaches.

The ERAP can be articulated in the form of an ERAP document, summarising activities and providing a framework for delivery, which can reflect longer-term ambitions and unconfirmed plans as appropriate. However, it is important to acknowledge that while this document may describe the ERAP at a specific point in time, it requires support from the necessary processes and behaviours within the business. It is recommended that focusing on integrating emissions reduction management into normal business processes and driving the implementation of the plan is more beneficial than merely maintaining a published document.

The figure below outlines seven elements to consider when developing an ERAP, and the text below provides more detailed information on each stage.

Figure 2: Development stages of an ERAP



3.1.1 Baseline

- Know the asset and source-level emissions baseline
    - Ensure a clear understanding of emissions sources and performance
    - Understand process equipment capacity, design basis and current operating demands for process plant, power generation and utilities.
- Confirm the current emissions measurement basis and acknowledge monitoring uncertainty.
- Emission source proportions (fuel gas, diesel, flaring and venting) and baseline trends form the fundamental basis of framing opportunities and prioritising improvement projects. More detailed information will make it easier to spot opportunities.

3.1.2 Identify abatement opportunities

- In order to identified emissions reduction opportunities in full it is beneficial to engage a cross-disciplinary team, including asset operations, maintenance, engineers, emissions specialists, contractors and OEMs.
- Energy efficiency and process optimisation to be considered: understanding where the energy is used and where the emissions occur. A checklist may include:
    - Optimising asset processing operations
    - Gas compression facilities projects
    - Power generation facilities projects
    - End-users of electrical power projects
    - Flaring reduction and elimination
    - Venting reduction and elimination
    - Methane plan prioritised on materiality.
        - Reduced system/ activity level venting;
        - Monitoring/ reducing imperfect flared gas combustion;
        - Monitoring imperfect fuel combustion;
        - Process plant fugitive emissions.
- Understanding and screening new, emerging and best available technology in each key area and their potential use in the asset's ERAP.
- Sharing ideas/challenges based on successes/experiences.
    - With JV partners: understanding, shaping & endorsing hub/ asset strategy, ERAP programme and WP&Bs. May be helpful also in identifying additional opportunities.
    - With Area neighbours: identifying local area needs/ development opportunities.
    - With infrastructure operator and shipper groups: small improvements can add up to a big reduction.
    - With similar installation types: operators may be carrying out projects elsewhere using techniques that could be copied.

3.1.3 Rank and screen

- All identified emissions reduction opportunities itemised, categorised and stored centrally, also known as a "hopper".
- Then screened to enable effective comparison and ranked based on pre-defined criteria.

- Opportunity categories may include:
    - Sources: power generation, compression, flaring, venting and fugitive emissions
    - Operational improvements e.g. optimising flash gas purge rates
    - Small/medium/ large engineering modification projects, e.g. flare gas recovery
    - Major infrastructure projects e.g. low-carbon power from shore
- Screening criteria may include:
    - Emission reduction potential (annual and remaining life of field)
    - Expenditure (Capex and/or Opex)
    - Complexity and scale of change/modification
    - Lead time, delivery schedule
    - Impact quantification:
        - More gas sales, lower fuel costs
        - Reduced/constrained production, deferred production during shutdown periods
        - Outage-dependant scope/ duration estimates
    - Abatement cost (£/tonne CO_2 abated)
    - Net present value (NPV), Internal Rate of Return (IRR) and Simple Payback Period (SPP)
    - Regulatory or company targets
- Screening criteria can be expressed as relative measures like cost per tonne of CO2e abated (£/CO2e) to assess cost-effectiveness.
- Economic assessments of abatement projects (such as NPV, IRR and SPP) can be conducted in the same way as other projects, using internal company methods. Relative measures to identify high-impact, low-cost opportunities will help align a plan for the NSTA strategy.
- Pre- and post-tax positions can be considered in the economic evaluation of any project.
- Opportunities (or groups of opportunities) can be plotted in a variety of ways:
    - Bubble charts comparing the economic value and the risk of each project relative to the volume abated.
    - Waterfall charts showing the impact of reduction relative to the schedules.
    - Gantt chart for visualising programme and project progression milestones.
    - Marginal abatement cost curve (MACC) for visualising project emissions impact and cost.
- Compare hopper of opportunities against company/ asset-level reduction targets, from a regional portfolio view to an individual project.
- Screened opportunities can be assigned a status to divide the hopper into manageable sections, typically covering actions being actively progressed (live), promising opportunities that need more work or are resource constrained (parked), and opportunities considered but ruled out (archived).
- All opportunities identified for progression assigned an owner so that it is clear who is responsible for progressing the opportunity and status reports.
- Ownership will change as the opportunity is matured to its execution phase.

3.1.4 Define pathway

- Drawing on the hopper and the results of the screening and ranking exercises, in line with the company commitments and Hub / Asset Strategy, the operator can define pathways, eg.

transposing an optimisation activity into the relevant asset activity plans; or appraising phase studies for material engineering modification projects.

- Items meeting the above criteria can be aggregated to yield the overall emission reduction profile. Using different criteria for selection will allow the comparison of alternative economic and emissions reduction.
- When compiling the pathway or scenario, interactions between opportunities can be considered to avoid double counting emissions.
- Building a ruleset into the analysis to account for opportunity interactions is very powerful and allows flexibility in scenario generation and keeping the economic and emissions potential live e.g. if the execution of an activity is delayed, the impact on the emissions targets can be immediately evaluated. This supports integration of emissions targets with operational and business decision processes.
- A hub/ asset will often have more than one emissions profile. As hub strategies and emission reduction projects are matured the associated emissions profiles can be reassessed and updated to ensure alignment, including consideration for budget and resources alongside other competing business needs.
- Opportunities that have been screened out, dismissed or parked can nevertheless remain visible within the hopper. They may feature in future evaluation exercises if and when internal and external factors change.
- The history of opportunity evaluation and screening can be maintained for continuity and to prevent re-work or loss.
- Encourage integration/collaboration of teams who look after the various emissions related activities, e.g. disclosure data, ERAP projects, OSPAR reports, financial disclosures, ESOS and business planning.

3.1.5 Refine and develop

- Appropriate to the emissions reduction opportunity, the reduction potential, scope, cost, and schedule can be continually matured through proportionate evaluation, engineering studies and company-specific project management stage gate criteria to support progression through to the execution phase.
- Continuous improvement is a well-established process and can be applied to emissions reduction as part of existing business practices.

3.1.6 Delivery

Good practice would be to share and effectively communicate the pathway in the organisation to achieve committed emissions reduction targets. Any changes to the delivery plan will need to be suitably evaluated to reflect the resulting impact on emissions delivery (e.g. if a scope of work were to be deferred from a scheduled TAR for example, the effect on emissions targets could be considered) alongside other business drivers and the impact on the emissions reduction targets suitably weighted. Good practice would be to have the targets embedded in the company/ asset reporting targets, rather than elsewhere.

3.1.7 Validation

Demonstrating delivery of the ERAP is a key mechanism for implementing positive reinforcement and is a useful metric for operators and their emissions reduction achievements. Actions may include:

- Retain a record of opportunities which have been not selected to progress forward, and why. Retain parked opportunities which may be revisited in the future.
- Recognise the benefit on completion, where proportionate to the magnitude of the emissions reduction, quantifying the actual emissions reduction post-delivery.
- Where appropriate communicate valid findings, share positive learnings and note any opportunities for improvement. This is particularly useful when the intended outcome differs from the actual.
- Where appropriate reforecast and consider whether to reassess other opportunities.

4 Emissions planning and performance management

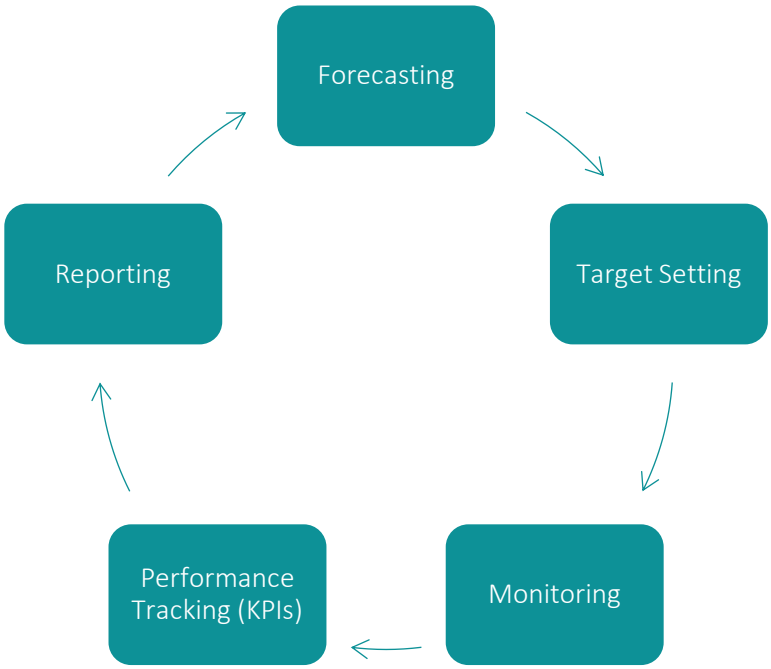
Careful performance management provides the correct technical analysis, strategic alignment and active management as described in Figure 1 and complements the emission planning process. The emissions performance cycle shown below can be applied to emissions planning and performance management alike.

An accurate emissions forecast allows for the future emission profile of the asset to be understood, through mapping the sources of emissions and the levers that drive change in the emissions profile, from subsurface through to topsides and hydrocarbon export systems. Combining the possible emissions reduction activities with the forecast allows target setting for a range of scenarios.

Target setting for absolute emissions and emissions intensity is most effective when constructed from the bottom up, working from an emission forecast and credible emissions reduction projects to establish achievable ambitions.

Key performance indicators can be selected to track performance against targets and ambitions. Operators can intervene if performance deviates from the plan before reduction targets are missed. The cycle is closed by reporting and feeding the status of emissions performance and emissions reduction activities back into the forecast to improve future accuracy and identify any gaps (*see Figure 3*).

Figure 3: Emissions performance cycle



4.1 Forecasting

Integrating emissions forecasting and production forecasting into the business planning cycle shows the effect that future production scenarios will have on emissions and emissions intensity. It is

recommended that the data used to prioritise emissions reduction projects be as rigorous and standardised as those used in production forecasting. Trends in the data allow stakeholders to visualise the interactions and communicate the impacts.

Starting with a clear basis and a statement of the assumptions underpinning the forecasts, such as production fluctuations and discrete emission reduction projects, the profile can be used to set realistic targets and reporting over the lifetime of the project. Linking the emissions forecast to the production forecast highlights the impact that field development work will have on emissions.

Emissions forecasts generated can then be used to feed the annual UKSS/ GHG section submission which when aggregated across the UKCS forms the basis of the annual *Emissions Monitoring Report*, published by the NSTA. This in turn enables alignment between internal performance tracking and reporting, and industry performance.

4.2 Target setting

Production forecasting and performance targets are well established in the industry. Emissions forecasting and performance targets can be equally embedded within both the organisation and the asset and can be considered alongside production.

While UK national, industry sector and corporate emissions targets are beneficial, successful emissions management also requires local, asset-specific targets and commitments. These can be developed considering both the wider context and the realities of the asset circumstances. Asset specific emission targets/ emission target profiles can be based on forecasts and associated with specific emissions reduction activities. They can also include targets for both absolute emissions and emissions intensity. This includes an understanding of emissions targets in short-, medium- and long-term timeframes. The targets can be incorporated into asset and company performance reporting, be endorsed by senior management and their performance measured against the targets for the purposes of remuneration.

Wider factors to consider when setting asset-specific targets:

- UK government targets
- Regulatory targets and indices
- Industry targets

To align with absolute emissions and emissions intensity targets, monitoring key performance indicators enables progress to be tracked and facilitates intervention, where necessary.

4.3 Monitoring

Effectively managing emissions is only possible if there is a way of identifying opportunities and monitoring material changes. Robust quantification is often desirable but it may also be impractical. A qualitative approach might be better where the objective is to identify emissions and find opportunities to reduce them.

Regularly reviewing emissions and identifying areas for improvement are important as technology improves. Regulatory requirements (principally EEMS and UK ETS) are in place for the quantification and

reporting of emissions but asset teams can benefit from a deep understanding of how the emissions are measured and also the impact of any changes made.

Alongside the measurement and monitoring of resultant emissions, it is also important to regularly appraise the energy efficiency of key plant and equipment items, including gas turbines/ power generators.

Measuring emissions reductions against planned targets in parallel with a specific activity also helps to inform the business performance cycle.

4.4 Performance tracking and reporting

Asset/ hub performance reporting can include appropriate emissions figures alongside the basket of health, safety and environmental, production, and cost performance indices over a range of timeframes, ranging from daily to annual. They can be split into lagging and leading KPIs, the former being look-back results and the latter being prospective. These indices can be developed and monitored in the appropriate core business reporting cycle, routine asset management forums and offshore/ onshore operations support meetings and shared internally.

Examples of lagging KPIs could include:

- Absolute GHG emissions
- Emissions intensity trends
- Power and/ or fuel consumption trends
- Spinning reserve/ recycle (which can provide a more relatable view on wasted energy)
- Routine flaring trends/ levels

Examples of leading KPIs could include:

- Programme/ project milestones including stage gate review status
- Delivery timescales and schedule/ quality
- Actual results consistent with planned/ expected outcomes

It is recommended that performance reviews by asset management be conducted regularly, considering performance against peers and appropriate benchmarks for the asset based on past best performance and targets derived from current forecasts.

5 References

Emissions management and reduction is a growing topic – and there are many aspects of regulatory reporting and engagement that have requirements in this area. A robust core foundation will position the operator for successful delivery and positive performance against each of these requirements.

Regulatory references

Regulatory requirement	Link
OGA Strategy	https://www.nstauthority.co.uk/regulatory-information/regulatory-framework/the-oga-strategy/
OGA Plan	https://www.nstauthority.co.uk/regulatory-information/regulatory-framework/the-oga-strategy/oga-plan-emissions-reduction/
OGA Stewardship Expectation 1, JV Hub Strategy	https://www.nstauthority.co.uk/media/5895/oga_se1_joint_hub_strategy_july_2019.pdf
OGA Stewardship Expectation 11, Net Zero	https://www.nstauthority.co.uk/media/7184/se11_net-zero.pdf
Energy Savings Opportunity Scheme [Phase 3]	https://www.gov.uk/government/publications/comply-with-the-energy-savings-opportunity-scheme-esos/complying-with-the-energy-savings-opportunity-scheme-esos
OPRED Offshore Pollution, Prevention and Control regulations, regulation 7(3) and Guidance document 3.3.2	h2ttps://www.legislation.gov.uk/uksi/2013/971/regulation/7/made https://assets.publishing.service.gov.uk/media/64ddd3133fde6100134a53e5/Offshore_PPC_Guidance__v1_August_2023.pdf

Additional references

Source and publication	Website link
IOGP - Efficient Use of Energy in Oil & Gas Upstream Facilities, Report 669	IOGP publications library: https://www.iogp.org/bookstore/
IOGP - Flaring Management Guidance, Report 467	
IOGP - Guidelines for the Design & operation of Flare Gas Recovery systems, Report 647	
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IOGP - Recommended Practices for Electrification of Oil & Gas Facilities, Report 653	

Source and publication	Website link
IOGP - Recommended Practices for methane emissions detection & quantification technologies, Report 661	
NSTA - *Emissions Monitoring Report* published annually.	News and publications:
NSTA - *Emissions Monitoring Dashboard*, up-dated annually.	https://www.nstauthority.co.uk/news-publications/?selectedCategories=59bc7558-2d10-46c9-81f6-e3ca24e60f72
NSTA - *Technology Insights* Review, summary published annually.	
OEUK Methane Action Plan guideline	https://oeuk.org.uk/publications-resources/
ASTF Joint Venture Hub Strategy Good Practice Template	https://oeuk.org.uk/product/astf-joint-venture-hub-strategy-industry-good-practice-template/

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